



ALBERDINGK BOLEY

A Unique Acrylic with Multi-purpose Use for Coatings

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Alberdingk Boley Inc.**





Plastics

Metal

Wood and
wood
composites

**Markets for
Waterborne
Acrylics**

Leather
Processing

Masonry

Construction





Benefits

Excellent exterior durability

Versatile, custom compositions

Economical

Excellent chemical resistance

Compatibility with other WB binders

Eco-friendly





Market Trends/Drivers

- Environmental regulations:
 - Reduction in VOCs (Volatile Organic Compounds)
 - Concern for Hazardous Air Pollutants (HAPs)
 - PFAS hazardous classification
- New rules and strict regulations by government agencies (EPA, European Commission...)
 - Eco-product Certification Scheme
 - Ecolabels
- Consolidation of raw material inventory
- Demand for high end products with low VOC capability



Technical Targets for Multipurpose Acrylic



Low to zero VOC capability >>> low MFFT

Hydrophobicity with excellent water resistance

High blocking resistance (Early & elevated temperatures)

Excellent chemical, hand fat and lotion resistance

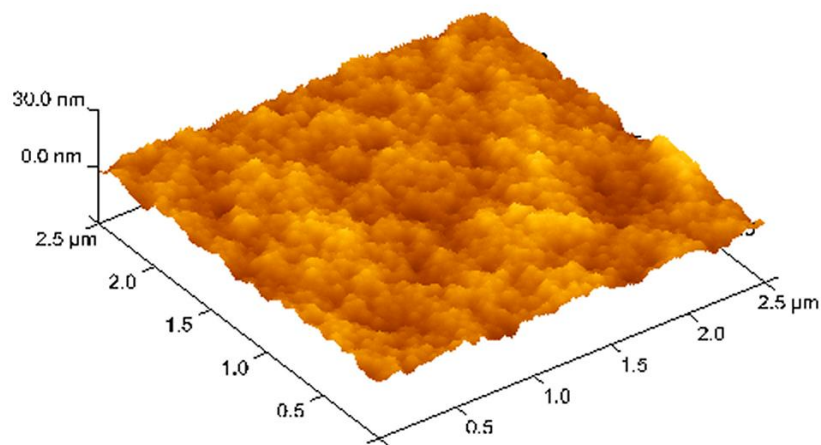
Formulation latitude and good compatibility



Morphology Design

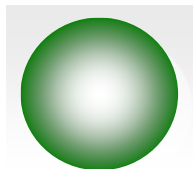
Comparison single- vs. multi-phase (height mode)

„smooth film“
roughness < 10 nm

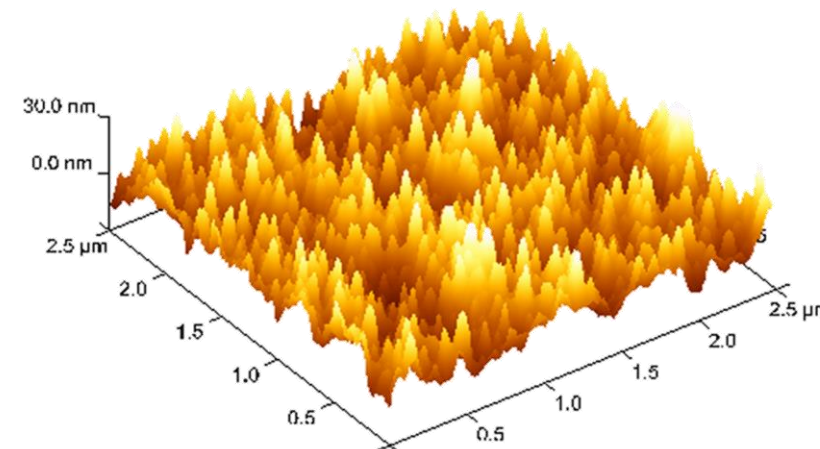


Dispersion: single phase, homogenous, soft
Properties:

- Very high gloss
- Very tacky

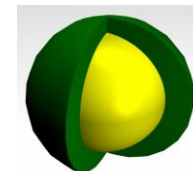


„rough film“
roughness approx. 50 nm



Dispersion: 2-phase, hard/soft
Properties:

- Reasonable gloss
- Tack free, high blocking resistance
- No restricted additives
- Low surfactant





Technical Data – AB Acrylic

Solids content [%]	47 – 49
Viscosity [mPas]	100 – 1000
pH-value	7.5 – 9.0
MFFT [°C]	approx. 0
Morphology	multi-phase
Polymer type	self-crosslinking acrylic
VOC capability	Near-zero to low VOC

Interior White Gloss Study





Binder Typical Properties

Property	AB Acrylic	Competitor 1	Competitor 2	Competitor 3
Solids [%]	49	48	49	50
MFFT [°C]	0	21	18	9
pH-value	7.5 - 9.0	8.5 - 9.0	8.5 - 9.0	8.5 - 9.0
Morphology	Multi-phase	Single-phase	Multi-phase	Multi-phase
Self-crosslinking	Yes	Yes	Yes	Yes



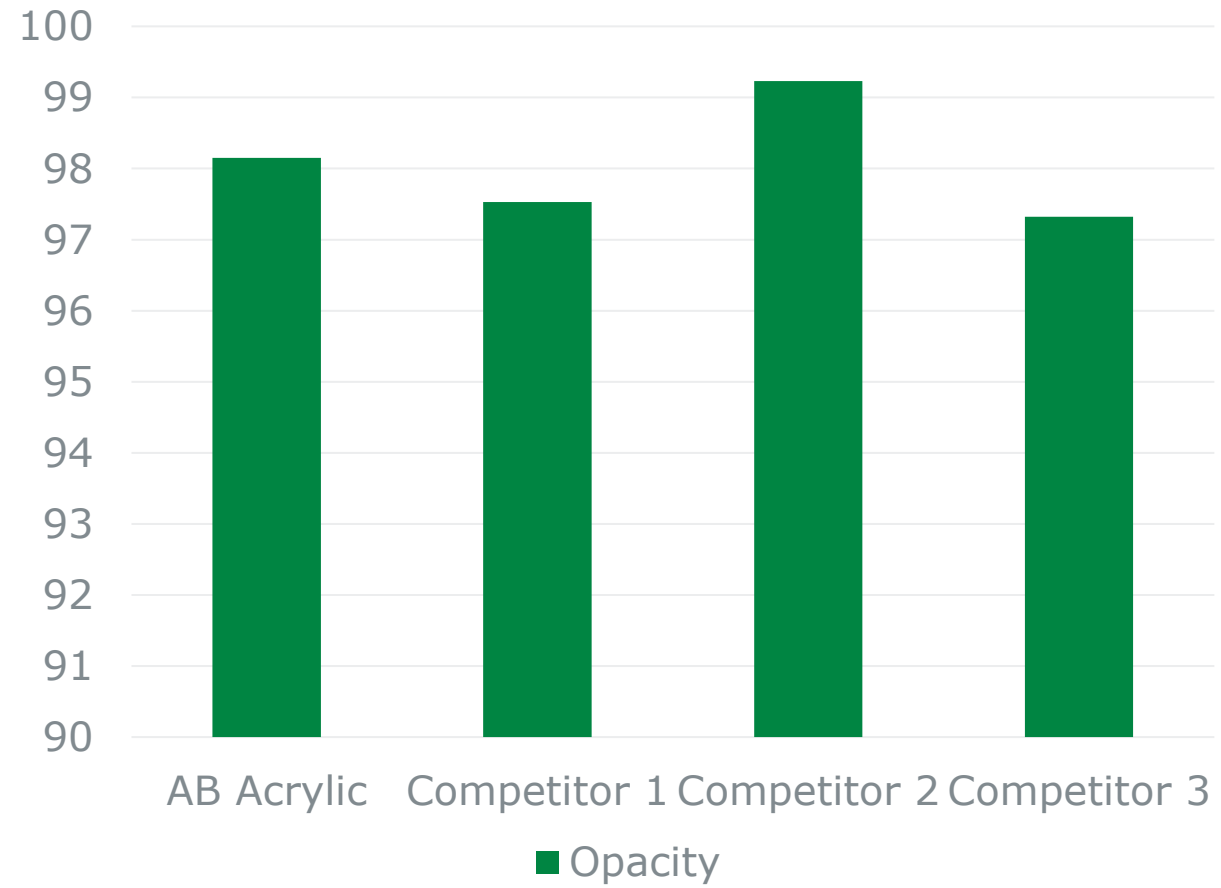
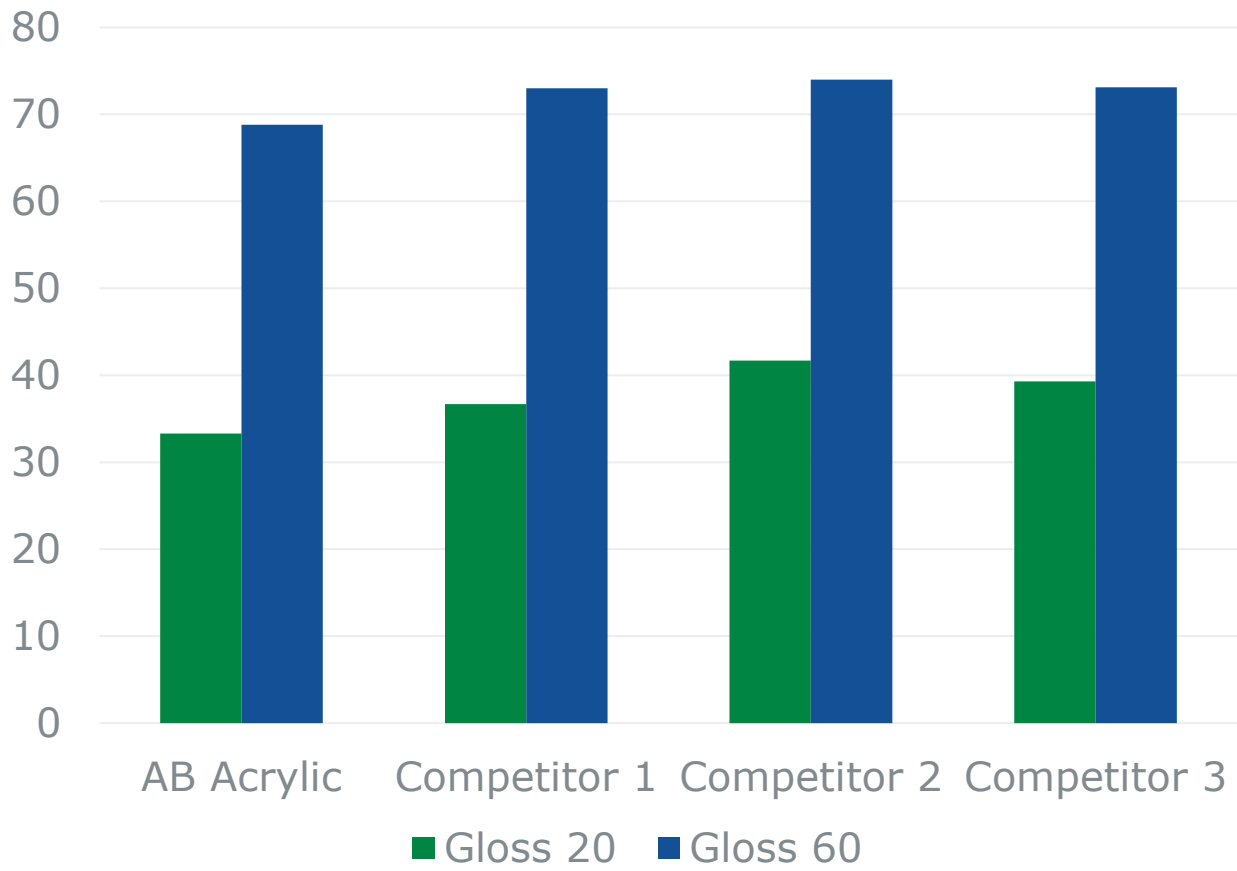
Formulation FPUS-2316-03 High gloss enamel Zero VOC

