

## Comparison of Architectural Specifications

	<b>GSB 3/99</b>	<b>Qualicoat Class 1</b>	<b>Qualicoat Class 2</b>	<b>AAMA 2603-98</b>	<b>AAMA 2604-98</b>	<b>AAMA 2605-98</b>
<b>Coating Material</b>	Powder Coating	Organic Coatings	Organic Coatings	Pigmented Organic Coating	High Performance Organic Coatings	Superior Performing Coatings
<b>Color</b>	RAL 3016, 8014, 9001	3 Colors selected by committee	3 Colors selected by committee	Consistent with established color range	Consistent with established color range	Consistent with established color range
<b>Substrate</b>	Al Mg 1 F13 mill finish 70 x 140 x 0.8 mm	Al Mg 1 AA 5005 H24/H14 70 x 140 x 0.8 – 1 mm	Al Mg 1 AA 5005 H24/H14 70 x 140 x 0.8 – 1 mm	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
<b>Metal Treatment</b>	DIN 50939 yellow chromated ( Cr6+ ) Non-chromes also allowed, subject to meeting spec	DIN 50939 yellow chromated Non-chromes also allowed, subject to meeting spec	DIN 50939 yellow chromated Non-chromes also allowed, subject to meeting spec	To comply with performance requirements.	ASTM D 5723 Chromated (>323 mg/m <sup>2</sup> , 30 mf/ft <sup>2</sup> ) Non-chromes also allowed, subject to meeting spec	ASTM D 1730 Amorphous Chromium Phosphate Treatment (>430 mg/m <sup>2</sup> ). Non-Chromes not permitted.
<b>Film Thickness</b>	50 – 80 µm ISO 2360	min. 60 µm for powder coatings ISO 2360	min. 60 µm for powder coatings ISO 2360	Min. 0.8 mil (20µm)	Min. 1.2 mil (30µm)	Min. 1.2 mil (30µm)
<b>Gloss (60°)</b>	DIN 67530/ISO 2813 ± 5 at < 40% ± 10 at < 40%	DIN 67530/ISO 2813 ± 5 at 0 – 30% ± 7 at 31 – 70% ± 10 at 71 – 100%	DIN 67530/ISO 2813 ± 5 at 0 – 30% ± 7 at 31 – 70% ± 10 at 71 – 100%	ASTM D 523/ 60° ± 5 units	ASTM D 523/ 60° ± 5 units	ASTM D 523/ 60° ± 5 units
<b>Film Hardness</b>	DIN 53153/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 F No rupture of film	ASTM D 3363 Pencil grade F No rupture of film
<b>Film Adhesion</b>	DIN 53151/ISO 2409 6 parallel of 1 mm 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	ASTM D 3359 11 parallel of 1mm Permaccel 99 min. Gt-0	ASTM D 3359 11 parallel of 1mm Permaccel 99 min. No loss	ASTM D 3359 11 parallel of 1mm Permaccel 99 min. No loss

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<b>Wet Adhesion</b>	N.A	N.A	N.A	24 hours at 38°C ASTM D 3359 11 parallel of 1mm Permaceal 99 min. Gt-0	24 hours at 38°C ASTM D 3359 11 parallel of 1mm Permaceal 99 min. Gt-0	24 hours at 38°C ASTM D 3359 11 parallel of 1mm Permaceal 99 min. Gt-0
<b>Boiling Water Adhesion</b>	N.A	N.A	N.A	20 mins at 100°C ASTM D 3359 11 parallel of 1mm Permaceal 99 min. Gt-0	20 mins at 100°C ASTM D 3359 11 parallel of 1mm Permaceal 99 min. Gt-0	20 mins at 100°C ASTM D 3359 11 parallel of 1mm Permaceal 99 min. Gt-0
<b>Cupping Test (Erichsen pen.)</b>	ISO 1520 min. 5 mm [min. 3 mm]	ISO 1520 min. 5 mm no signs of cracking or detachment	ISO 1520 Min. 5 mm No signs of detachment	N.A.	N.A.	N.A.
<b>Bend Test</b>	ISO 1519/DIN 53152 min. 5 mm [min. 12 mm]	ISO 1519 5 or 8 mm mandrel no signs of cracking or detachment	ISO 1520 5 or 8 mm mandrel No signs of detachment	N.A.	N.A.	N.A.
<b>Impact Test (Reverse)</b>	ASTM D 2794 (40 – 50 µm) min. 20 inlb [min. 10 inlb]	ASTM D 2794 min. 2.5 Nm = 22 in/lb no signs of cracking or detachment	ASTM D 2794 min. 2.5 Nm = 22 in/lb No signs of detachment	ASTM D 2794/direct Deformation min. 3 mm No removal of coating	ASTM D 2794/direct Deformation min. 3 mm No removal of coating	ASTM D 2794/direct Deformation min. 3 mm No removal of coating
<b>Scratch resistance.</b>	N.A.	N.A.	N.A.	N.A.		
<b>Abrasion Resistance</b>	N.A	N.A	N.A	N.A	ASTM D968 20 minimum	ASTM D968 40 minimum

