

# MATTE POLYESTER

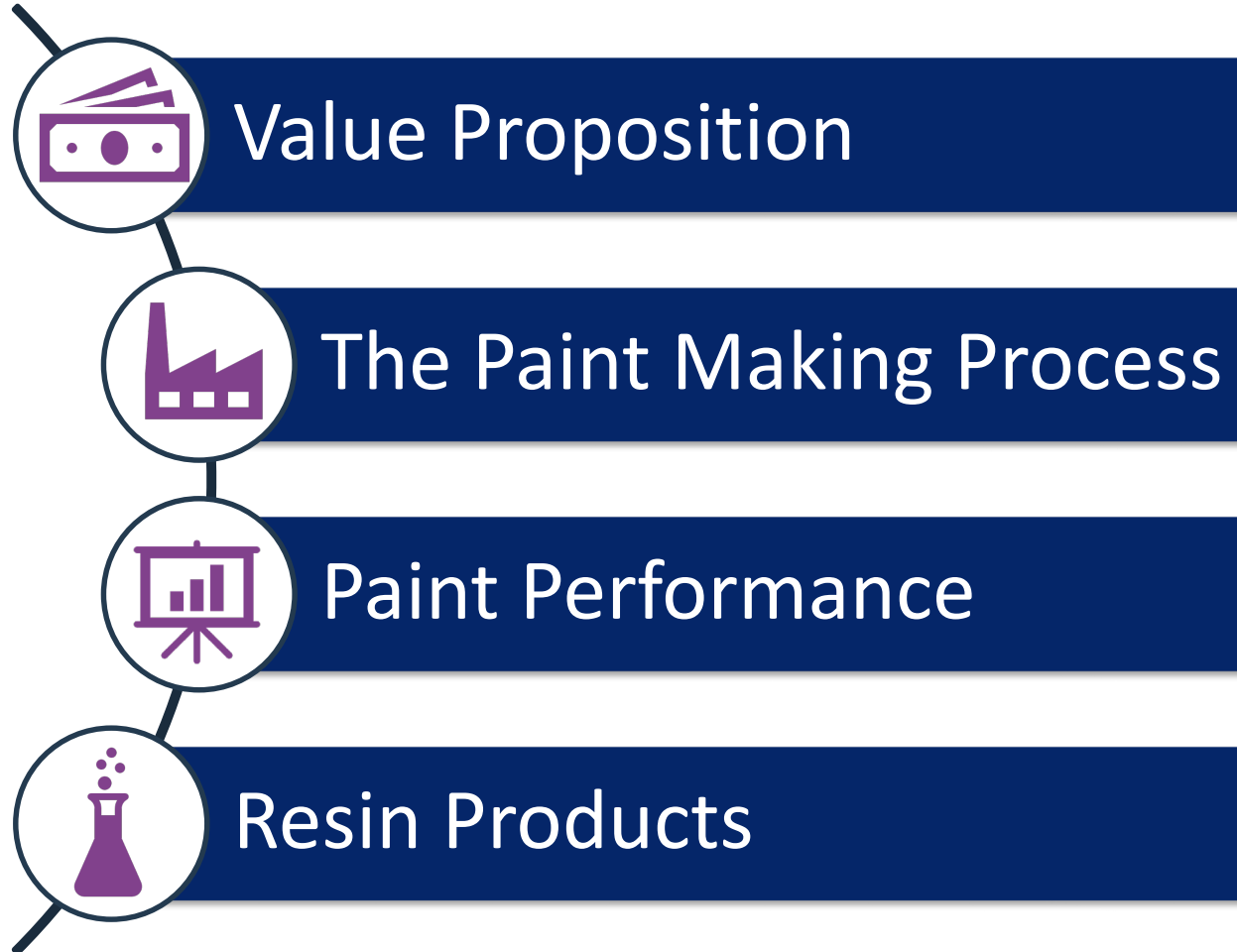
Gloss Control Made Easy. Introducing a New Benchmark: Save Time. Save Money.



Cal Ezeagu  
TS&D Manager, Powders, Americas



# MATTE POLYESTER – Gloss Control Made Easy





# MATTE FINISH NEEDS

## Benefits

- Physical and aesthetic properties
- Improved value to consumer parts
- Reflects less sunlight - making the surface less visible
- Provides warm and softer appearance
- Easy to clean

## Applications

- Lighting fixtures
- Automotive trim parts
- Lawn furniture
- Architectural extrusion
- Office furniture
- Glass bottles
- Sporting goods



