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	GSB 8/2020	Qualicoat Class 1	Qualicoat Class 2	Qualicoat Class 3	FGIA AAMA 2603-21	FGIA AAMA 2604-21	FGIA AAMA 2605-20
Coating Material	Powder Coating	Organic Coatings	Organic Coatings	Organic Coatings	Pigmented Organic Coatings	High Performance Organic Coatings	Superior Performing Coatings
Color	Flo 1: RAL 3016, 8014, 9001 + metallic 9006 or 9007 Flo 3,5, 10: RAL 3009, 5003, 9001 + metallics 9006 or 9007	3 Colors selected by committee	3 Colors selected by committee	3 Colors selected by committee	Consistent with established color range	Consistent with established color	Consistent with established color
Substrate	Al Mg 1(B) mill finish 70 x 140 x 0.8 mm	Al Mg 1 AA 5005 H24/H14 0.8 – 1mm	Al Mg 1 AA 5005 H24/H14 0.8 – 1mm	Al Mg 1 AA 5005 H24/H14 0.8 – 1mm	Al 76 x 152 mm 3 x 6 inch	Al 75 x 150 mm 3 x 6 inch	Al 75 x 150 mm 3 x 6 inch
Metal Treatment	Approved chromium-free or chromium VI-free pre-treatment; Pre-anodizing; Chromating in accordance with EN 12487	ISO 10546 Yellow chromated Non chromes also allowed, subject to meeting spec	ISO 10546 Yellow chromated Non chromes also allowed, subject to meeting spec	ISO 10546 Yellow chromated Non chromes also allowed, subject to meeting spec	To comply with performance requirements	ASTM D 5723 Chromated (>323 mg/m², 30 mf/ft²) Alt chrome and/or non chrome conversion coating permitted. Weights as per suppliers recommendations	ASTM D 1730 Amorphous Chromium Phosphate Treatment (>430 mg/m²). Alt chrome and/or non chrome conversion coating permitted. Weights as per suppliers recommendations
Film Thickness	50 – 80 µm	Min. 60 µm for powder coatings ISO 2360	Min. 60 µm for powder coatings ISO 2360	Min. 50 µm for powder coatings ISO 2360	Min 0.8 mil (20 µm)	Min 1.2 mil (30µm)	Min 1.2 mil (30µm)
Gloss (60°)	2-15 GU ±5 GU;	ISO 2813 ± 5 at 0 -30%	/ISO 2813 ± 5 at 0 -30%	ISO 2813 ± 5 at 0 -30%	ASTM D 523/ 60° ± 5 units	ASTM D 523/ 60° ± 5 units	ASTM D 523/ 60° ± 5 units