Ingredients	Lbs	Gal
Water	75.00	8.99
DISPERBYK-2081	5.00	0.54
Rhodaline WA 100	2.25	0.27
AMP 95	2.25	0.27
BYK-024	2.00	0.24
Ti Pure R-706	225.00	6.76
<i>Let Down</i>		
AB Acrylic	575.00	65.62
Water	100.00	11.98
Tergitol TMN-6	6.00	0.72
Optifilm Enhancer 400	20.00	2.48
Acrysol RM 8W	5.00	0.57
RM 5000	15.00	1.73
Total	1032.49	100.17

Technical data	
Specific Gravity (SG)	1.235
Lb / Gal	10.31
% Weight Solids	52.21
% Volume Solids	40.85
PVC	18.20
% dispersant on Pigments	1
Grams VOC/liter less water	0.17
Lbs VOC/Gallon Less Water	0
Total Pounds	1032.49
Total Gallons	100.17

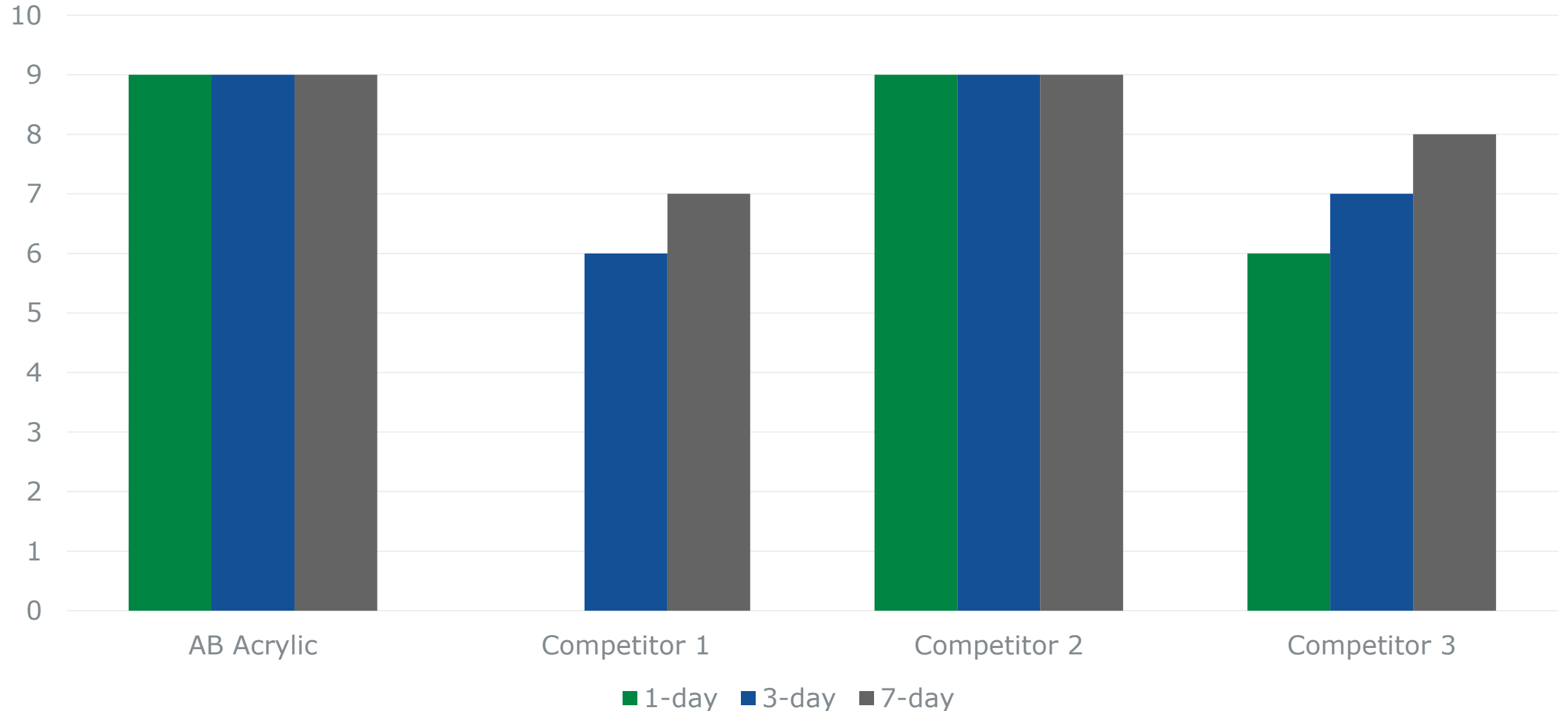


Gloss Development





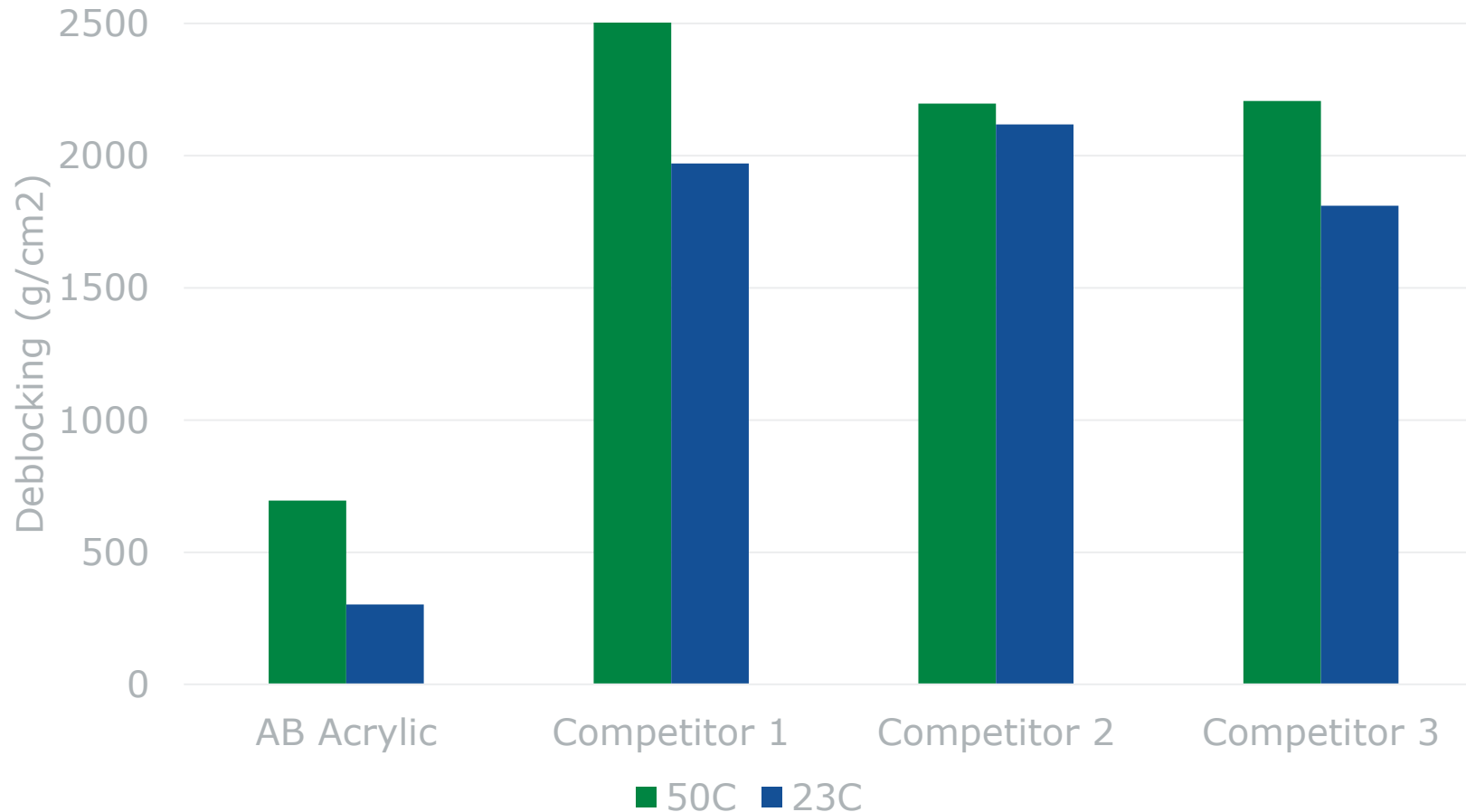
Elevated Block Resistance 50 °C (ASTM D 4946)





Hot block: 30 min/1000g/50°C & RT block: 1 day/500g/23°C

>2500



The blocking strength property is defined by the force required to separate the film surfaces after compression.



MPI Stain Resistance

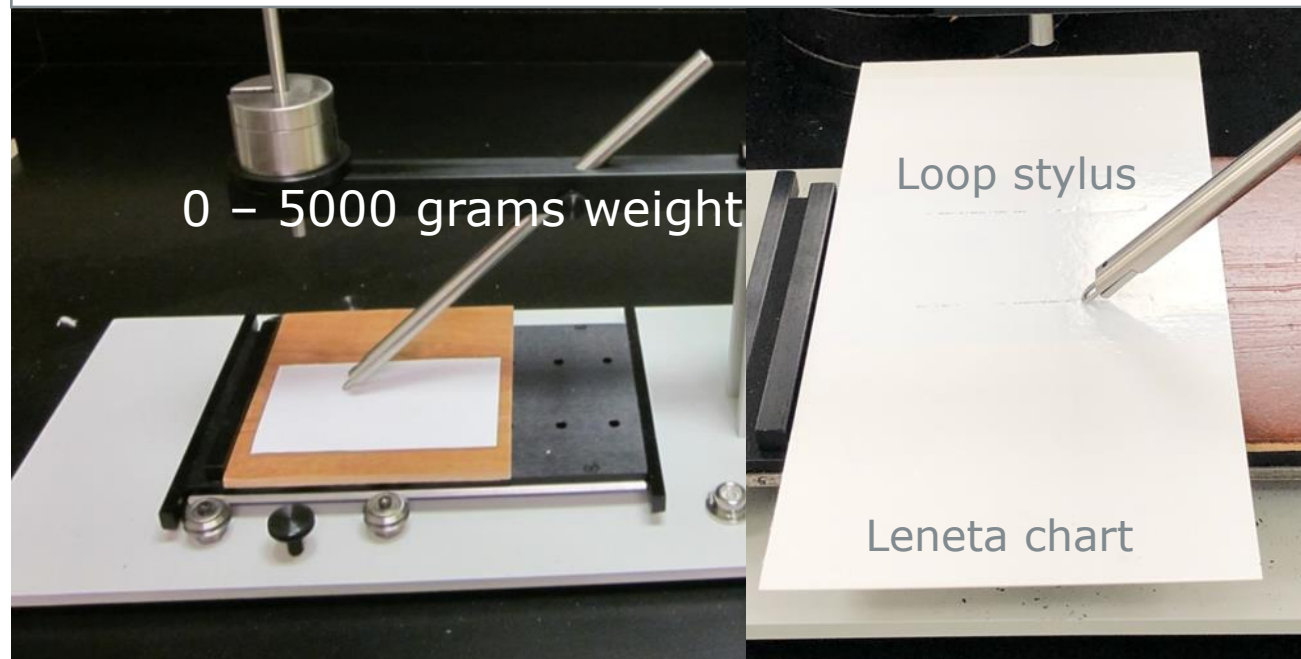
Stain Resistance, DE of cleaned area vs. none stained area	AB Acrylic	Competitor 1	Competitor 2	Competitor 3
Mustard	1.64	0.97	0.81	1.4
Ketchup	0.47	0.29	0.1	0.39
Red Wine	0.86	0.92	1.73	1.52
Coffee	3.10	1.48	3.36	3.76
Nigrosine	0.23	0.28	0.39	0.42
Graphite	0.36	0.63	0.11	0.35
Sum	6.66	4.57	6.50	7.84
MPI current stains sum	3.69	2.39	3.86	4.53

Resistance to Household Cleaning Liquids

- Bleach (dilute)
- Formula 409
- Clorox Wipes
- Fantastik
- Lysol
- Pinesol
- Germ X Hand Sanitizer
- TSP
(tri-sodium phosphate)
- Windex
- Murphy's Oil Soap
- Vinegar

Test Parameters

Film dry time	7 days
Cleaner exposure time	30 min.
Film thickness	3 mil (wet)
Recovery time	5 – 30 min.