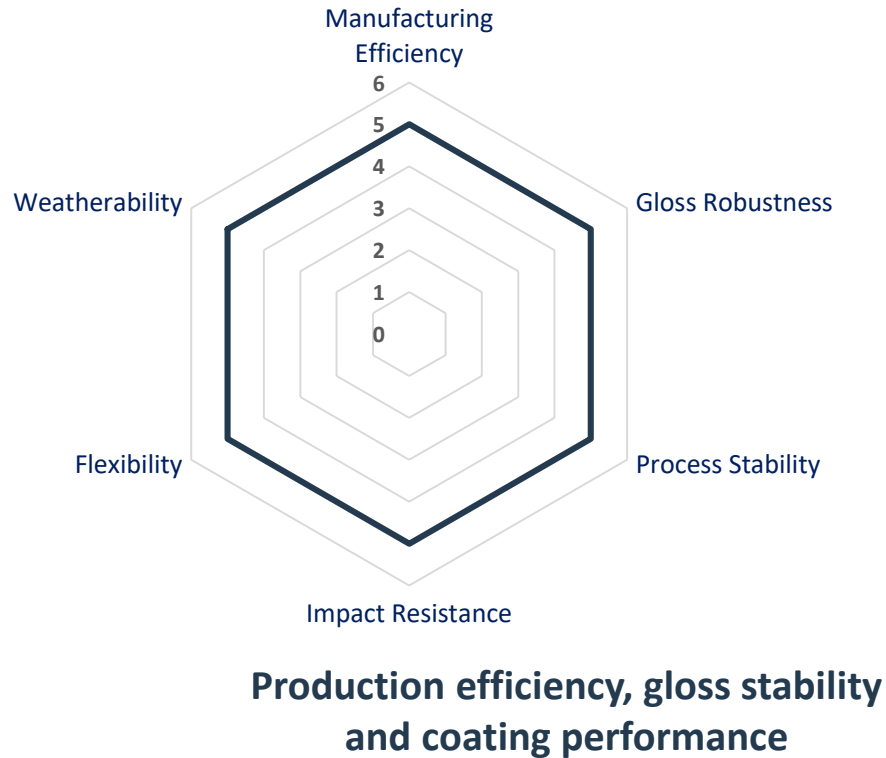
# MATTE FINISH CHALLENGES

Dry Blend 2- incompatible	One-shot matte Polyurethane	One-shot matte HAA	GMA Matting
<ul style="list-style-type: none"><li>• Sparkling effect</li><li>• Additional manufacturing overhead</li><li>• Difficult to achieve gloss &lt; 10 units</li><li>• Lack of reproducibility</li><li>• Gloss stability after multiple reclaim cycles</li></ul>	<ul style="list-style-type: none"><li>• High cost of isocyanate</li><li>• Sensitivity to processing conditions</li><li>• Manufacturing efficiency and reproducibility</li></ul>	<ul style="list-style-type: none"><li>• Lack of reproducibility</li><li>• Sensitivity to processing condition</li><li>• Long term gloss stability</li><li>• Manufacturing efficiency and reproducibility</li></ul>	<ul style="list-style-type: none"><li>• Poor mechanical properties</li><li>• High cost of raw material</li><li>• Prone to cross-contamination</li></ul>



# Value Proposition

Introducing a novel technology platform designed to reduce your processing time, saving you time and money

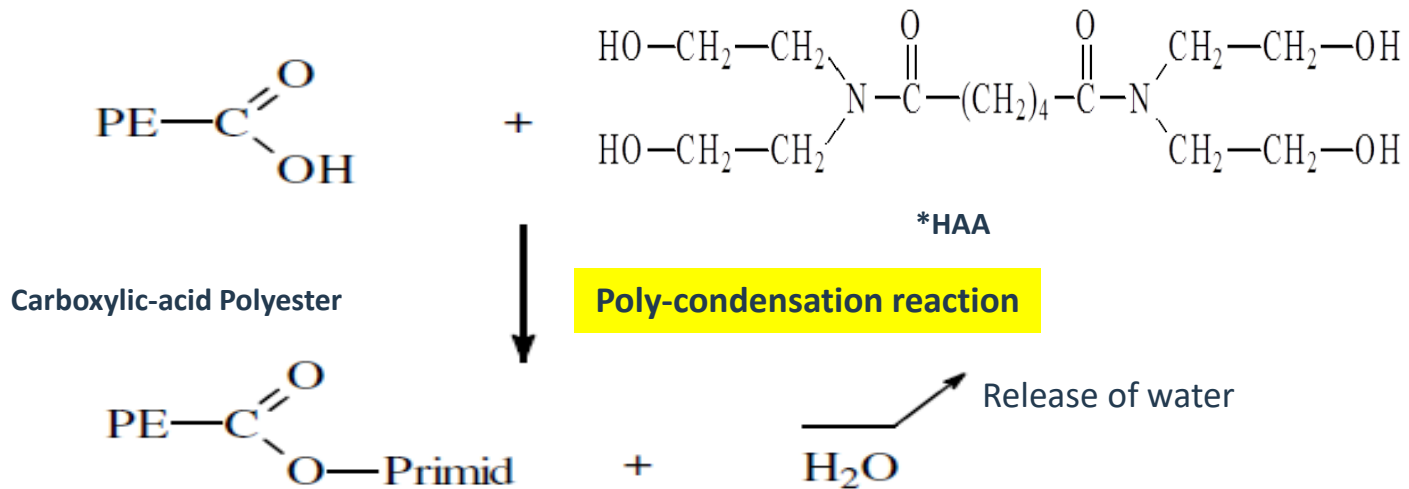


## Innovation in processing

- elimination of multiple steps simplifies the paint-making process
- reduce batch time & increase plant capacity
- significant reduction in inventory and rework
- patented technology

## Initial offering

- the matte polyester platform of gloss control resins, **CC E 04824**
- deliver outdoor durable, low gloss HAA powder coatings with a single resin
- achieve 3-7 gloss units