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	16-60 GU ±10 GU; >60 ±15 GU	± 7 at 31 - 70% ± 10 at 71 – 100%	± 7 at 31 - 70% ± 10 at 71 – 100%	± 7 at 31 - 70% ± 10 at 71 – 100%			
Film Hardness	DIN 53153/ISO 2815 Min 80	ISO 2815 Min 80	ISO 2815 Min 80	ISO 2815 Min 80	ASTM D 3363 Pencil grade H No rupture of film	ASTM D 3363 Pencil grade H No rupture of film	ASTM D 3363 Pencil grade H No rupture of film
Film Adhesion	Min Gt-0	ISO 2409 6 parallel of 1 mm/min Gt-0 Scotch 610	ISO 2409 6 parallel of 1 mm/min Gt-0 Scotch 610	ISO 2409 6 parallel of 1 mm/min Gt-0 Scotch 610	ASTM D 3359 11 parallel of 1 mm Permacel 99 min Gt-0	ASTM D 3359 11 parallel of 1 mm Permacel 99 min No loss	ASTM D 3359 11 parallel of 1 mm Permacel 99 min No loss
Wet adhesion	N.A	N.A	N.A	N.A	24 hours at 38°C ASTM D 3359 11 parallel of 1 mm Permacel 99 min Gt-0	24 hours at 38°C ASTM D 3359 11 parallel of 1 mm Permacel 99 min Gt-0	24 hours at 38°C ASTM D 3359 11 parallel of 1 mm Permacel 99 min Gt-0
Boiling Water Adhesion	Boil test/pressure cooker test No blistering, cross cut & adhesion GT 0/GT 1	2h dist. H2O Or 1 h press. Cooker Test as per ISO 2409 no detachment or blistering	2h dist. H2O Or 1 h press. Cooker Test as per ISO 2409 no detachment or blistering	2h dist. H2O Or 1 h press. Cooker Test as per ISO 2409 no detachment or blistering	20 mins at 100°C ASTM D 3359 11 parallel of 1 mm Permacel 99 min Gt-0	20 mins at 100°C ASTM D 3359 11 parallel of 1 mm Permacel 99 min Gt-0	20 mins at 100°C ASTM D 3359 11 parallel of 1 mm Permacel 99 min Gt-0
Cupping Test (Erichsen pen.)	Min. 5 mm No cracking or removal of coating	ISO 1520 Min. 5 mm No signs of cracking or detachment	ISO 1520 Min. 5 mm No signs of detachment	ISO 1520 Min. 5 mm No signs of detachment	N.A	N.A	N.A
Bend Test	Mandrel ≥5 mm Flo 1: no cracking or	ISO 1519 5 or 8 mm Mandrel	ISO 1519 5 or 8 mm Mandrel	ISO 1519 5 or 8 mm Mandrel	N.A	N.A	N.A

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	signs of detachment Flo 3, 5, 10: No signs of detachment	No signs of cracking or detachment	No signs of detachment	No signs of detachment			
Impact Test (Reverse)	Min. 20 in/lb Flo 1: no cracking or detachment of coating Flo 3,5,10 no detachment of coating	ASTM D 2794 Min. 2.5 Nm = 22 in/lb No signs of cracking or detachment Class 1.5, tape pull adhesion test	ASTM D 2794 Min. 2.5 Nm = 22 in/lb No signs of detachment plus tape pull adhesion test	ASTM D 2794 Min. 2.5 Nm = 22 in/lb No signs of detachment plus tape pull adhesion test	ASTM D5420/DIRECT Deformation min. 3 mm No removal of coating	ASTM D5420 /DIRECT Deformation min. 3 mm No removal of coating	ASTM D 5420/DIRECT Deformation min. 3 mm No removal of coating
Scratch Resistance	N.A	150x150 mm panel conditioned at 23 ±2°C & 50 ±5% RH for ≥ 16 h, powder thickness 60 µm - 90 µm. Martindale test. Gloss retention smooth: 40% for smooth; 60% for structured coatings	150x150 mm panel conditioned at 23 ±2°C & 50 ±5% RH for ≥ 16 h, powder thickness 60 µm - 90 µm. Martindale test. Gloss retention smooth: 30% for smooth; 60% for structured coatings	150x150 mm panel conditioned at 23 ±2°C & 50 ±5% RH for > 16 h, powder thickness 60 µm - 90 µm. Martindale test. Gloss retention smooth: 30% for smooth; 60% for structured coatings	N.A	N.A	N.A
Abrasion Resistance	N.A	N.A	N.A	N.A	N.A	ASTM D968 Withstand 40L sand. If less than 40L abrasion coefficient calculated	ASTM D968 Withstand 80L sand. If less than 80L abrasion coefficient calculated

