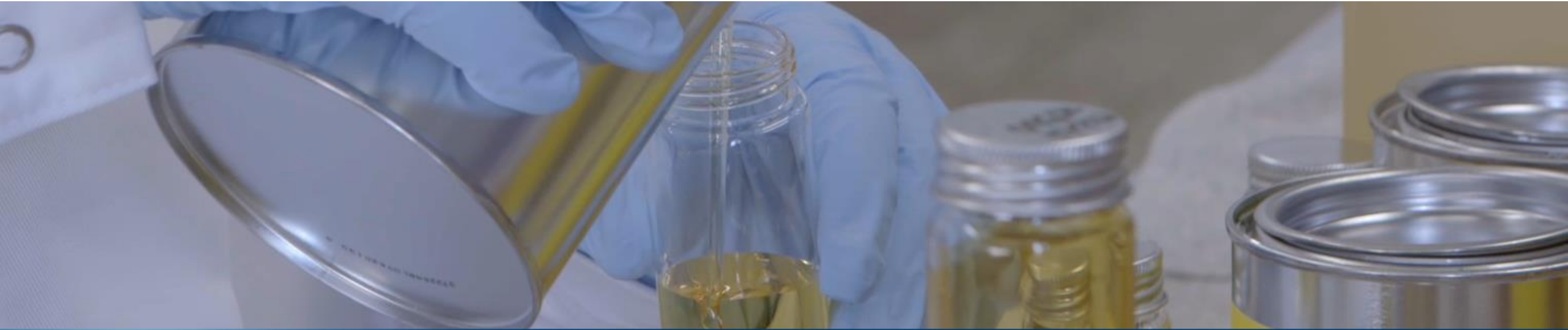
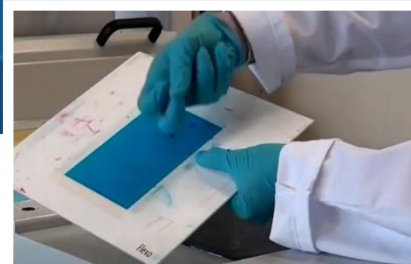


# SOFT TOUCH TECHNOLOGIES



Jonathan Shaw, Marcus Hutchins, Jennifer McClung



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[www.allnex.com](http://www.allnex.com)



# Introduction

- Soft touch is one of the most popular aesthetic trends in the coating market
- It is extensively used in the consumer electronics, appliances, automotive interiors, packaging and furniture markets to impart a luxurious feel to substrates that have an beautiful feel.
- EBECRYL® 8896 / EBECRYL® 8894 are the newly developed resins for direct and film coating that imparts **excellent soft feel features while maintaining superb scratch & abrasion resistance performance**



# Introduction

Soft feel may play a decisive role in the consumer's decision purchasing process. Even though feel is critical to the sale, there is no unified haptic scale because touch is subjective and unique from person to person. Therefore, it is important that resin(s) system have tunable feel.

Haptics normally refers to the following different types of sensations:

- Silky feeling / velvety feeling
- Rubbery feeling
- Leathery feeling
- Others

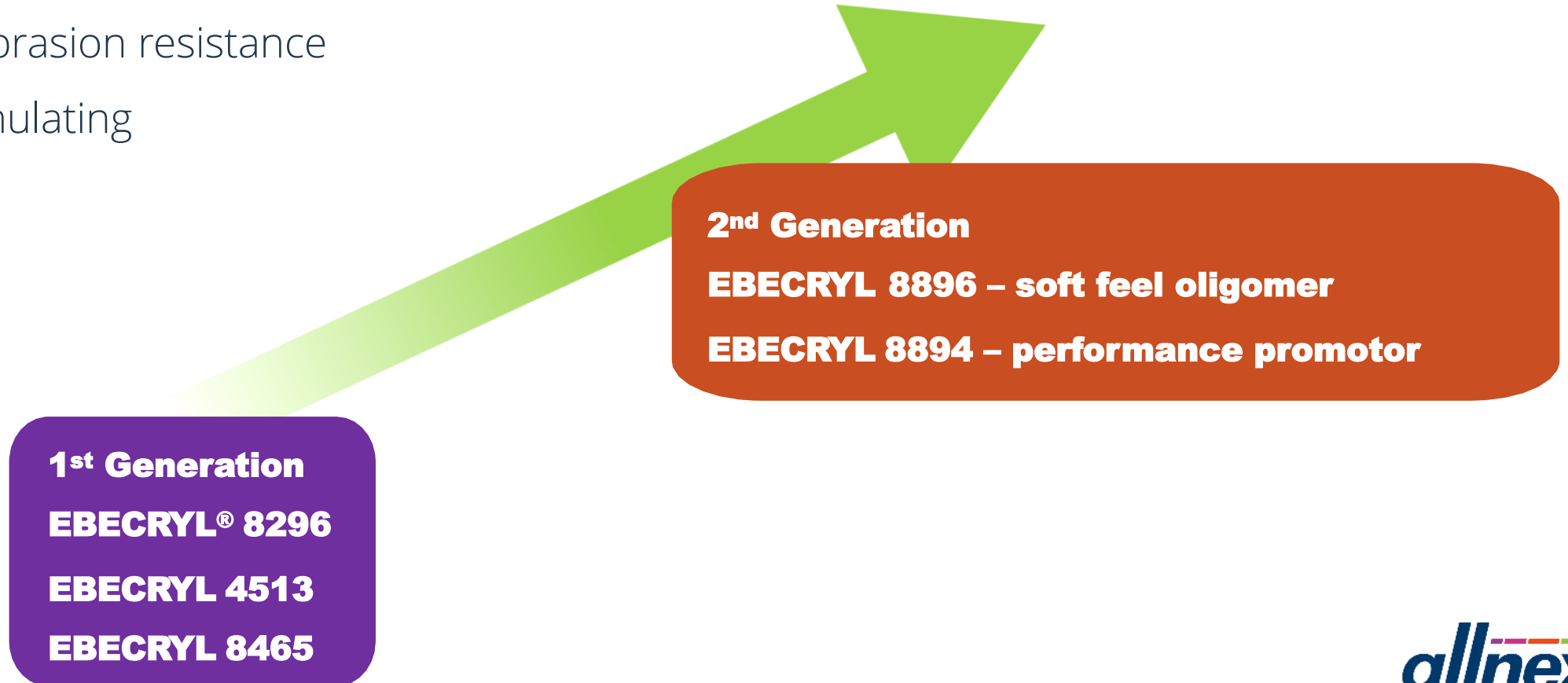
In real world, formulators look not only for haptic solutions, but also to fulfill special performance requirements. So allnex has developed the 2<sup>nd</sup> generation haptic resin solutions by improving other performance requirements beyond having a soft touch.



# New solution to UV Soft touch

The 2<sup>nd</sup> generation products improved further in:

- Soft feel
- Scratch & Abrasion resistance
- Ease of formulating



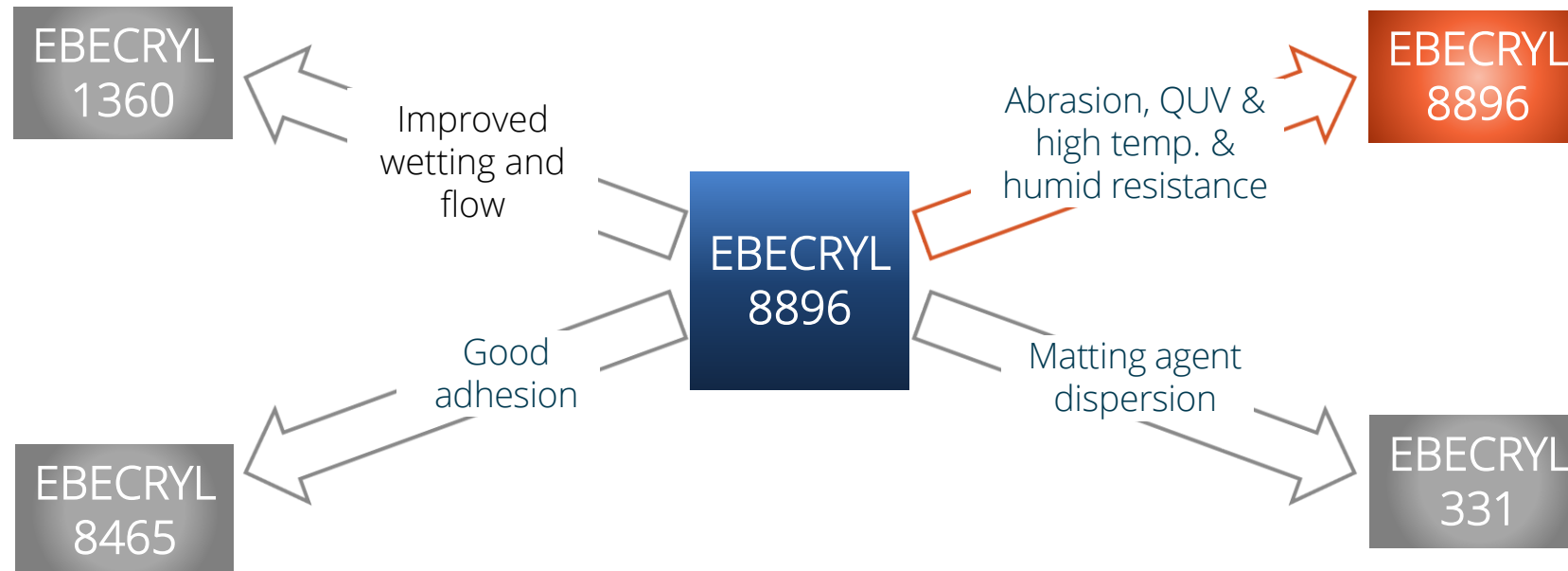
# EBCRYL® 8896 & 8894 Resin Properties

Property	EB 8896	EB 8894
Chemistry	Aliphatic Urethane Acrylate	Aliphatic Urethane Acrylate
Characteristics	<ul style="list-style-type: none"> <li>• High elasticity</li> <li>• Rubbery feel</li> </ul>	<ul style="list-style-type: none"> <li>• Excellent abrasion resistance</li> <li>• Excellent hydrolysis &amp; QUV resistance</li> </ul>
Functionality	3	4
% BuAc	20	20
Visc (mPa.s @ 25°C)	10000	65000
Tg (tan δ max) (°C)	-26	60
Ultimate elongation (%)	50	37
Tensile strength (MPa)	3.3	28
Young's Modulus (MPa)	10	426