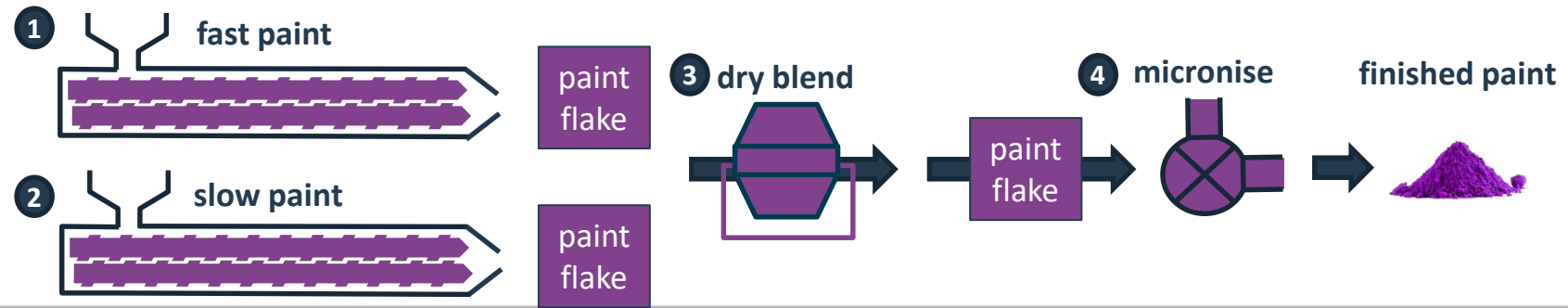
Gloss reduction through incompatible design of the polyester backbone



# The Paint Making Process

## Traditional Dry Blend Matts

- Traditional Primid matt coatings require the preparation of two individual paints which then have to be blended together in the correct ratio to give the finished paint



## MATTE POLYESTER

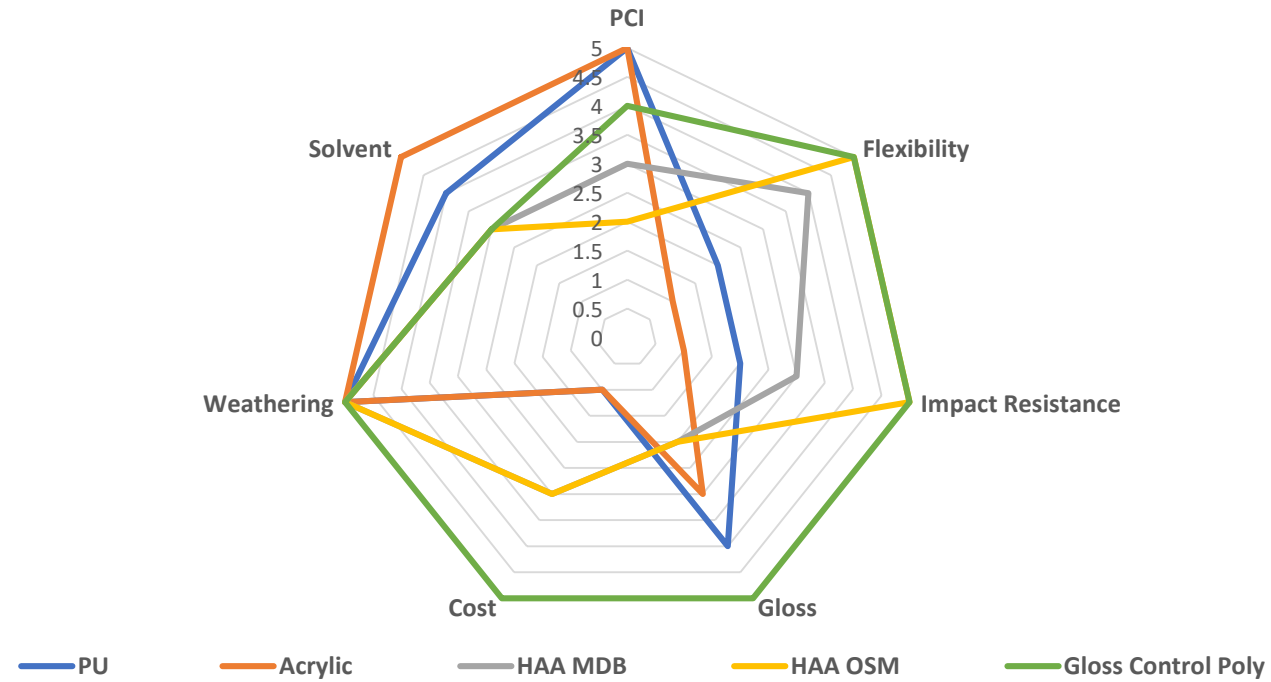
- Primid matt coatings prepared using the gloss control polyester require only one paint to be extruded and there is no blending stage, thus cutting the number of major production steps in half





# Paint Performance Benchmark

## Performance versus other technologies







# The Paint Making Process

Starting Point Formulation			Extrusion Conditions		Application Conditions	
Composition	Black	White	Parameter	Setting	Parameter	Type / Value
CC E 04824	1000	1000	Premixing	Bag blend	Grinding	Strand
Primid XL-552	86	86	Extruder type	ZSK – 30 MM	Sieving	Russel
Modaflow P 6000	9	9	Screw	Twin	Mesh	200
Benzoin	10	10	Temp zones (°C)	90/110/110	Spray gun	GEMA Optiflex 2
Carbon black	20	-	Speed (rpm)	350	Substrate	CRS
TiO2	-	350	Torque (%)	65-75	Cure temp	15' at 200 °C
Barium sulfate	100	100	Feeder speed (rpm)	20	Oven type	Electric
			Chill roller speed (rpm)	45	Film thickness	1.8 – 5.0 mils