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Mortar Test	Flo 1: color change max. ΔL* 1, metallics max. key value 3; Flo 3,5,10: Color change max. ΔL* 1 metallics change max. key value 2	ASTM C 207 ASTM D 3260 24 h at 40°/95% No residue	ASTM C 207 ASTM D 3260 24 h at 40°/95% No residue	ASTM C 207 ASTM D 3260 24 h at 40°/95% No residue	ASTM C 207 24h at 38°/100% No change, no loss of adhesion	ASTM C 207 24h at 380°/100% No change, no loss of adhesion	ASTM C 207 24h at 380°/100% No change, no loss of adhesion
Muriatic Acid (HCL 37%)	N.A	N.A	N.A	N.A	10 Vol. % HCL (37%) 15 minutes, 20°C, under watch glass no blister, no change	10 Vol. % HCL (37%) 15 minutes, 18-27°C, under watch glass no blister, no change	10 Vol. % HCL (37%) 15 minutes, 18-27°C, under watch glass no blister, no change
Nitric Acid	N.A	N.A	N.A	N.A	N.A.	70% Nitric Acid 30 min No more than 5 Hunter Units color change	70% Nitric Acid 30 min No more than 5 Hunter Units color change
Detergent resistance	N.A	N.A	N.A	N.A	ASTM 2248 3 wt%, 72 h/38°C No loss of adhesion	ASTM 2248 3 wt%, 72 h/38°C No loss of adhesion	ASTM 2248 3 wt%, 72 h/38°C No loss of adhesion
Window Cleaner Resistance	N.A	N.A	N.A	N.A	N.A.	10 drops (37%) 24 hours under watch glass no blister, no change, dry adhesion test after 4 hours	10 drops (37%) 24 hours under watch glass no blister, no change, dry adhesion test after 4 hours
Humidity Resistance	1000 h/ 100%	ISO 6270-2 1000 h Max. 1 mm creepage at cross cut.	ISO 6270-2 1000 h Max. 1 mm creepage at	ISO 6270-2 2000 h Max. 1 mm creepage at	ASTM D 4585 1500 h/38°/100%	ASTM D 4585 3000 H/38°/100% Few/ No. blisters	ASTM D 4585 4000 H/38°/100% Few/ No. blisters

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	Maximum 1 mm creep, no blisters	no blisters (ISO4628-2)	cross cut. no blisters (ISO4628-2)	cross cut. no blisters (ISO4628-2)	Few/ No. blisters (No. 4 ASTM D 714)	(No. 4 ASTM D 714)	(No. 4 ASTM D 714)
Salt Spray Resistance	N.A	N.A	N.A	N.A	ASTM G85 1000 h Few No. 8 blisters No removal of film	ASTM G85 1500 h Few No. 8 blisters No removal of film	ASTM G85 2000 h Few No. 8 blisters No removal of film
Acetic salt spray	AASS1000 h no blistering, max. 1 mm creep	ISO 9227 1000 h/35° Max. 4 mm creep	ISO 9227 1000 h/35° Max. 4 mm creep	ISO 9227 2000 h/35° Max. 4 mm creep	N.A	N.A	N.A
Sulfuric test (Kesternich)		ISO 3231 0.2 S 24 cycl. Max. 1 mm creep. at cross cut no color change	ISO 3231 0.2 S 24 cycl. Max. 1 mm creep. at cross cut no color change	ISO 3231 0.2 S 24 cycl. Max. 1 mm creep. at cross cut no color change	N.A	N.A	N.A
Boiling water (permeability)	2 h boil test/pressure cooker test No blistering	2 h dist. H2O Or 1 h press. Cooker No blistering	2 h dist. H2O Or 1 h press. Cooker No blistering	2 h dist. H2O Or 1 h press. Cooker No blistering	N.A	N.A	N.A
Machu test (accelerated corrosion)	N.A	NaCl 50g/l CH_3COOH 10ml/L pH 3.2 H_2O_2 5ml/L 48 h/37° Max. 0.5 mm creep at crosscut	NaCl 50g/l CH_3COOH 10ml/L pH 3.2 H_2O_2 5ml/L 48 h/37° Max. 0.5 mm creep at crosscut	NaCl 50g/l CH_3COOH 10ml/L pH 3.2 H_2O_2 5ml/L 48 h/37° Max. 0.5 mm creep at crosscut	N.A	N.A	N.A
Solvent Test	N.A	XYLENE 30 sec.	XYLENE 30 sec.	XYLENE 30 sec.	N.A	N.A	N.A