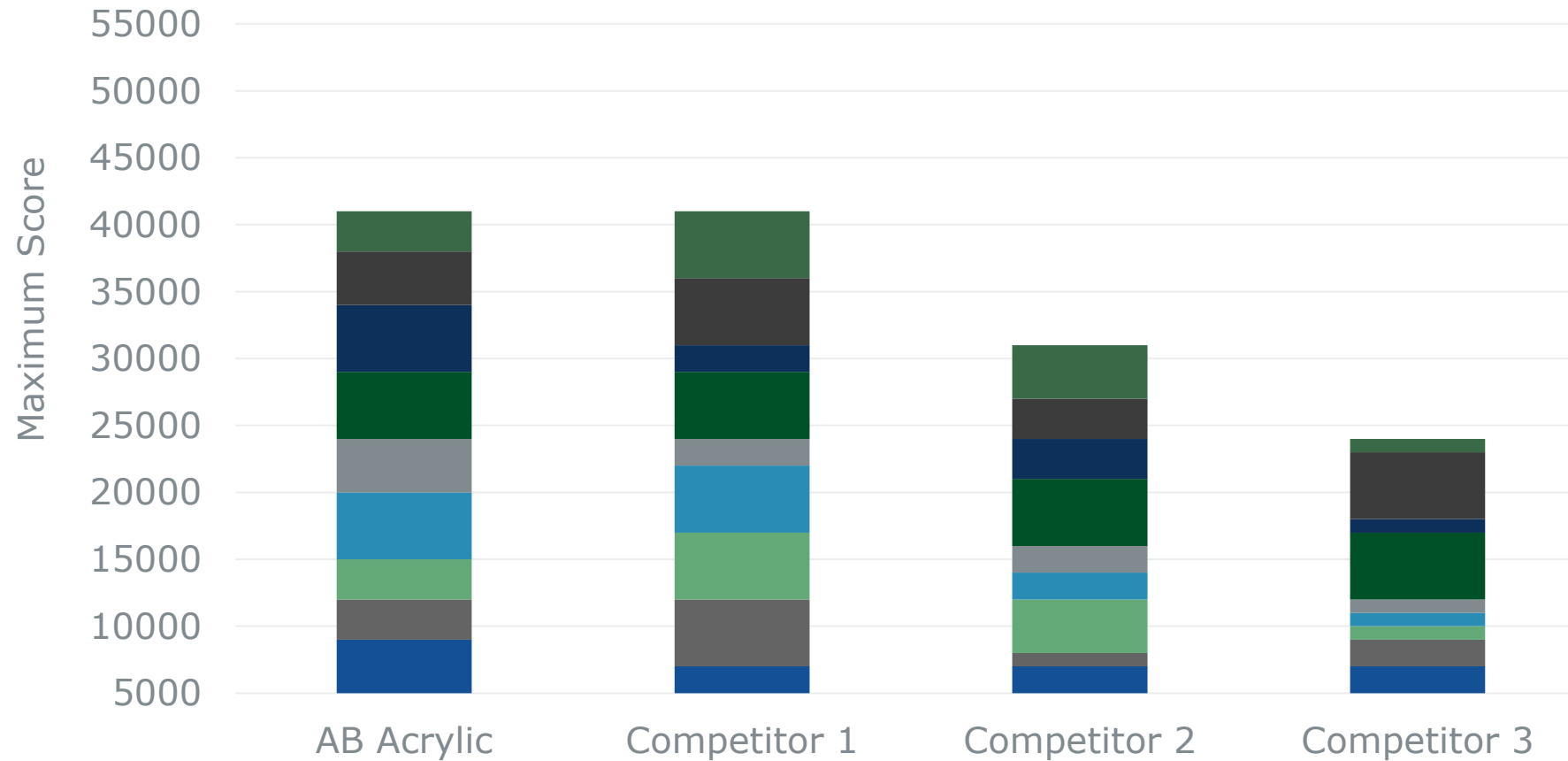


**Adapted from EPS developed test method: Institutional and Household Chemical/Cleaner Resistance*

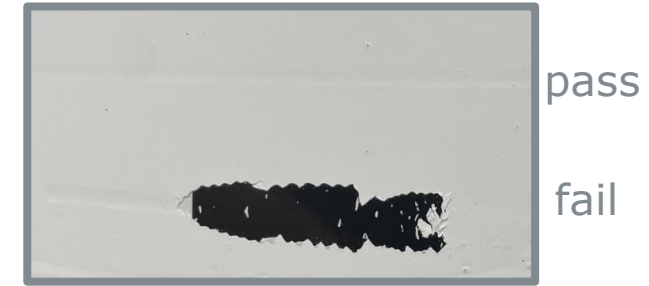
BYK Balanced Beam Scrape Adhesion and Mar Tester



Recovery time (5 min)



Rating based on no film failure at applied weight



- Lysol
- Windex
- Pinesol
- TSP
- Bleach (dil)
- 409
- Germ X hand sanitizer
- Vinegar
- Fantastik
- Murphy's oil soap



Oil Softening Resistance

Oils/lotions applied 16h, removed and dirt slurry application overnight; pictures show after panels rinsed

Eucerin
Lubri-
derm
Lanolin
Motor-
Oil
Mineral
Vegetable
Oil
Olive Oil



AB Acrylic

Competitor 1

Competitor 2

Competitor 3



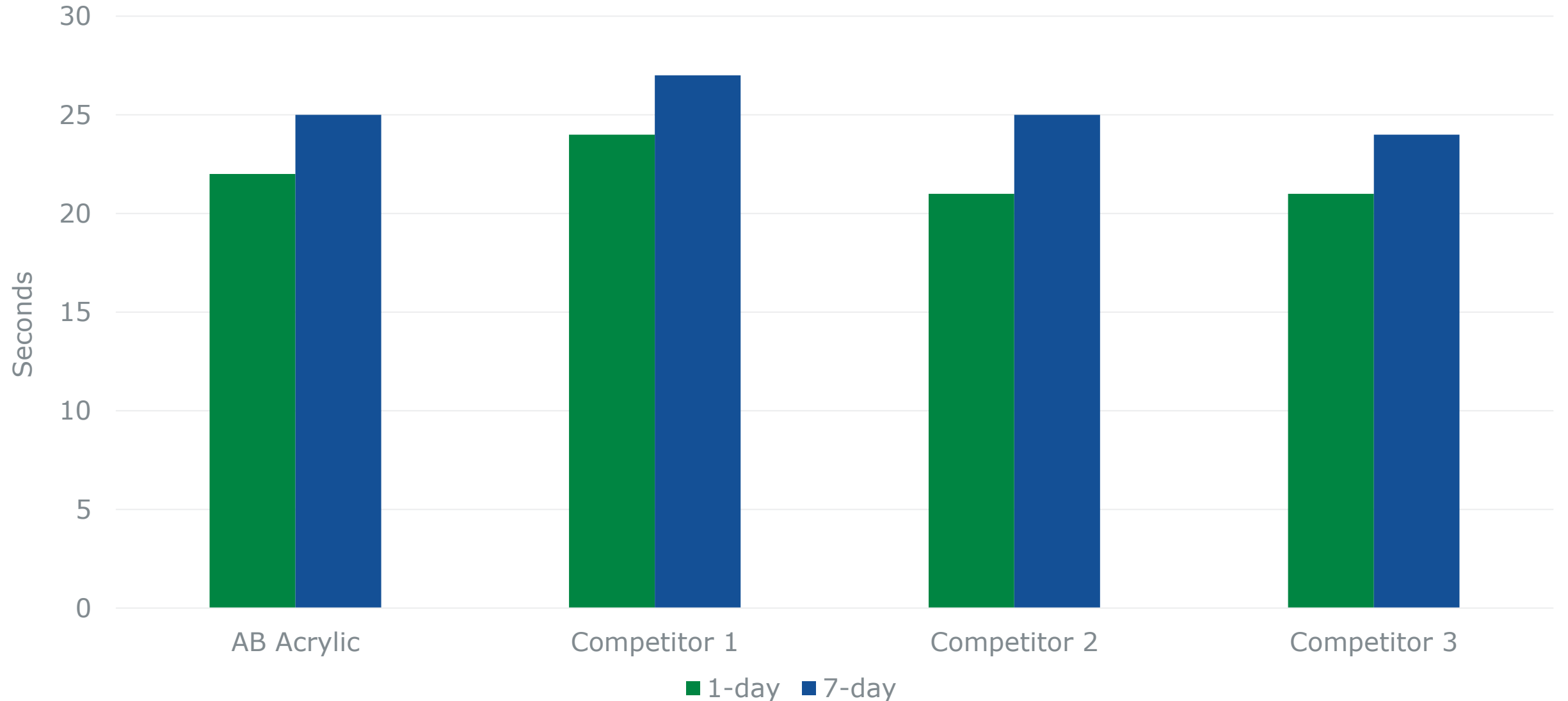
Formulation FPUS-2316-02 Gloss neutral base Zero VOC

Ingredients	Lbs	Gal
AB Acrylic	675.00	77.03
BYK-1724	5.00	0.59
BYK-024	3.00	0.36
BYK-349	4.00	0.46
Optifilm Enhancer 400	20.00	2.48
Water	144.00	17.25
Rheolate CVS 15	2.75	0.31
Coapur 3020	13.00	1.51
Total	866.75	100

Technical data	
Specific Gravity (SG)	1.039
Lb / Gal	8.67
% Weight Solids	41.46
% Volume Solids	38.59
Grams VOC/liter less water	0.27
Lbs VOC/Gallon Less Water	0
Total Pounds	866.75
Total Gallons	100