# Formulation matrix for UV Soft touch

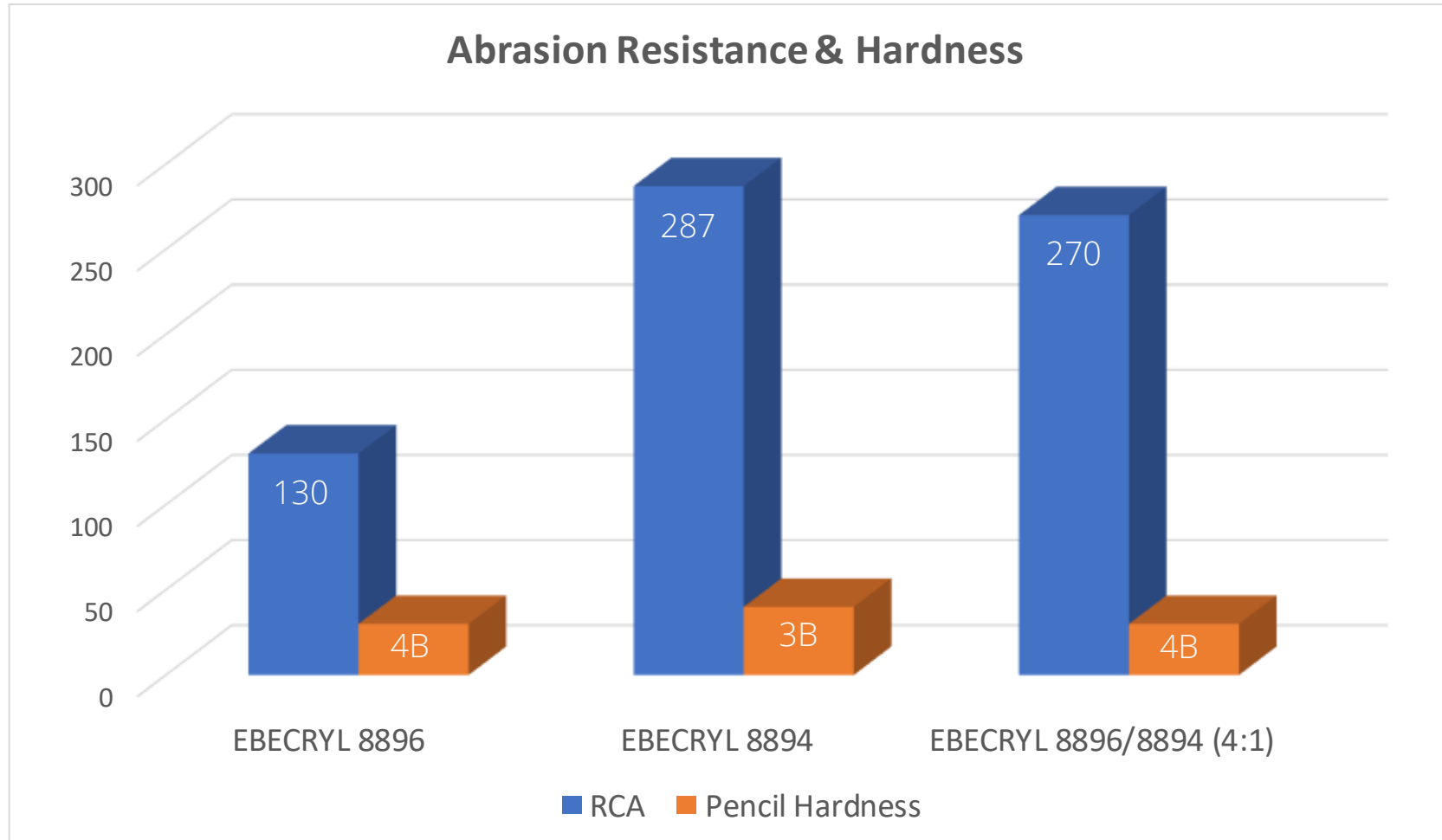
## Formulation partners for EBECRYL® 8896:

- Resins below can enhance other film properties of EBECRYL 8896 while retaining the soft feel
- Suggested usage of EBECRYL 8894 is 20~50% weight of EBECRYL 8896



# Formulation matrix for UV Soft touch

Film Properties (hardness) for soft feel blends 12um



Test Formula	
Oligomer	40.0
CPK	2.0
TPO	0.4
EB 1360	0.2
Solvent	70-100

RCA is tested at 35µm thickness while pencil hardness is tested at 12 um on PC board

# SPF for Rubbery Feel Formulation

Raw Material	Description	Parts
EBECRYL® 8896	Aliphatic urethane acrylate	50
NIPSIL® E1011	Amorphous silica, avg. PS=1.5 µm (Tosoh Silica Corp.)	3.0
ACEMATT® TS-100	Untreated silica, PS d <sub>50</sub> = 9.5 µm (Evonik)	1.3
RHU-5070D	Crosslinked PU bead (Dainichiseika)	2.0
EBECRYL 331	Wetting and dispersing agent	0.3
EBECRYL 1360	Slip Agent	0.2
IRGACURE® 754	Photoinitiator	2.0
LUCIRIN® TPO	Photoinitiator	0.4
Solvent	BuAc (40), MIBK (30), PM (50)	70 - 100

Spray application - 35-50µm DFT

UV cure - 1500mj/cm<sup>2</sup>,

# SPF for Rubbery Feel Formulation

Rubbery SPF gives films that have :

- Excellent soft and elastic feeling
- Good abrasion resistance. (RCA > 130 @35µm.)
- Good adhesion on PC
- Good nail scratch recovery
- Low yellowing

# SPF for Velvety Feel Formulation

Raw Material	Description	Parts
EBECRYL® 8896	Aliphatic urethane acrylate	40
EBECRYL 8894	Aliphatic urethane acrylate	10
NIPSIL E1011	Amorphous silica, avg. PS=1.5 µm (Tosoh Silica Corp.)	5.0
ZN-26 Wax paste	PE wax, average PS 5 µm (GIFU)	2-5
EBECRYL 331	Wetting and dispersing agent	0.3
EBECRYL 1360	Slip Agent	0.5
IRGACURE 754	Photoinitiator	2.0
LUCIRIN TPO	Photoinitiator	0.4
Solvent	BuAc (40), MIBK (30), PM (50)	110-140

