

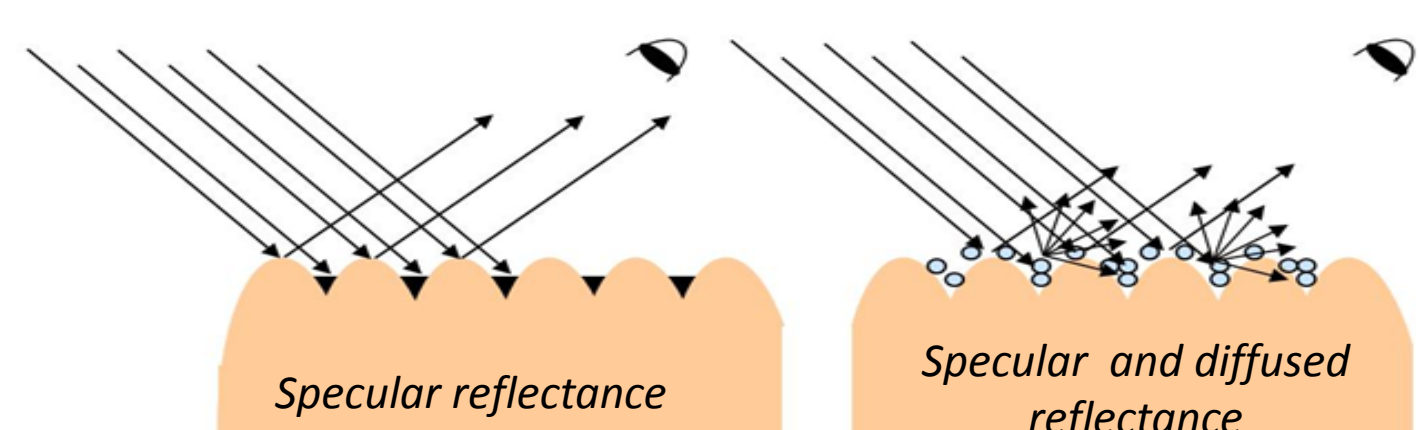
## Abstract

Today's consumers are seeking instant gratification for hiding skin imperfections such as pores, wrinkles and fine lines. Shin-Etsu's hybrid KSP spherical powders are designed to mask skin imperfections and offer superior sensorial benefits. These powders are transparent upon application combining the unique feel of silicone elastomer with optimal optical effects.

This is a continuation of a previous poster in which a simple anhydrous vehicle was used. In this poster, we used a fully formulated o/w vehicle and based on our extensive study we found empirical drivers such as volatility and absorption properties of the powders in addition to particle size and RI which dominates visual effects. The findings will enable the chemists to select the best blurring ingredient(s) to "dial in" the visual effects along with the best skin feel to develop the ideal blurring products.

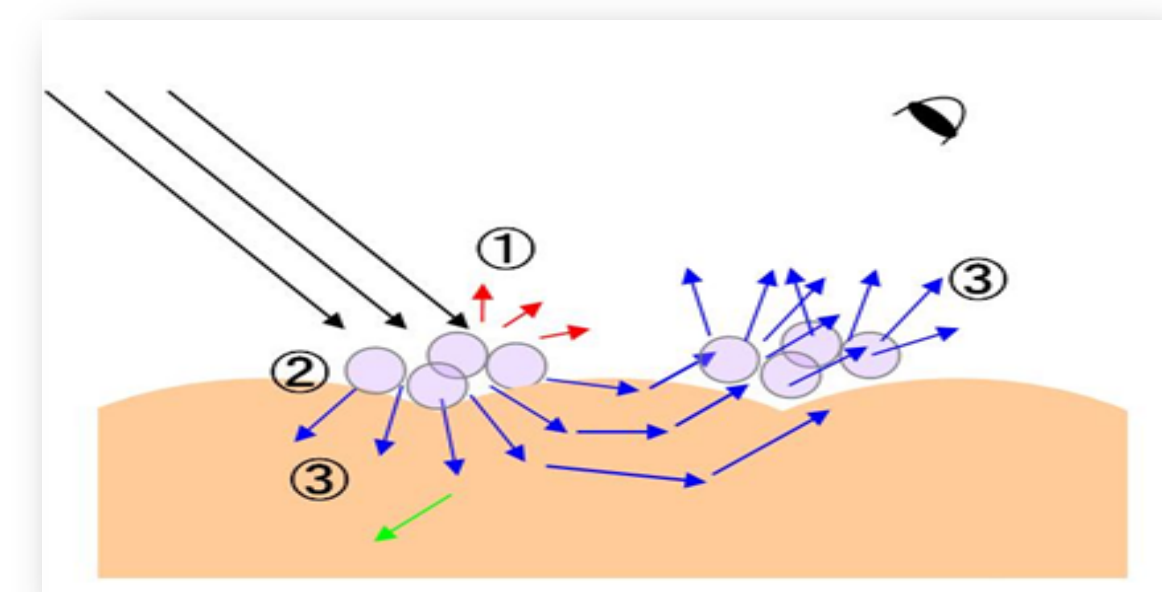
## Natural Looking: Soft Focus Technical Concept