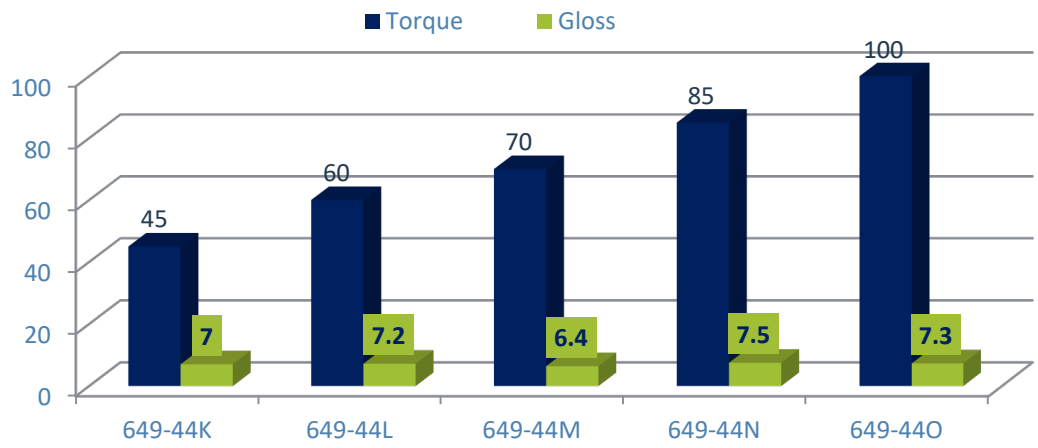


## Paints evaluated in black formulation

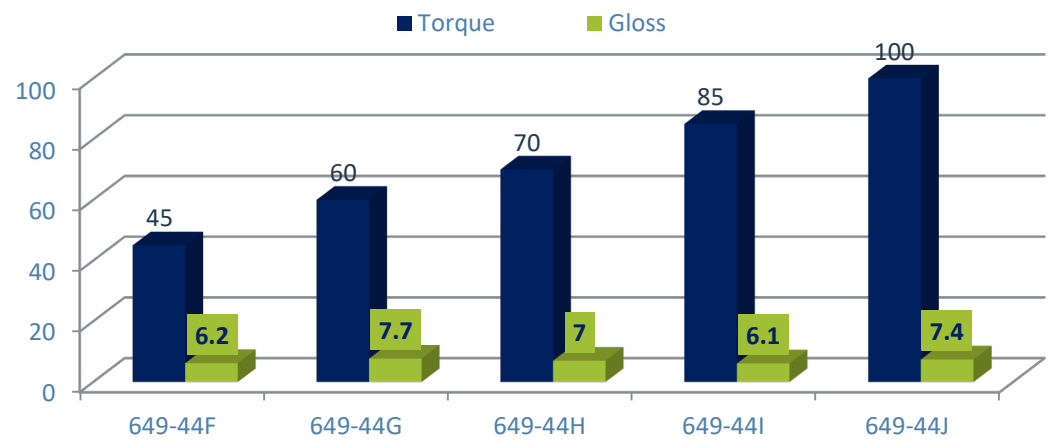
<u>Parameter</u>	<u>Test Method</u>	<u>CC E 04824</u> <u>Matte polyester</u>
Gloss: 60° / 20°	ASTM D523	5 / 1
Smoothness: PCI	PCI #20	6
F/R Impact Resistance: min @ 2 mils (in/lb)	ASTM D2794	160 / 160
Flexibility: Conical Mandrel (inch)	ASTM D522	0.125
Adhesion	ASTM D3359	5B
Re-coat Adhesion	ASTM D3359	5B
Chemical Resistance: 100% MEK	PCI #8	Pass
Gel Time: @ 200 °C (s)	PCI #6	49
Pill Flow: 177 °C x 20 min (mm)	PCI #7	32



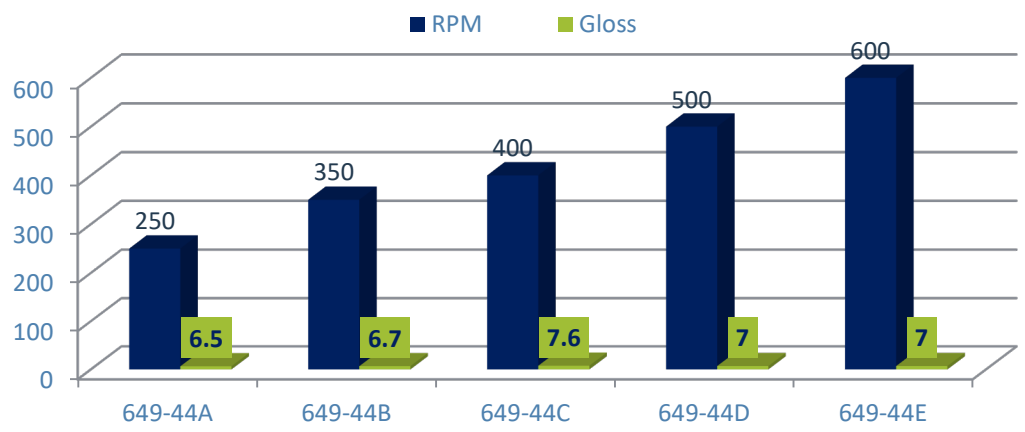
## Influence of Extruder Torque at 600 RPM