Koenig Pendulum Hardness - Clear Base no tint

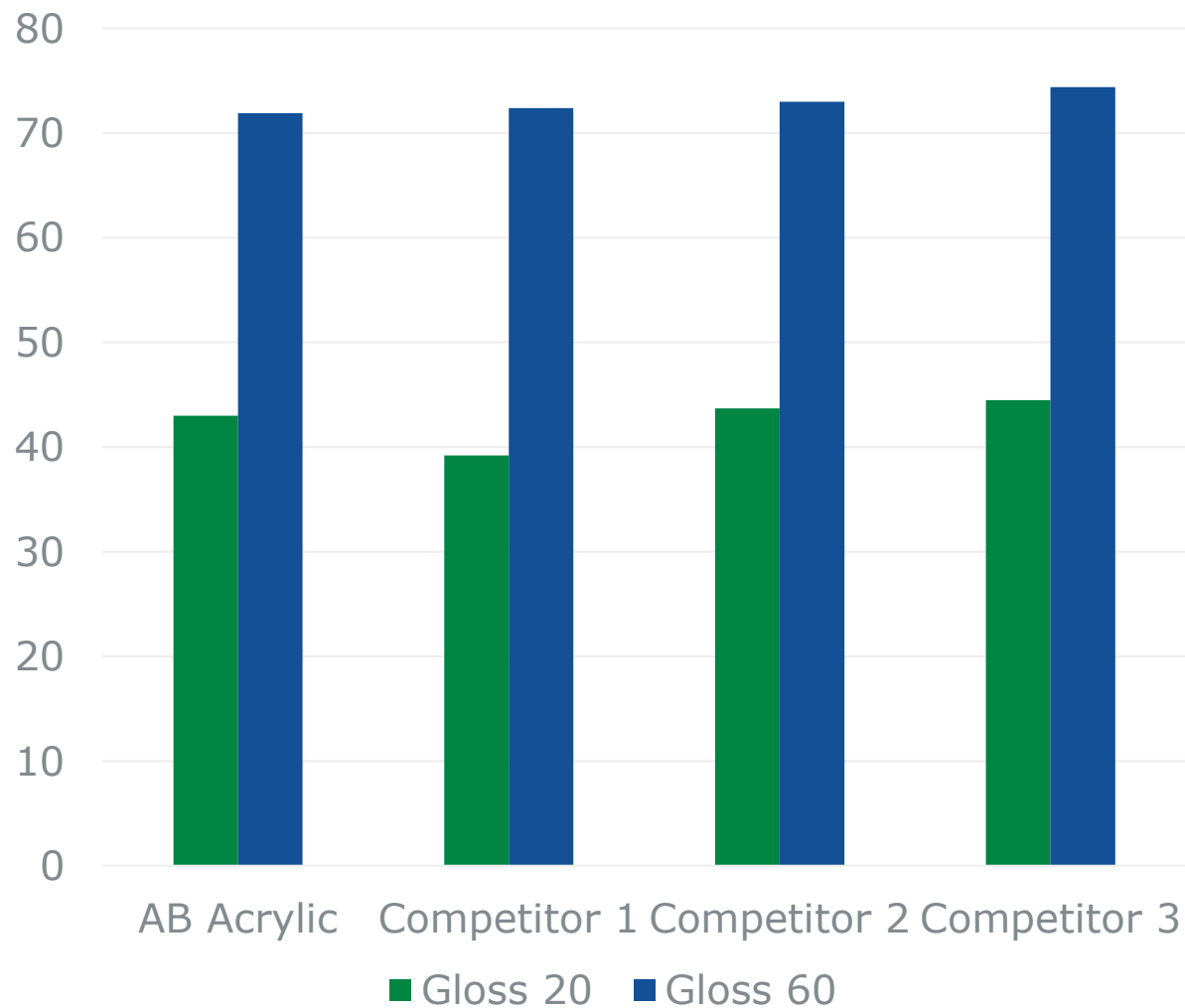




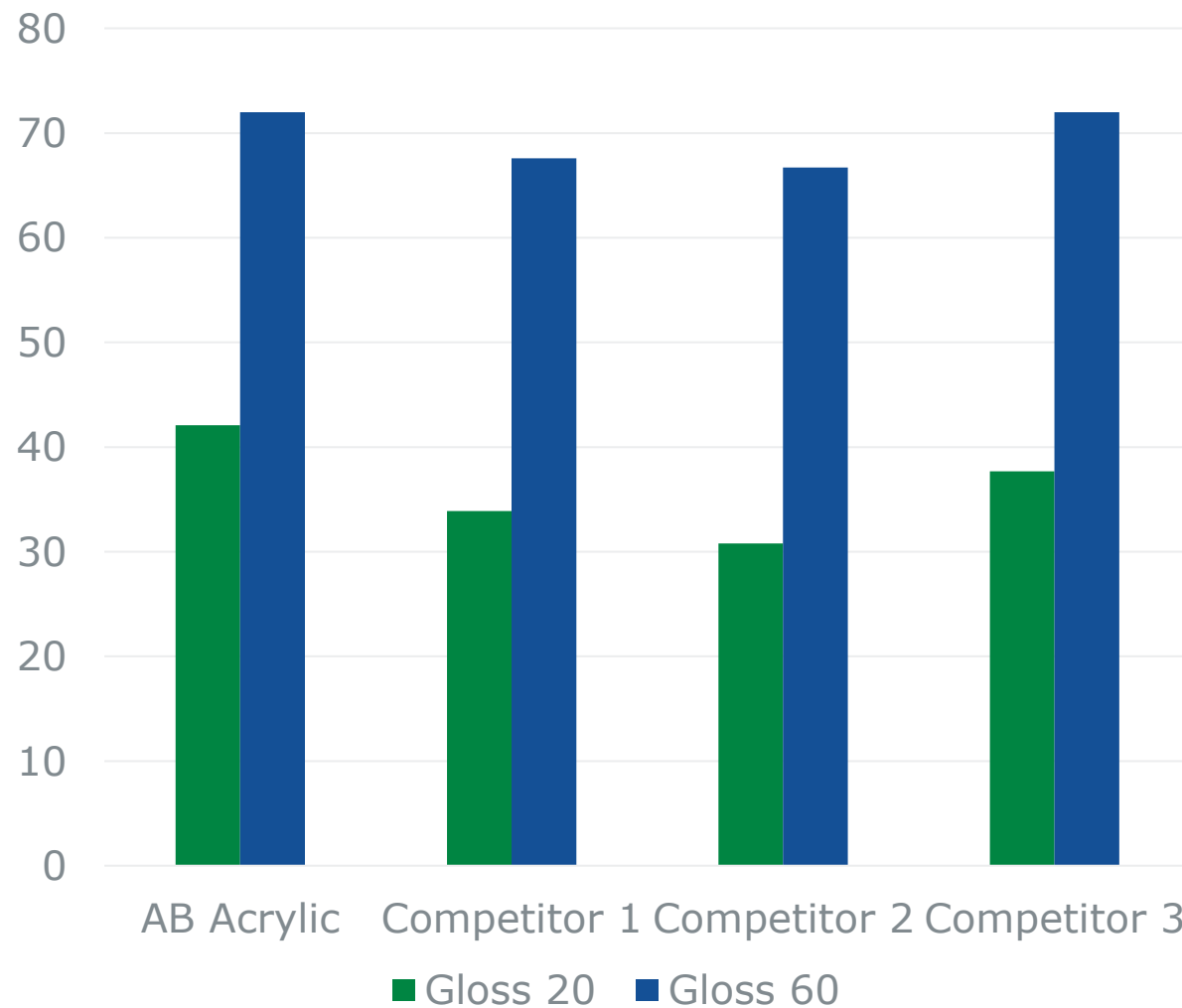
Gloss Development

High Gloss Neutral tinted with 10% Colortrend 808

Lamp Black



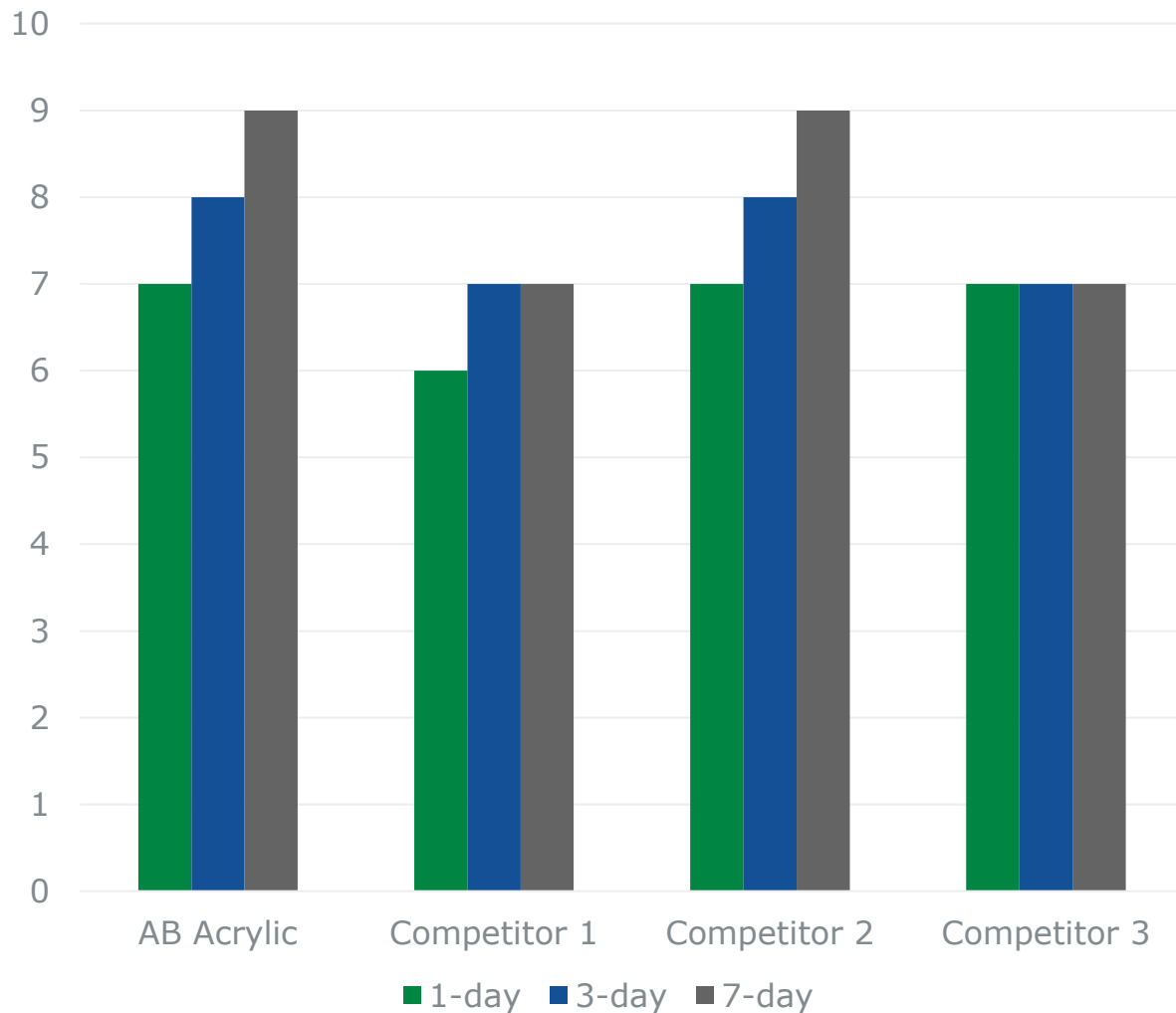
phthaloblue



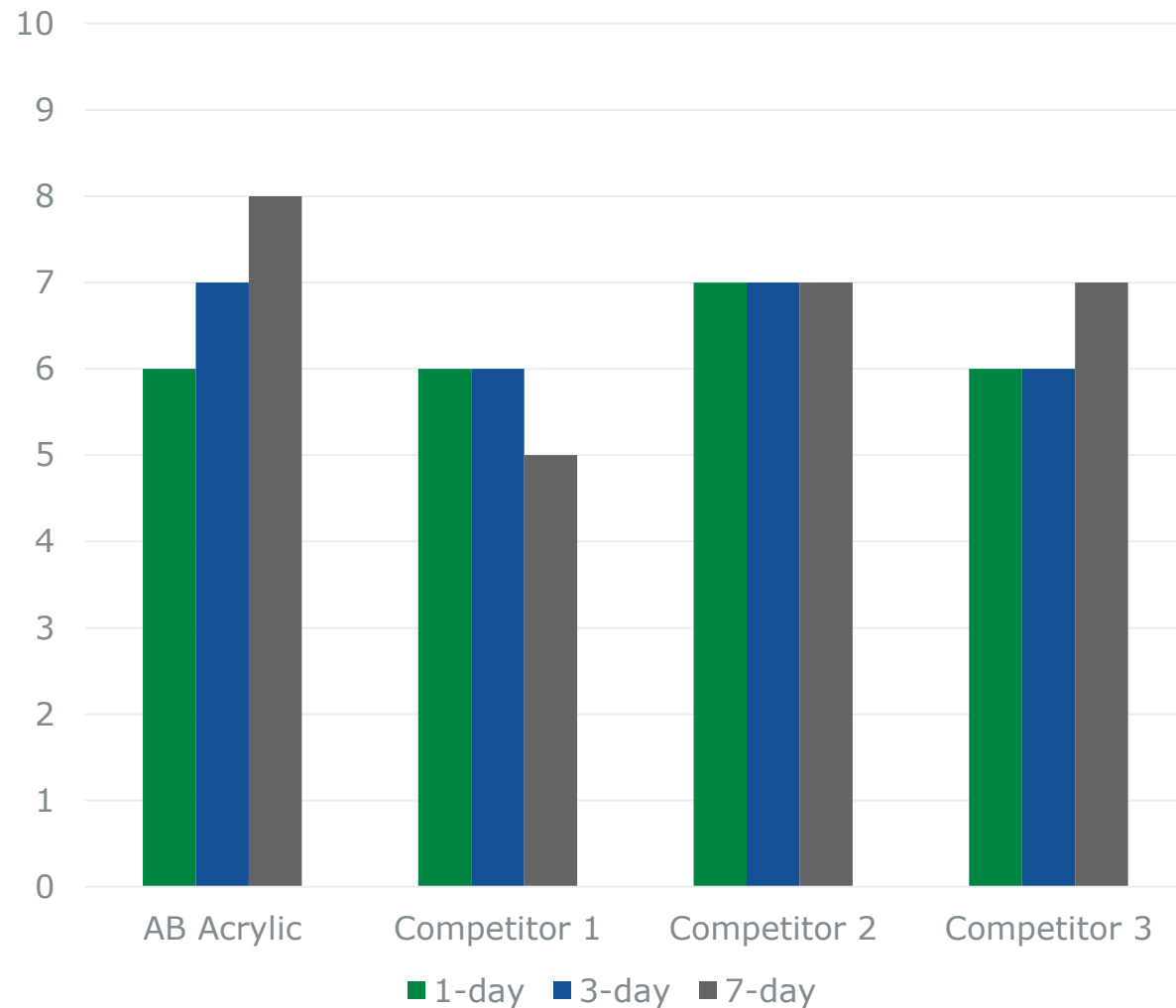


Block Resistance Room Temp High Gloss Neutral tinted with 10% Colortrend 808

