Coatings Trends & Technologies SUMMIT

Biobased PFAS-free Additives for Powder Coating Texturing

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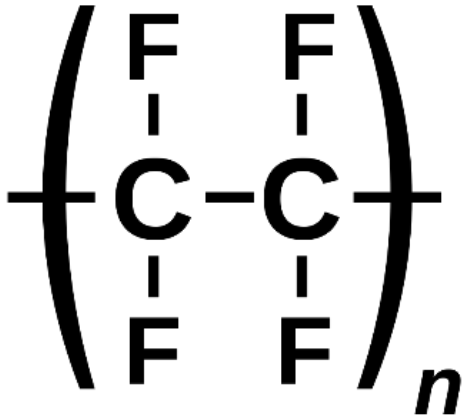
Update on PTFE (PFAS) based products

In February 2023, ECHA published a comprehensive dossier to ban around 10,000 per- and polyfluoroalkyl substances (PFAS)

In parallel, EPA published a proposed rule for PFAS substances under TSCA

Both small molecule fluorochemicals (many of which are known to be serious human health hazards) and high molecular weight fluoropolymers (many of which have a long history of safe use) would be considered a PFAS under both EU and EPA definitions



PTFE is a fluoropolymer

Therefore, **PTFE is a PFAS substance**

Update on PTFE (PFAS) based products

- Customers in the food packaging industries have been very active at testing and replacing ingredients that contain PFAS/PTFE

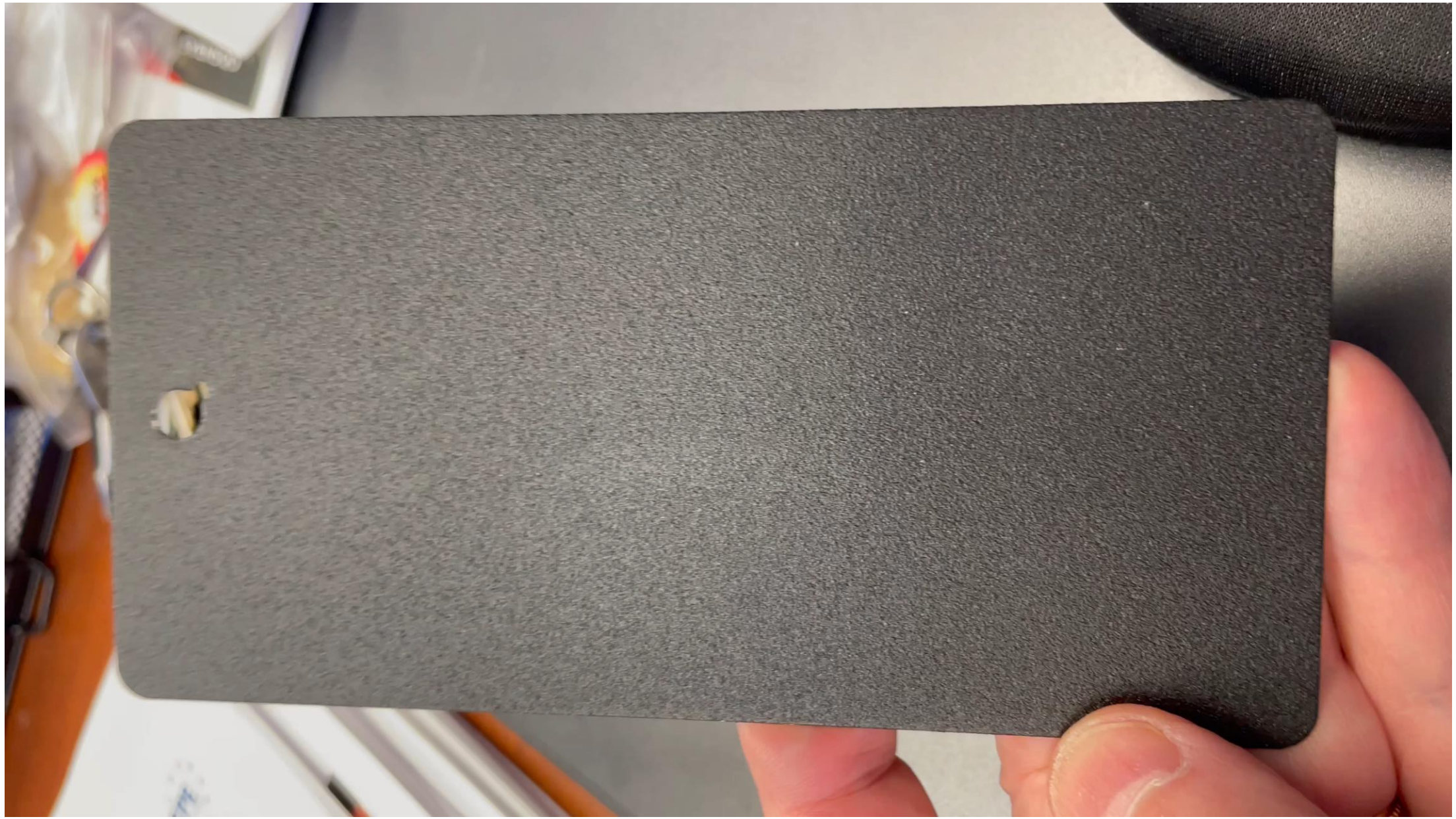
- Many other customers are also concerned about the potential regulatory burden from ECHA and EPA