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<b>Mortar-Test</b>	ASTM C 207 STM 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 40°/100% no change, no loss of adhesion	ASTM C 207 24h at 40°/100% no change, no loss of adhesion	ASTM C 207 24h at 40°/100% no change, no loss of adhesion
<b>Muriatic acid (HCL 37%)</b>	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, 20°C, under watch-glass no blister, no change	10 Vol. % HCL (37%) 15 minutes, 20°C, under watch-glass no blister, no change
<b>Nitric acid</b>	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
<b>Detergent resistance</b>	N.A.	N.A.	N.A.	3 wt%, 72 h/38°C no loss of adhesion	3 wt%, 72 h/38°C no loss of adhesion	3 wt%, 72 h/38°C no loss of adhesion
<b>Window cleaner resistance</b>	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
<b>Humidity resistance</b>	DIN 50017 KK / ISO 6270 1000 h/40°/100% maximum 1 mm creep, no blisters	DIN 50017 KK 1000 h/40°/100% max. 1 mm creepage at cross cut, no blisters	DIN 50017 KK 1000 h/40°/100% max. 1 mm creepage at cross cut, no blisters	ASTM D 4585 1500 h/38°/100% Few /No. blisters (No. 4 ASTM D- 714)	ASTM D 4585 3000 h/38°/100% Few /No. blisters (No. 4 ASTM D- 714)	ASTM D 4585 4000 h/38°/100% Few /No. blisters (No. 4 ASTM D- 714)
<b>Salt spray resistance</b>		N.A.	N.A.	ASTM B 117 1500 h/5% Na. Cl few No. 8 blisters No removal of film	ASTM B 117 3000 h/5% Na. Cl few No. 8 blisters No removal of film	ASTM B 117 3000 h/5% Na. Cl few No. 8 blisters No removal of film



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<b>Window cleaner</b>	N.A.	N.A.	N.A.	N.A.	10 drops 24 hours at 20C No blistering or change in appearance. No removal of film	10 drops 24 hours at 20C No blistering or change in appearance. No removal of film
<b>Natural weathering</b>	Florida/1 year 5° south method B washed <b>colour:</b> ISO 7724/3 DIN 6174 $\Delta L = 1 - 7$ <b>gloss retention:</b> > 50% (60°)	Florida/1 year 5° South/April method B washed <b>colour:</b> DIN 5033 DIN 6174 $\Delta E = 2 - 6$ dependant on color <b>gloss retention:</b> $\geq$ 50% (60°)	Florida/3 year 5° South/April method B washed <b>colour:</b> DIN 5033 DIN 6174 $\Delta E = 2 - 6$ dependant on color <b>gloss retention:</b> $\geq$ 1 <sup>st</sup> year: 90% 2 <sup>nd</sup> year: 75% 3 <sup>rd</sup> year: 50%	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
<b>Artificial weathering</b>	ASTM G 53- 88/DIN 53 384 QUV-B 313 (0.67 W/m <sup>2</sup> ) 4 h UV at 50°C 4 h cond. at 40°C 200 h <b>gloss</b> : $\geq$ 50% (60°) <b>color:</b> DIN 54004 (min.7)	ISO 11341 (CPS+) BP = 65°C, 18/102 1000 h <b>gloss retention:</b> $\geq$ 50% (60°) <b>colour:</b> ISO 7724/3  $\Delta E = 2 - 6$ dependant on color	ISO 11341 (CPS+) BP = 65°C, 18/102 1000 h <b>gloss retention:</b> $\geq$ 90% (60°) <b>colour:</b> ISO 7724/3  $\Delta E = 2 - 6$ dependant on color	ASTM D 822 Atlas WOM (XW) BP = 65°C, 18/102 1000 h only slight gloss and colour change plus slight water staining	N.A	N.A.