### Wrinkles, Pores, Texture:



Wrinkles and pores are perceivable because of "shadow" effect (lost light)

### Hybrid Powder - Unique Properties:



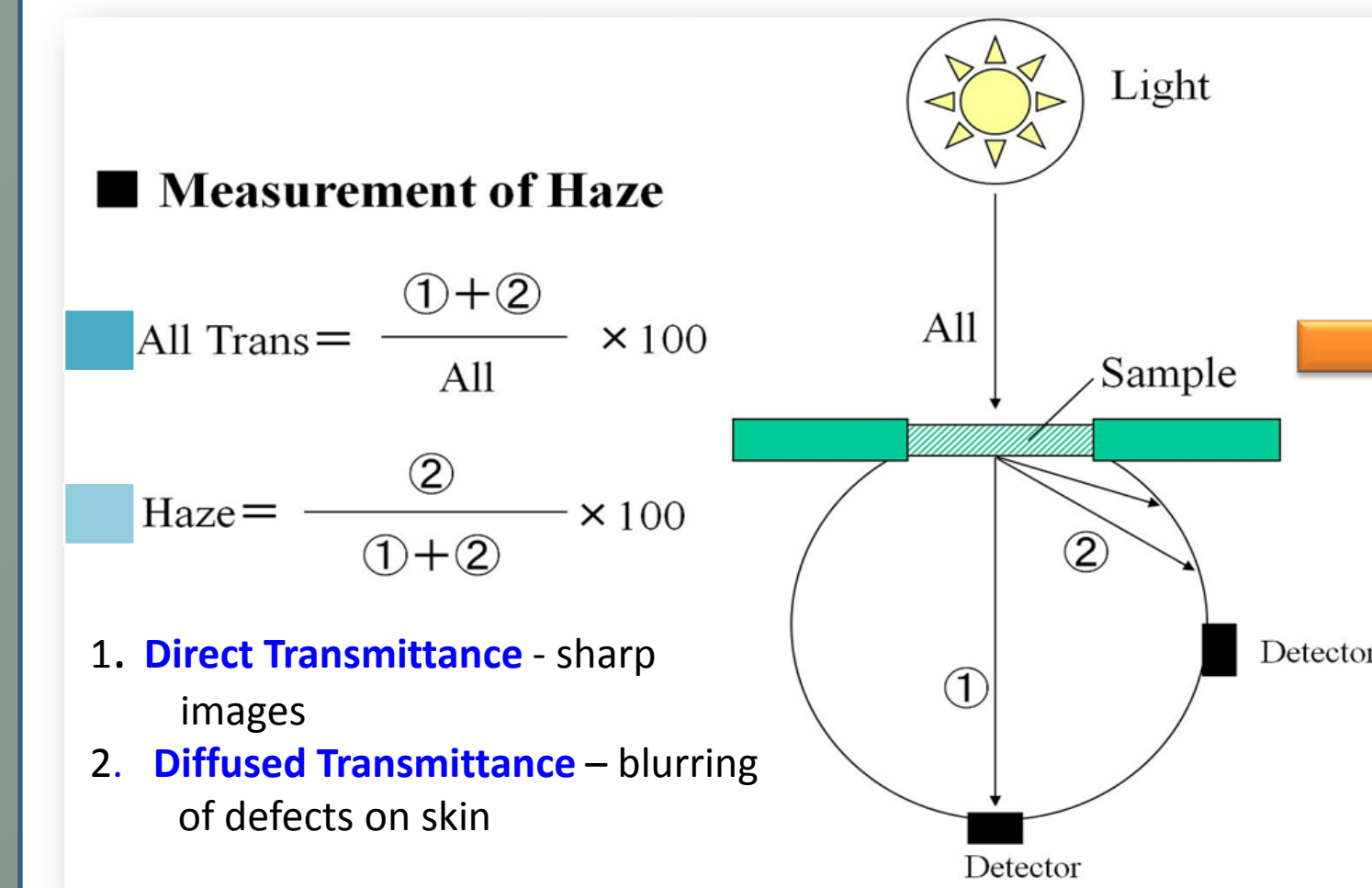
1. Low RI (refractive index): Control of reflected light and increase in transmitted light
2. Spherical Powder: Increase in diffusion efficiency
3. High Diffusivity of Transmitted Light: Light diffusion in the shallow part of skin and serum to the surface a lot of light