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		Slight loss of gloss no percept. Change	Slight loss of gloss no percept. change	Slight loss of gloss no percept. change			
Sawing, milling, drilling	No spalling of coating	The coating must not crack or chip when sharp tools are used	The coating must not crack or chip when sharp tools are used	The coating must not crack or chip when sharp tools are used	N.A	N.A	N.A
Filiform Corrosion test	N.A	ISO 4623–2 150 x 170mm drip hydrochloric acid (37%, density 1.18 g/cm3) along scratches for 1 minute Within 10 cm each side of scratch: L ≤ 4 mm M ≤ 2 mm	ISO 4623–2 150 x 170mm drip hydrochloric acid (37%, density 1.18 g/cm3) along scratches for 1 minute Within 10 cm each side of scratch: L ≤ 4 mm M ≤ 2 mm	ISO 4623–2 150 x 170mm drip hydrochloric acid (37%, density 1.18 g/cm3) along scratches for 1 minute Within 10 cm each side of scratch: L ≤ 4 mm M ≤ 2 mm	N.A	N.A	N.A
Natural Weathering	Flo 1 Gloss ≥ 50% Color ISO 11664-4 Color ΔE = ±1 - 3 dependent on color Flo 3, 5 Gloss ≥ 50% Color ISO 11664-4	ISO 2810 Florida/1 year 5° south/April Washed DI water 24 h **Color** ΔE = 2 – 8 dependent on color **Gloss retention**: ≥ 50% (60°)	ISO 2810 Florida/3 year 5° south/April Washed DI water 24 h **Color**: ΔE = 2 – 6 dependent on color **Gloss retention:** ≥ 1st year: 75% 2nd year: 60% 3rd year: 50%	ISO 2810 Florida/10 year 45° south/April Washed DI water 24 h **Color**: After ≥3 yrs max. 50% of ΔE 3 – 5 dependent on color ≥10 years ΔE 3 – 5	Florida/1 year 45° south/wash A No checking, crazing or loss of adhesion. Slight chalking and fading	Florida/5 year 45° south/wash A Color change <5 Hunter Units ASTM D4214 Chalking ≥ No. 8 Gloss retention min 30% Erosion > 10% film loss	Florida/10 year 45° south/wash A Color change <5 Hunter Units ASTM D4214 Chalking ≥ No. 8 Gloss retention min 50% Erosion > 10% film loss

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	Color ΔE = ±1 - 4 dependent on color Flo 10 ≥ 80% (60) ≥ 50% (120) Color ISO 11664-4 Color ΔE = ±1 - 4 dependent on color			dependent on color **Gloss retention:** ≥ 3rd: 80% 7th year: 55% 10th year: 50%			
Accelerated Weathering	Flo 1: UV B (313 nm), 300 h **Gloss:** ≥50% (60°) Flo 3: UV B (313 nm) 600 h for Florida 3 Gloss: ≥ 50 % Flo 5 UV B (313 nm), 1000 h Gloss: ≥ 50 % Flo 10 N/A	ISO 16474-2 (CPS+) BP = 65° C, 18/102 1000h **Gloss retention:** ≥ 50% (60°) **Color:** ΔE = 2 – 6 dependent on color	ISO 11341 (CPS+) BP = 65° C, 18/102 1000h **Gloss retention:** ≥ 90% (60°) **Color:** ΔE = 2 – 6 dependent on color	Accelerated weathering is replaced by 3yr Florida exposure test**:** Gloss retention: at least 80% after 3 years Color: ≤ 50% ΔE = 3 – 5 dependent on color	N.A	N.A	N.A

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Modification/Addition Notes from the previous document

1) Completely updated GSB standards from March 1999 version to August 2020 version.
2) Updated numerous Qualicoat Class 1 standards.
3) Updated numerous Qualicoat Class 2 standards.
4) Added new Qualicoat Class 3 standards
5) Updated the AAMA 2603-98 standards to the FGIA AAMA 2603-21 standards.
6) Updated the AAMA 2604-98 standards to the FGIA AAMA 2604-21 standards.
7) Updated the AAMA 2605-98 standards to the FGIA AAMA 2605-20 standards.