## Influence of Extruder Torque at 350 RPM



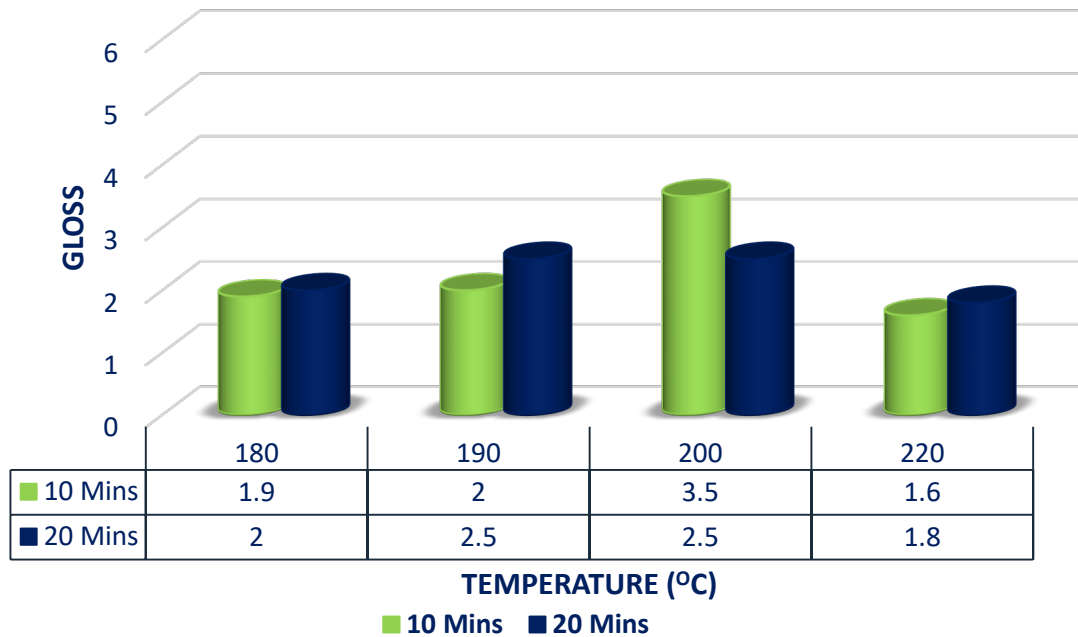
## Influence of Extruder RPM at 70% Torque