■ **High Total Transmittance (Diffuse + Direct) = Natural Look**

■ **Transmission Haze = Diffuse Transmittance/Total Transmittance**

■ **High Transmission Haze - Helps minimize texture (wrinkle) defects on skin**

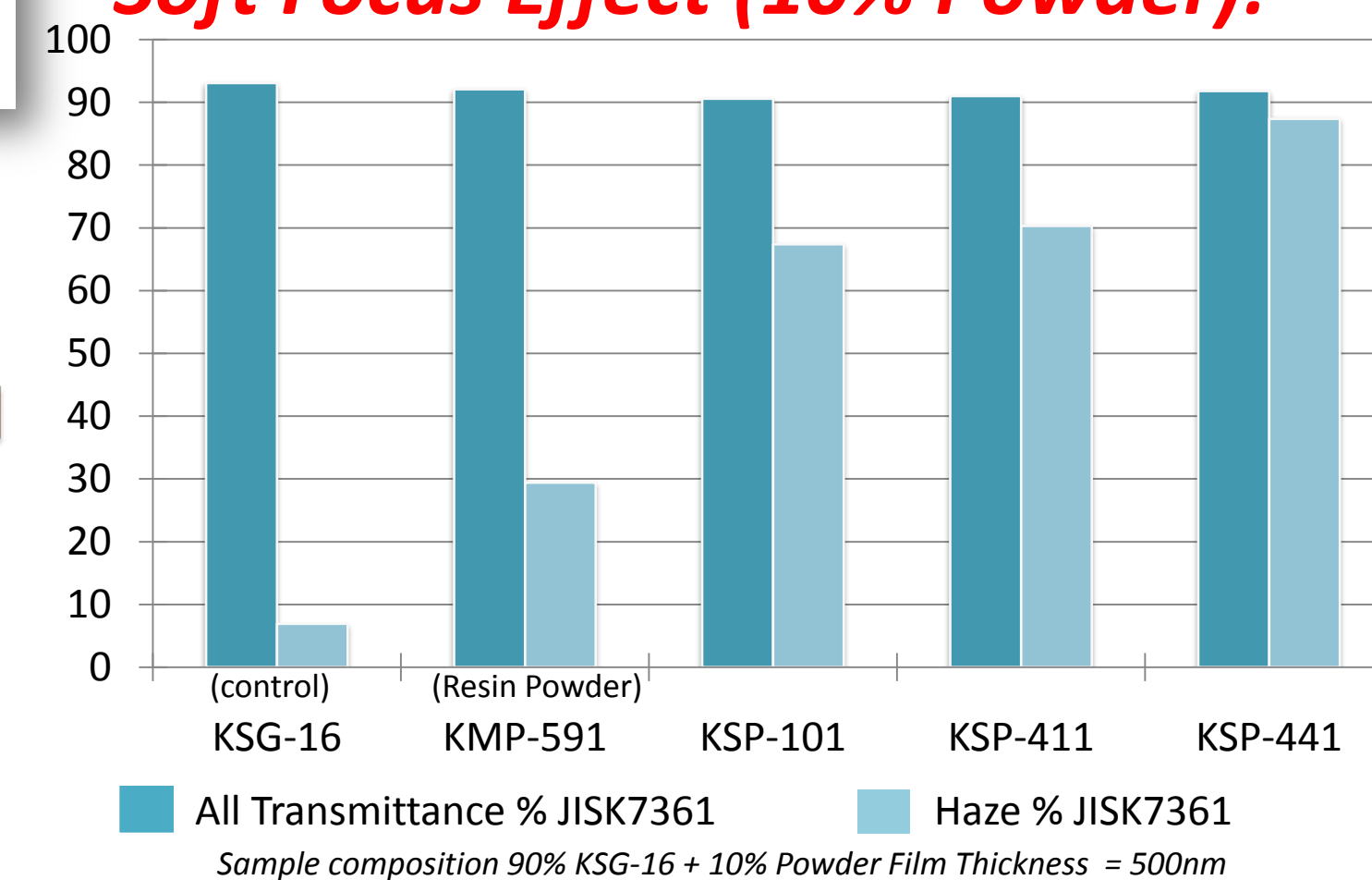
### In-vitro Measurement of Haze:



- ✓ Hybrid Powder gives higher %Haze When compared with Resin powder
- ✓ RI drives haze: KSP-441 > KSP-411 ~ KSP-101
- ✓ High transmittance provides a natural look