Lamp Black



phthaloblue

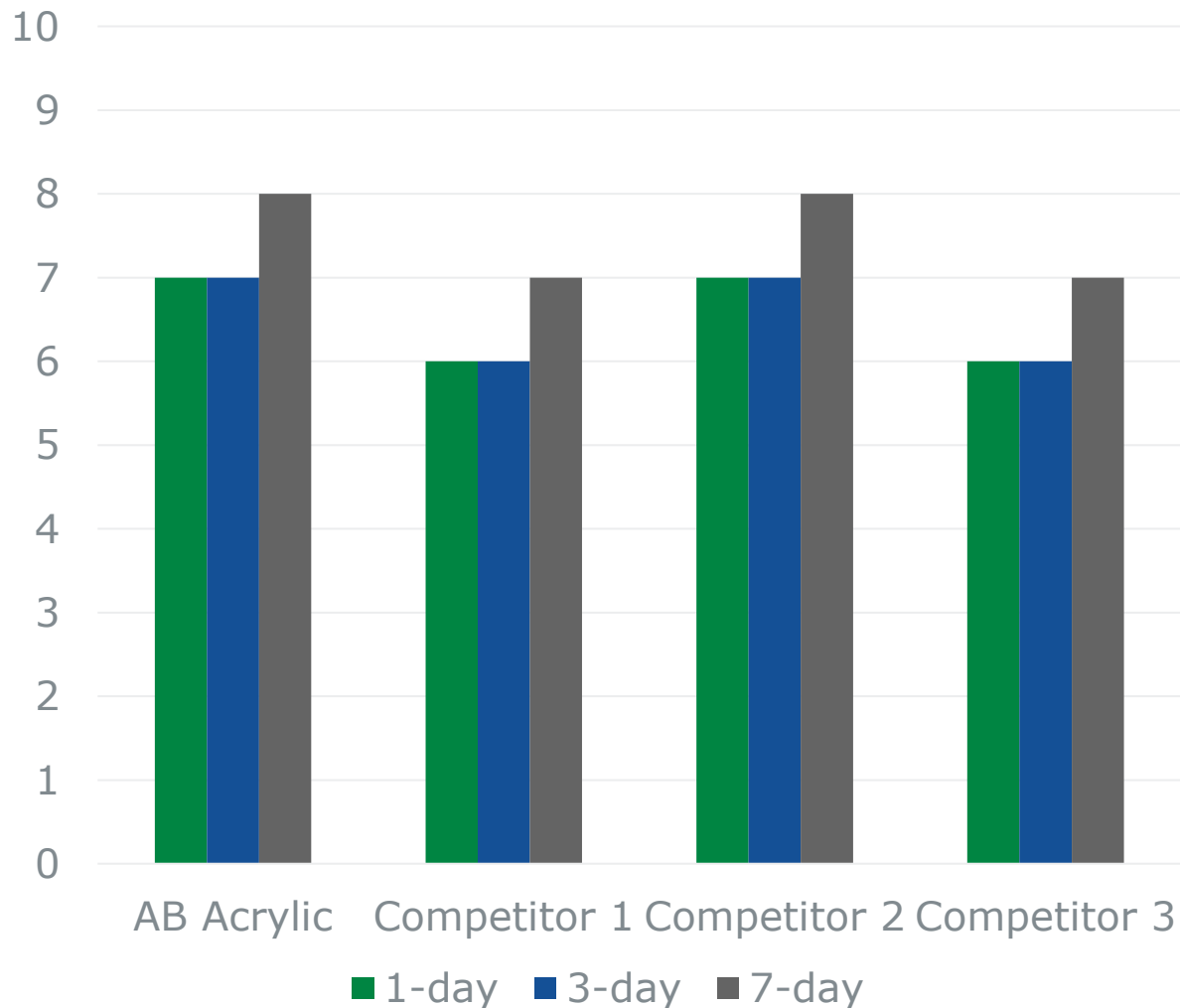




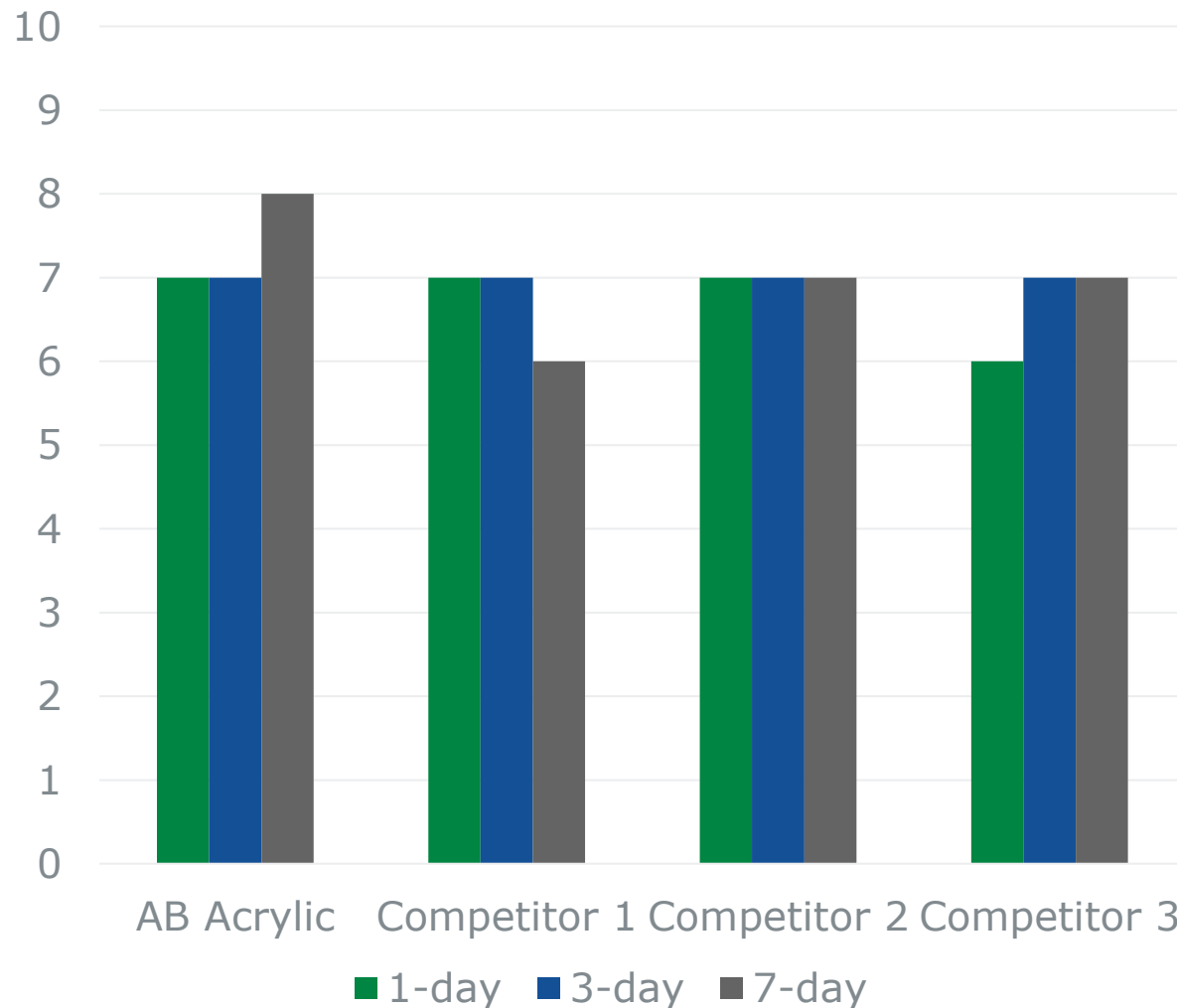
Elevated Block Resistance 50 °C

High Gloss Neutral tinted with 10% Colortrend 808

Lamp Black



phthaloblue



Porch & Floor Application



Properties

	FPUS 2316-04	Commercial Control 1	Commercial Control 2	Commercial Control 3	Commercial Control 4