- Micro Powders has built and commercialized a successful portfolio of nanocomposite waxes that almost always surpass the performance of PTFE based additive powders

- We expect this trend moving away from PTFE will continue

Powder coating texture additives

- Micro Powders has been very successful with additive powders that provide texture effects in powder coatings
- All of these products are based on PTFE
- Typically dosed at 1% or less
- Provides a fine sandpaper-like texture with low gloss
- **Many customers want a PTFE-free alternative that provides the same appearance and haptics**



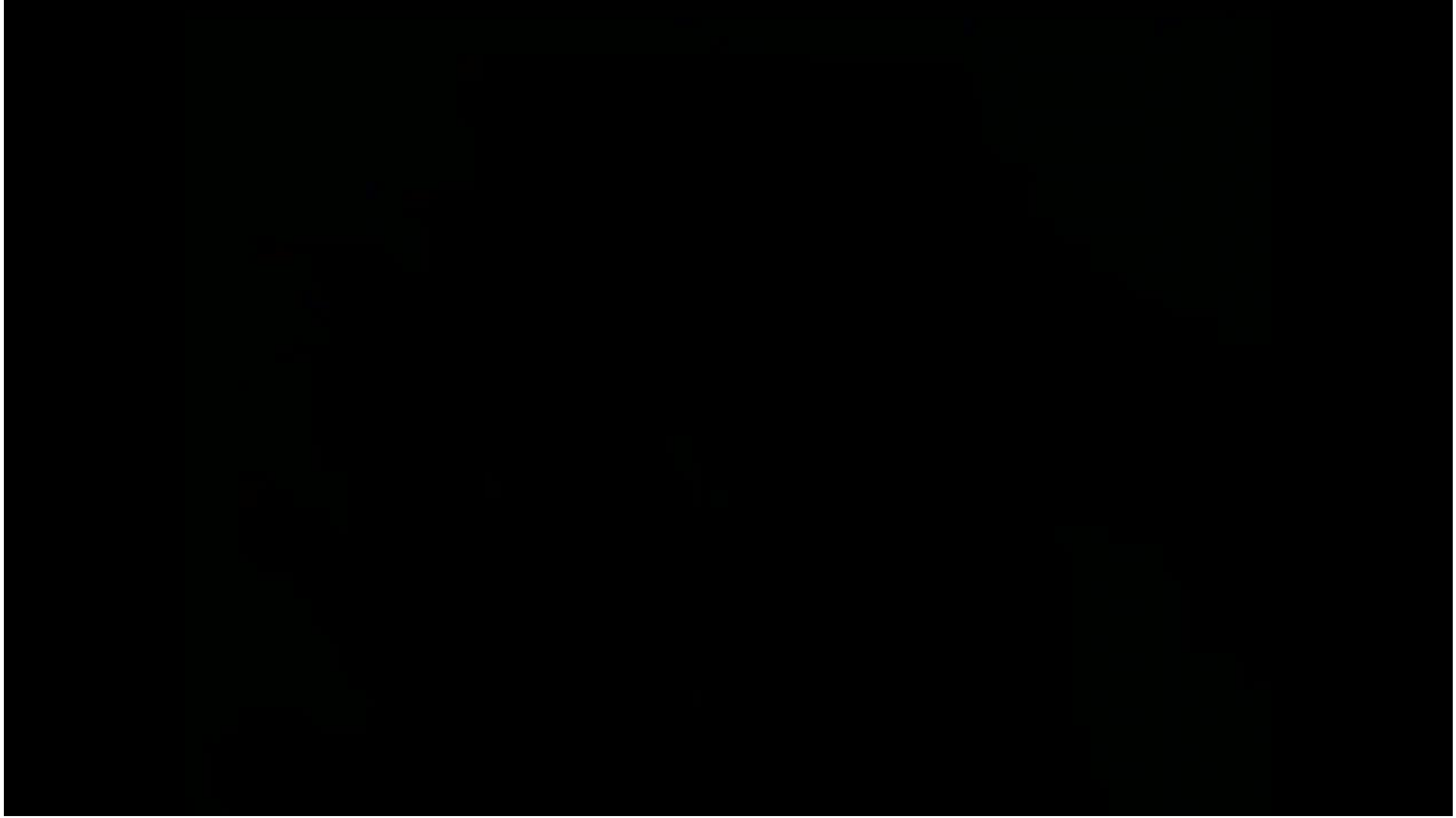
Mechanism of PTFE texturing

Texturing with PTFE in powder coatings appears to be primarily due to a rheological “incompatibility” that takes place as the powder is melted and cured

Obviously, PTFE does not melt during powder cure

The following video provides an interesting view of the curing process

Note how ridges and valleys form as the powder is heated, melted and eventually cured into the final coating, forming the fine topography and lowering the gloss



Biopolymer texture additive alternative

An additional benefit for some customers

Natural and sustainable

Unlike PTFE texture additives, *this biopolymer additive will give different texture effects in different types of powder coating chemistries*

The choice of maximum powder screen size can modify/enhance the texturing effect

The most pronounced texturing results will be achieved with a powder screened to 80 mesh maximum, but other texturing effects are still possible with finer powder screening at 100 or 140 mesh