**Consistent gloss levels irrespective of extruder setting**

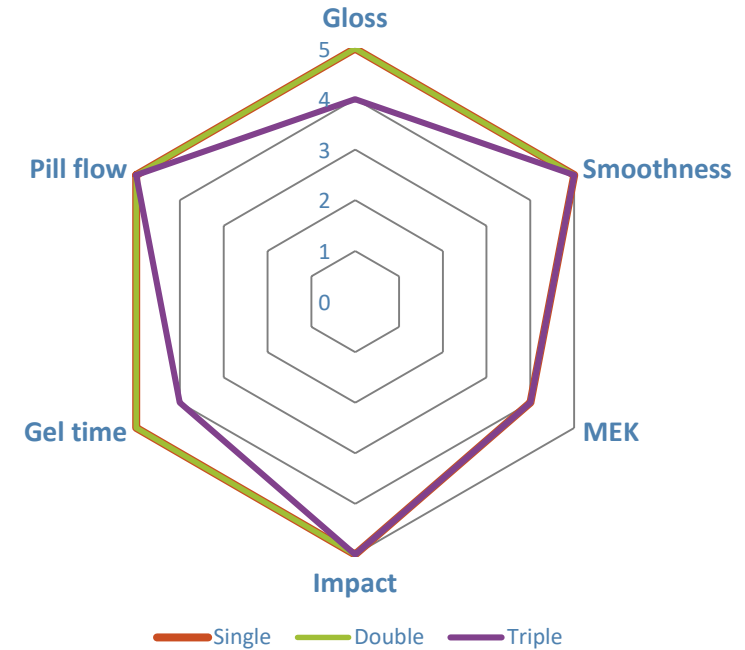


## Influence of Cure Schedule



Gloss is stable when cured at different temperature

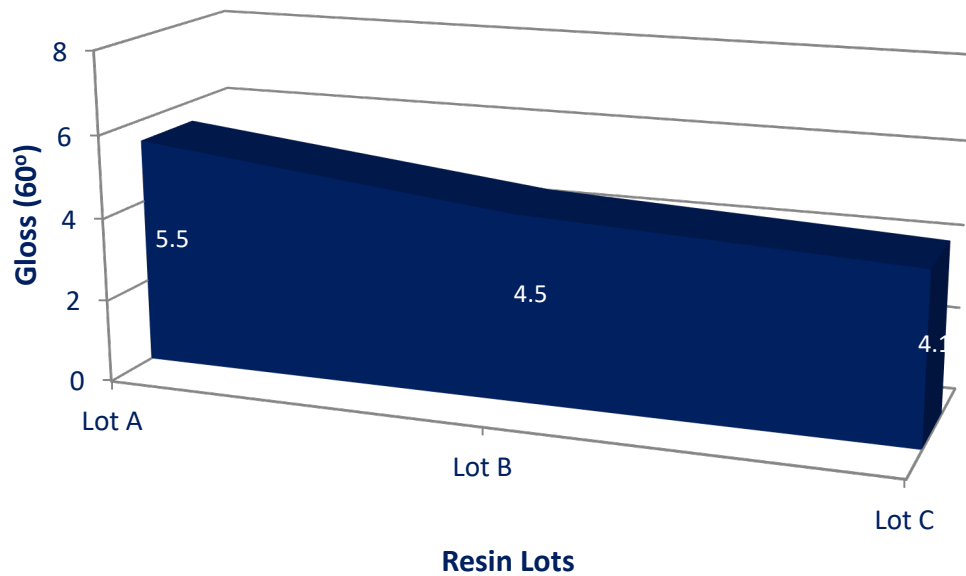
## Influence of Multiple Extrusions



Greater stability in gloss and performance properties after triple extrusions

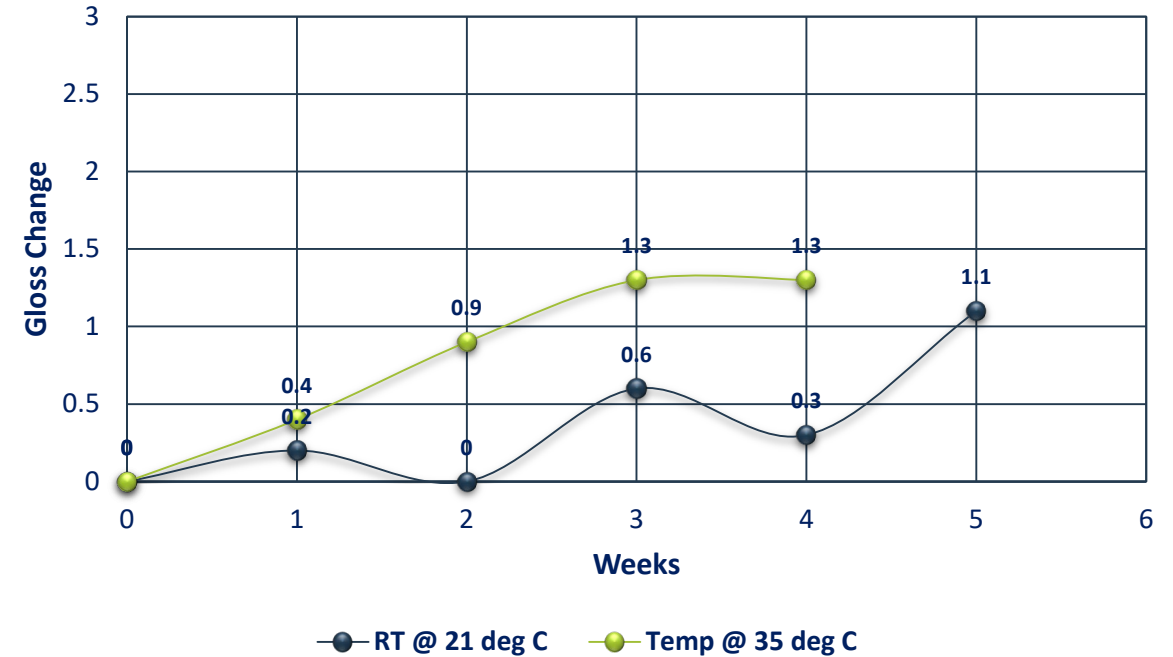


## Influence of Lots

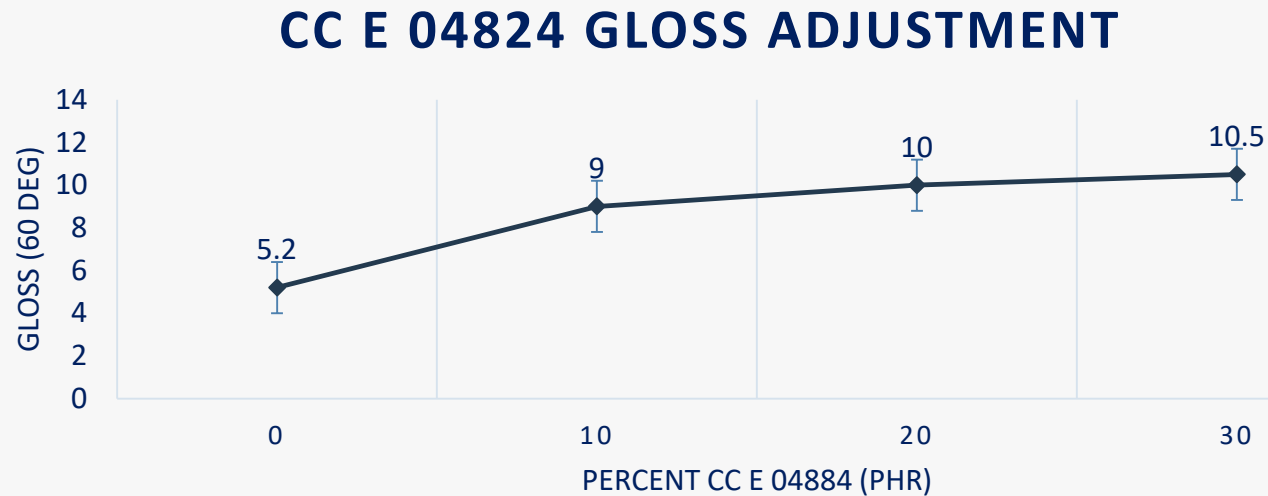


Batch-to-batch consistency with different lots of resins