Weight Solids [%]	53.12	50	52.3	49.9	54
Volume Solids [%]	39.35	37	40	37	41
Viscosity [KU]	107.7	103.4	102.9	96.8	88.2
Gloss [60°]	14.7	15.35	7.4	11.4	11.2



Formulation FPUS-2316-04 - White Satin Porch and Floor

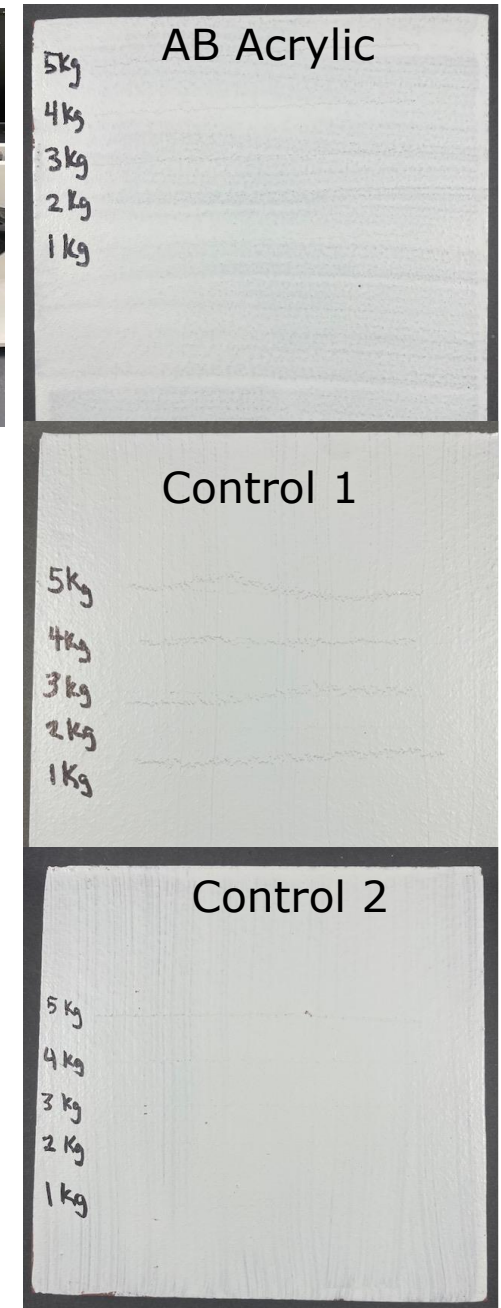
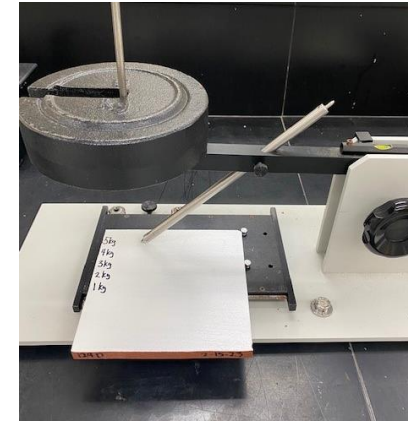
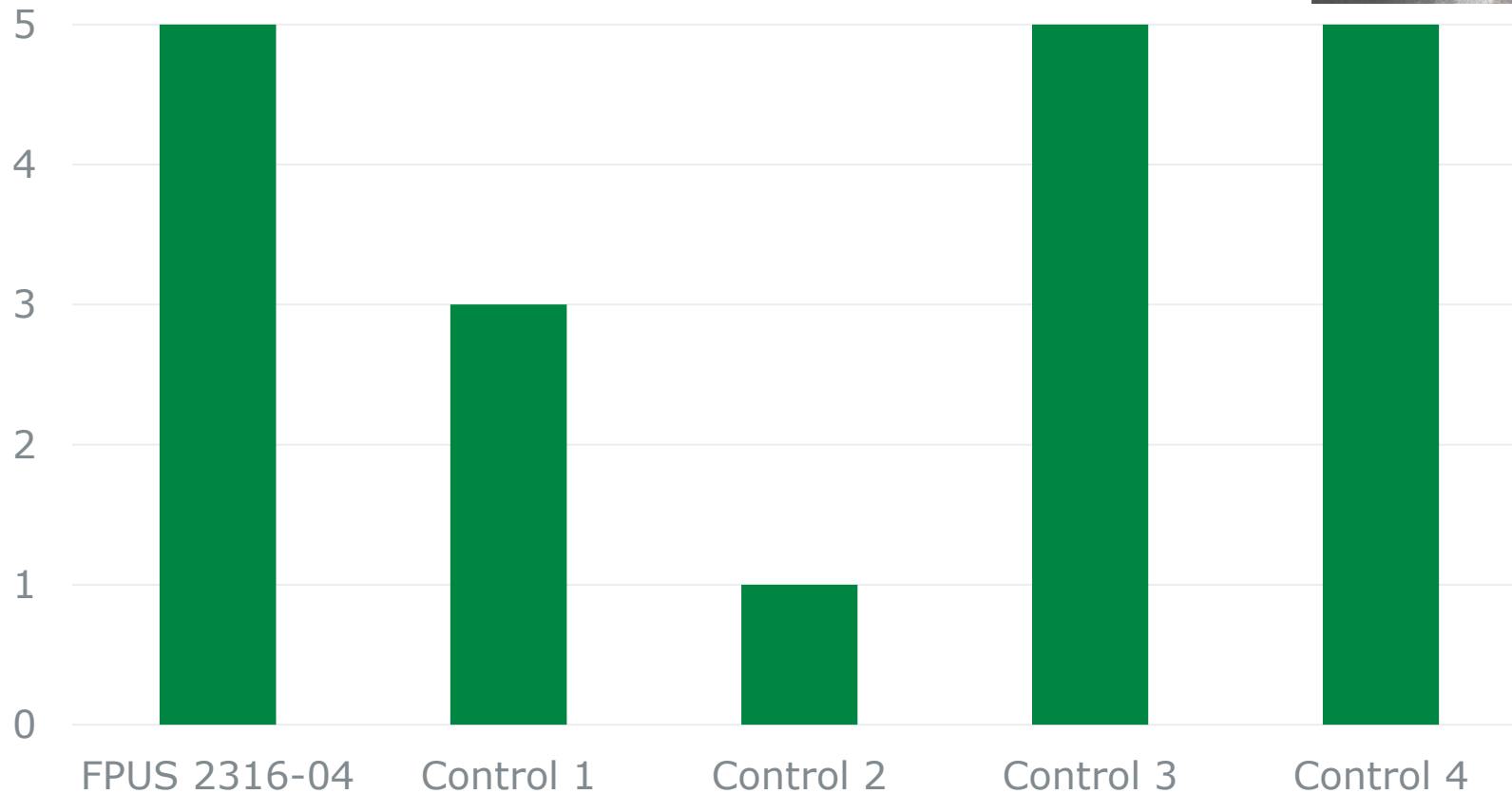
Ingredients	Lbs	Gal
Water	114.74	13.76
DISPERBYK-2081	4.24	0.46
Rhodaline WA 100	1.9	0.23
AMP 95	1.9	0.23
BYK-024	1.7	0.2
Ti-Pure R-706	195.79	5.88
Minex 7	112.41	5.16
AB Acrylic	487.79	55.66
Water	101.94	12.22
Glycol Ether DPM	5.74	0.72
Glycol Ether DPnB	11.47	1.51
CERAFLOUR 1000	7.41	0.71
Optifilm Enhancer 400	10	1.24
Acrysol RM 8W	4.89	0.56
Acrysol RM 5000	12.72	1.47
Total	1074.65	100