As with conventional PTFE based additives, the biopolymer texture additive is ideally added in the powder coating premix

Biopolymer texture additive alternative

Example 1:
Polyester/epoxy and polyester/HAA (Primid) systems

Biopolymer texture additive creates a smooth, scattered granular texture

In these powder coating chemistries, the final coating will not have a matte appearance

1. Model formula

Polyester/Epoxy		Polyester/HAA (Primid)	
Sun Polymers polyester	47.3%	Allnex polyester	59.2%
Kukdo epoxy	20.3%	HAA	3.1%
Estron leveling agent	1.0%	Estron leveling agent	1.0%
Benzoin	0.5%	Benzoin	0.7%
Raven carbon black	1.0%	Raven carbon black	1.0%
Barium sulfate	25.0%	Barium sulfate	28.0%
Biopolymer texture additive	**5.0%**	**Biopolymer texture additive**	**7.0%**

Biopolymer texture additive alternative

Example 2:
Polyester/GMA acrylic system

Biopolymer texture additive creates a fine, sandpaper-like surface haptic with low gloss

The final powder coating finish is *similar to the haptics and low gloss provided with conventional PTFE texture additives*.

2. Model formula

Matte Polyester/GMA Acrylic (control <1 @ 60°, <3 @ 85°) (<2 @ 85° with biopolymer texture additive)	
Allnex polyester	49.4%
Worlee GMA acrylic	16.5%
Imidazole catalyst	1.6%
Estron leveling agent	1.0%
Benzoin	0.5%
Raven carbon black	1.0%
Barium sulfate	25.0%
Biopolymer texture additive	**5.0%**

Summary

- A biopolymer approach can provide texture effects in powder coatings without PTFE/PFAS

- Customers can create different texture effects depending on the powder coating chemistry used

- Our thanks for collaboration and support from

ChemQuest POWDER COATING RESEARCH®

Stop by Booth #1
to see and feel
PTFE Powder Coating Texture – without PTFE

Questions?