## Influence of Storage



Good powder stability



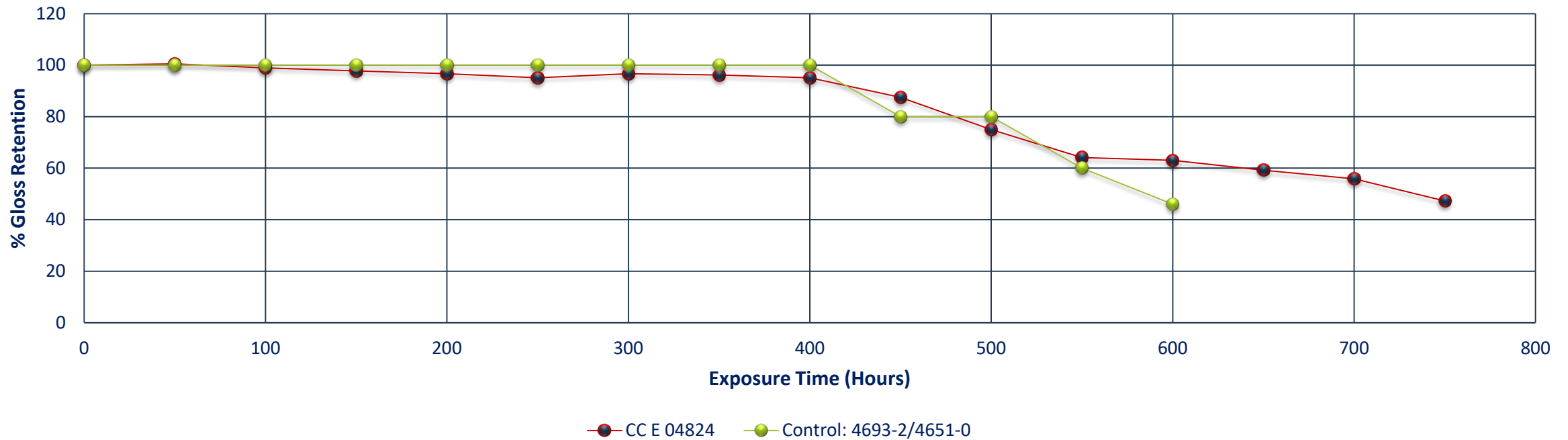
## Takeaway: Gloss adjustment guidelines

- Recommend 10% max adjustment with CC E 04884
- 10% PHR will raise gloss about 4 units
- Adjustment requires corresponding ratio of HAA



## UVA-313B PER ASTM 4587

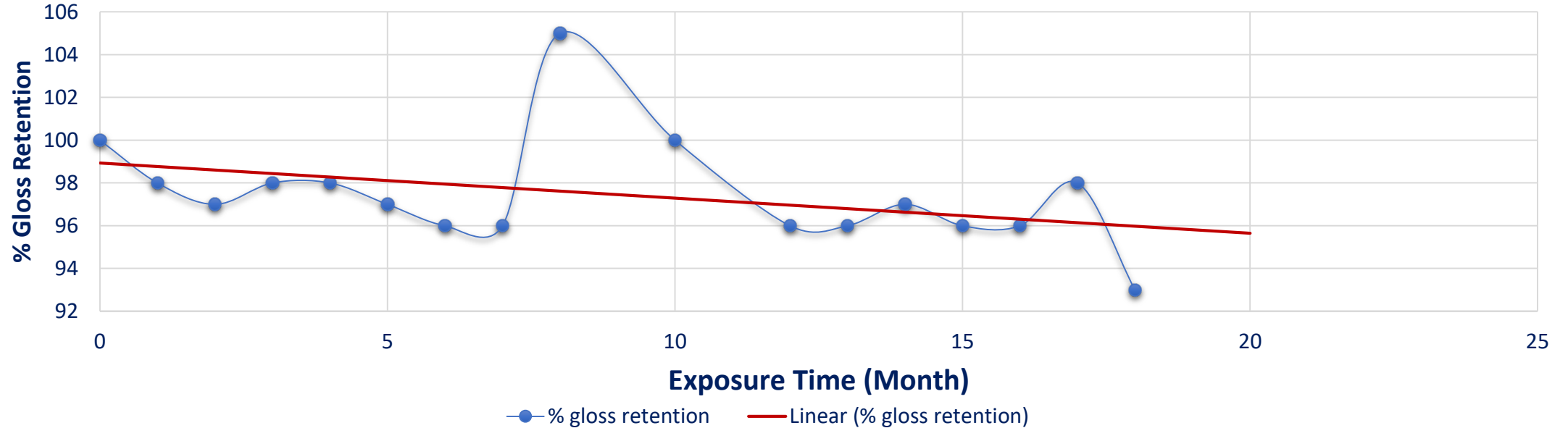
- Test conditions: Irradiance - 0.75 W/m<sup>2</sup>-nm | UV - 4 hrs | condensation – 4 hrs
- Coatings have equal or better gloss retention than traditional one-shot matte super-durable systems