Spray application - 35-50µm DFT

UV cure - 1500mj/cm<sup>2</sup>,

# SPF for Velvety Feel Formulation

Velvety SPF gives films that have :

- Excellent soft and silky feeling
- Good adhesion on PC
- Good abrasion resistance (RCA > 250@35µm.)
- Good nail scratch recovery
- Improved QUV & humidity resistance
- Low yellowing

# SPF for Leathery Feel Formulation

Raw Material	Description	Parts
EBECRYL® 8896	Aliphatic urethane acrylate	30
EBECRYL 8894	Aliphatic urethane acrylate	12
EBECRYL 8296	Aliphatic urethane acrylate	8
NIPSIL E1011	Amorphous silica, avg. PS=1.5 µm (Tosoh Silica Corp.)	4.8
EBECRYL 331	Wetting and dispersing agent	0.5
EBECRYL 1360	Slip Agent	0.3
IRGACURE 754	Photoinitiator	2.0
LUCIRIN TPO	Photoinitiator	0.4
Solvent	BuAc (40), MIBK (30), PM (50)	110-140

Spray application - 35-50µm DFT

UV cure - 1500mj/cm<sup>2</sup>,

# SPF for Leathery Feel Formulation

Leathery SPF gives films that have :

- Good leather feeling
- Improved QUV & humidity resistance
- Excellent abrasion resistance
- (RCA>300 @50µm)
- Good nail scratch resistance
- Low yellowing

# SPF for Soft Feel Primer Formulation

Raw Material	Description	Parts
EBECRYL <sup>®</sup> 8896	Aliphatic urethane acrylate	45
EBECRYL 8465	Aliphatic urethane acrylate	40
MODAFLOW <sup>®</sup> 9200	Silicone free acrylic leveling agent	0.3
TMPTA	Trifunctional diluent	5.0
HDDA	Difunctional diluent	7.0
IRGACURE 754	Photoinitiator	2.0
LUCIRIN TPO	Photoinitiator	1.0
Solvent	BuAc (40), MIBK (30), PM (50)	110-140

In case of poor adhesion over ABS, PC, or PC/ABS, this primer formulation is suggested to coat underneath the soft touch coating. It can also help improve the tear resistance to heavy nail scratch.

A slight tack in the primer can further improve the adhesion application, so less energy is used for UV cure – 300-600 mJ/cm<sup>2</sup>,

# Soft Feel Coatings for Non-Plastic Substrates

Soft feel has been mainly focused on plastic substrates as they are considered hard and “cold”

Wood coatings (desk tops, wall panels) are looking to incorporate soft feel.

# SPF for Wood Formulation

Raw Material	Description	Parts
EBECRYL <sup>®</sup> 4387	Aliphatic urethane acrylate	40
EBECRYL 2047	Polyester acrylate	25
EBECRYL 113	Monofunctional diluent	20
ODA	Monofunctional diluent	10
ACEMATT <sup>®</sup> 3600	Polymer treated silica, P.S. $d_{50} = 5$ (Evonik)	10
EASACURE <sup>®</sup> HB	Photoinitiator	4.6
TPO-L	Photoinitiator	0.4

Viscosity = 800 cps

Applied via roller coater @ 20 um DFT, cure using 2 passes at 5m/min under 300 W/cm Hg lamps

Give a silky feel to the wood

# Soft Feel – what's next?

We have shown that allnex has oligomers for SB soft touch and now 100% solids soft touch

So the next step is... WB soft touch oligomers

We have developed a few resin systems that are ready to trial

We can discuss now under NDA, but we anticipate filing IP shortly, and will be able to discuss more openly afterwards

# Conclusions

Haptic quality is a function of both the resin system and fillers used for the coating

allnex has developed resins that can be used in combination with each other to give a wide range of soft feel

In addition to the feel of the coating, the allnex resins also provide additional coating properties such as hardness, abrasion resistance, humidity resistance and weatherability

# THANK YOU FOR YOUR ATTENTION!



ANY QUESTIONS?

Please contact: [jon.shaw@allnex.com](mailto:jon.shaw@allnex.com)



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