Technical Data	
Specific Gravity (SG)	1.288
Lb / Gal	10.75
% Weight Solids	53.12
% Volume Solids	39.35
Grams VOC/liter less water	49.29
Lbs VOC/Gallon Less Water	0.41
PVC	31.32



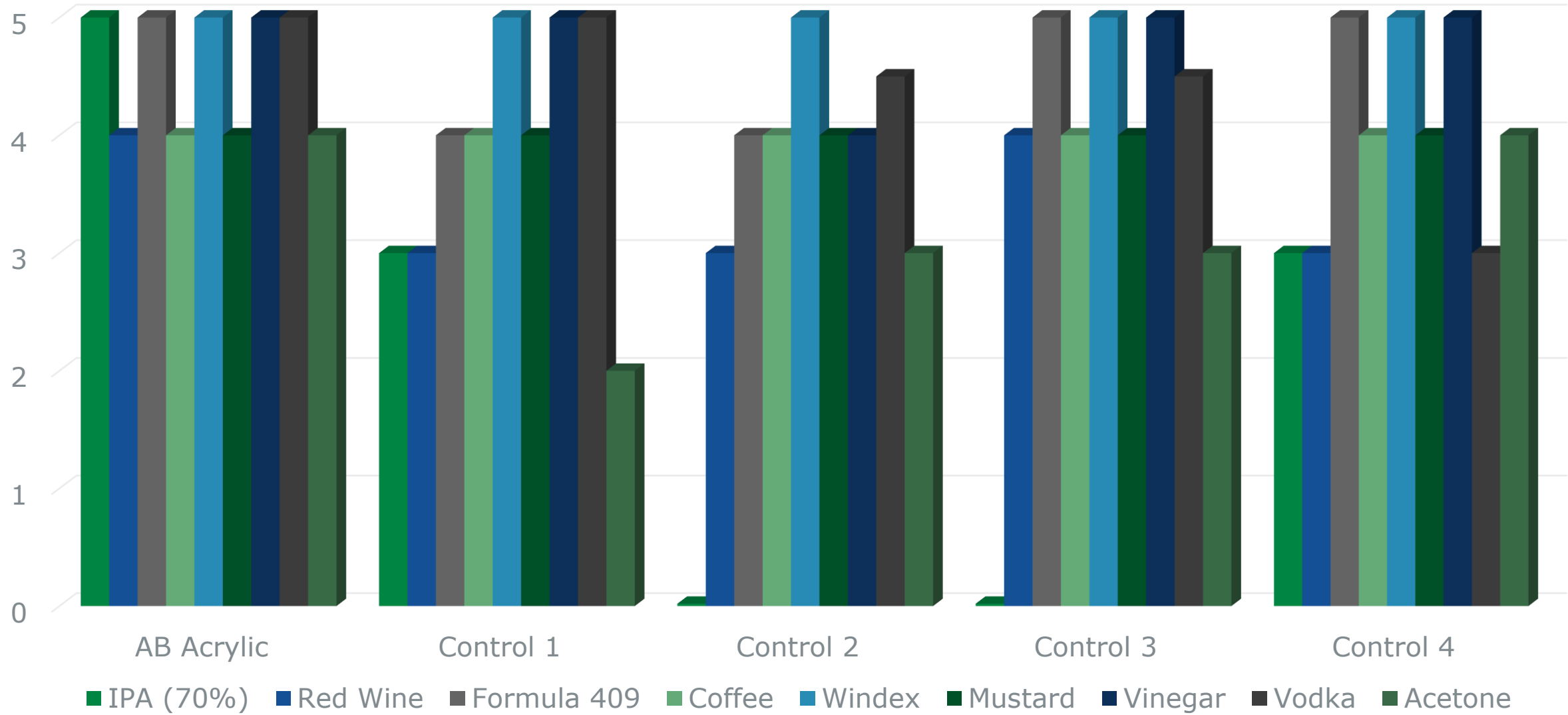
Scrape Adhesion - Kg passed

BYK Balanced Beam Scrape Adhesion
and Mar Tester





Chemical Resistance – 1 hour spot test





Dirt Pick-Up Resistance Test method

- Draw each test paint down on an aluminum “Q” panel with a 6 mil blade.
- Allow samples to air dry for 7 days.
- Expose panels for 500 hours in QUV.
- Remove from QUV and cool for 1.5 hours.
- Cover panels with a wet cloth for 1.5 hours.
- Blot the panels dry and apply a brown oxide pigment slurry on ½ of the panel.
- Air dry for 3 hours then place in a 60oC oven for 1 hour.
- Wash each panel under running water rubbing lightly with a microfiber cloth. Make sure that all excess iron oxide is removed.
- Air dry for 4 hours then take pictures.



Dirt Pick-Up Resistance Results

AB Acrylic

Control 1

Control 2

Control 3

Control 4





Scrub Resistance

ASTM 2486, Form P121-10N, 7 mils, 7 day dry

	AB Acrylic	Control 1	Control 2	Control 4
Trial 1				
Cycles to fail	1287	191	395	1297
Cycles to fail, Control	619	516	442	449
% of Control	208%	37%	89%	289%
Trial 2				
Cycles to fail	1070	224	423	1197
Cycles to fail, Control	476	477	491	431
% of Control	225%	47%	86%	278%
Average % of Control	216%	42%	88%	283%
Average Cycles to fail	1178.5	207.5	409	1247



Efflorescence Resistance

Coated bisque tiles immersed in 2% NaSO_4 solution for 7 days



Wood Flooring





Wood Flooring Performance

	AB PUD	PUD: Acrylic 30:70	PUD:Acrylic 70:30	Commercial Finish #1	Commercial Finish #2	Commercial Finish #3
AB PUD	70.0	15.84	47.22	-	-	-
AB Acrylic	-	44.43	20.24	-	-	-
Flow additive	0.50	0.28	0.50	-	-	-
Wax	5.00	4.43	5.00	-	-	-
Solvent	10.00	8.02	8.87	-	-	-
Defoamer	0.10	-	0.10			
Thickener	-	-	0.20			
Water	14.40	27.00	17.86	-	-	-
Gloss (60°)	85.0	85.0	87.7	85.0	85.3	88.0
Koenig Hardness	109/156/163	91/106/106	110/144/155	94/99/101	84/84/84	57/64/63
Taber Abrasion (mg loss)	47.8	44.1	20.6	101.5	147.6	72.5
BHMR	5	5	5	4	1	5
Fingernail mar	2	5	5	3	3	5
CoF	0.43	0.52	0.52	0.5	0.38	0.48
100 Proof (1h)	Fail	Pass	Pass	Pass	Pass	Pass

Summary

A new multi-purpose acrylic:

- Delivers outstanding performance for high end interior/exterior architectural paints, especially for deep-base formulas, without the use of restricted additives.
- Can be formulated near-zero VOC without compromising paint performance and maintains high durability and blocking resistance.
- Has excellent chemical, stain and scrub resistance.
- Can be formulated for use in other applications like porch and floor and wood floor coatings. It has excellent compatibility with PUDs.

Disclaimer:

The aforesaid information is based on our present state of knowledge and shall inform about our products and their application possibilities. It is not intended to assure certain characteristics of the products and their suitability for precise application fields. Products including "VP" in their label are trial products during test stage. For these products Alberdingk Boley is only able to provide preliminary characteristics without obligation. Please consider possible industrial property rights. Subject to change without prior notice. ALBERDINGK® and ALBODUR® are registered trademarks of ALBERDINGK BOLEY GmbH or an affiliate thereof in one or more, but not all, countries. Possible trademark rights of third-party products mentioned have to be observed.

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