## Black Formulation

TEST IS ON-GOING



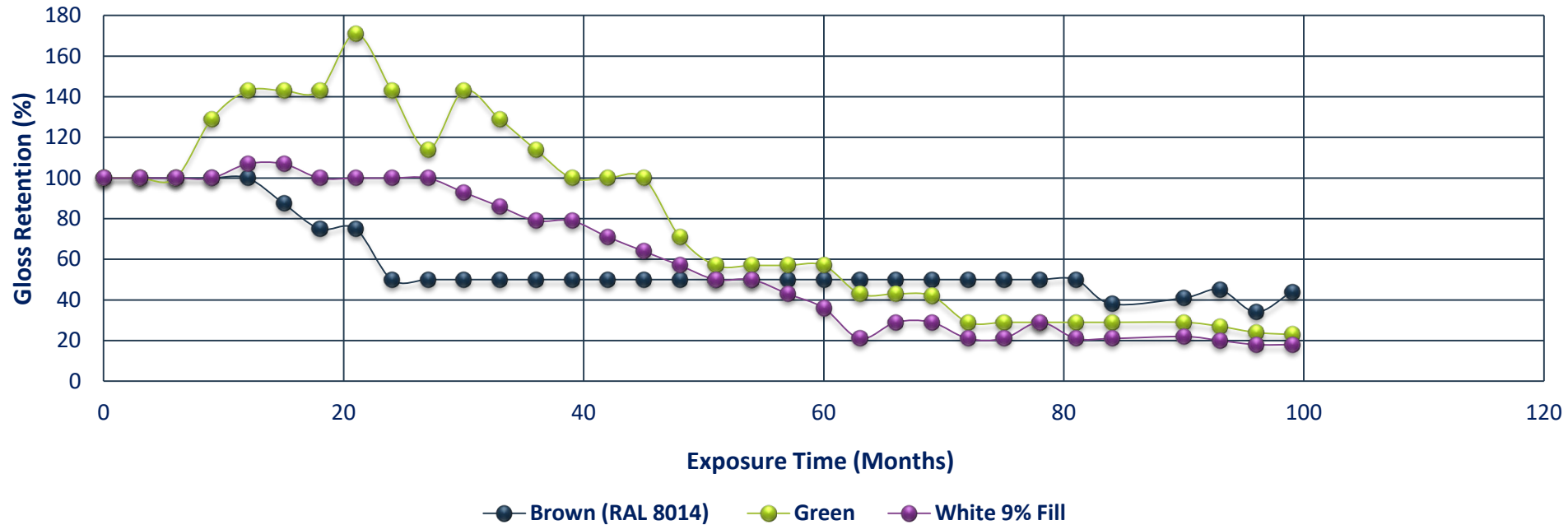
**Exposure Type:** Exposure testing is performed in Miami, Florida (26° N) at a tilt angle(s) of 45° from the horizontal facing south. The specimens are mounted unbacked on a 1643 x 3586 mm aluminum exposure rack, with grass groundcover, and the painted side facing the sun.





## Florida Test Data

- Florida natural weathering data in three colors based on coatings derived from mother chemistry used in gloss control polyester technology
- Coatings achieve between 24 to 48 months 50% gloss retention depending on colour
- Gives high degree of confidence in expected weathering performance





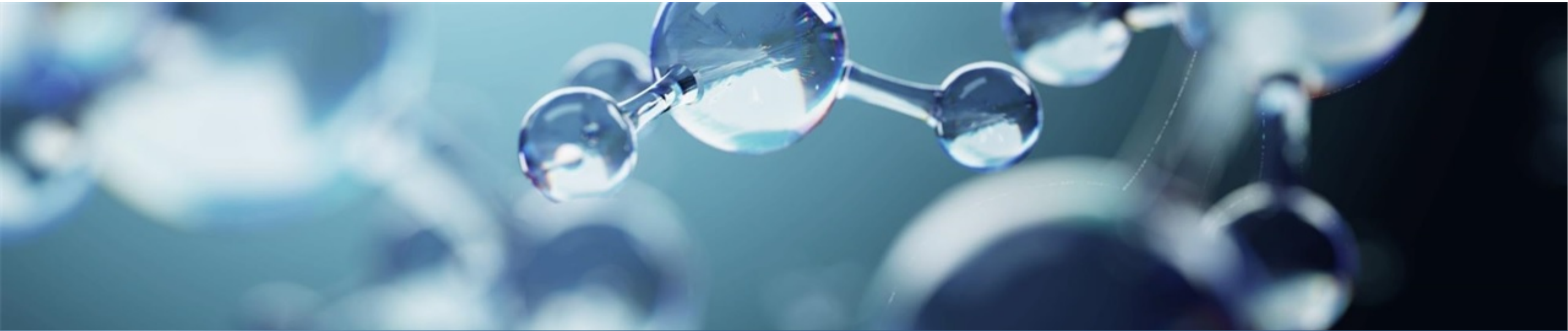
# Resin Products

Matte Polyester	Gloss Range	Viscosity <sup>(a)</sup> (mPa.s at 200°C)	Acid Value <sup>(b)</sup> (mg KOH/g)	Glass Transition Temperature (°C)	Samples Available
CC E 04814	10 - 20	2,340	59	58	Yes
CC E 04884	20 - 30	2,036	61	56	Yes



THANK YOU FOR YOUR ATTENTION!

Questions?



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