**Need to maximize both transmittance and haze for best look!**

### Soft Focus Effect (10% Powder):



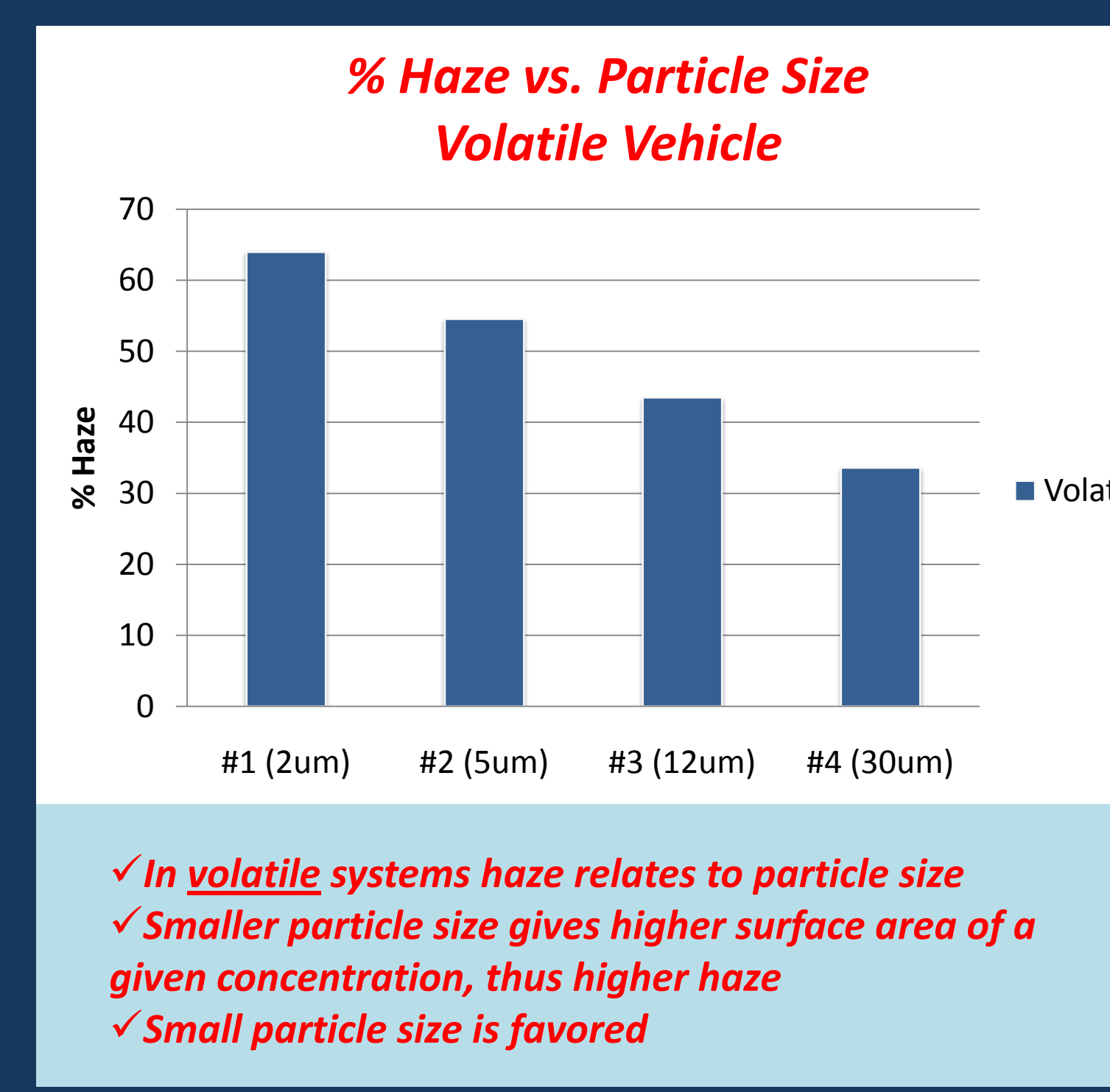
## KSP Series Silicone Hybrid Powder:

Product Name	INCI Name	Particle Size (um)	Chemical Structure	Scanning Electron Micrographs of Spherical Hybrid Powders
KSP-100	Vinyl Dimethicone/Methicone Silsequioxane Crosspolymer	5		
KSP-101		12		
KSP-102		30		
KSP-105		2		
KSP-300 (Phenyl Modified Core)	Diphenyl Dimethicone/Vinyl Diphenyl Dimethicone/Silsequioxane Crosspolymer	5	<ul style="list-style-type: none"> <li>•Low surface energy</li> <li>•Hydrophobicity</li> <li>•Easy to disperse</li> <li>•High slip</li> <li>•Smooth</li> </ul>	
KSP-411	Polysilicone - 1 Crosspolymer	12		
KSP-441 (Alkyl Modified Core)	Polysilicone-22	12		
<b>Benefits</b>				

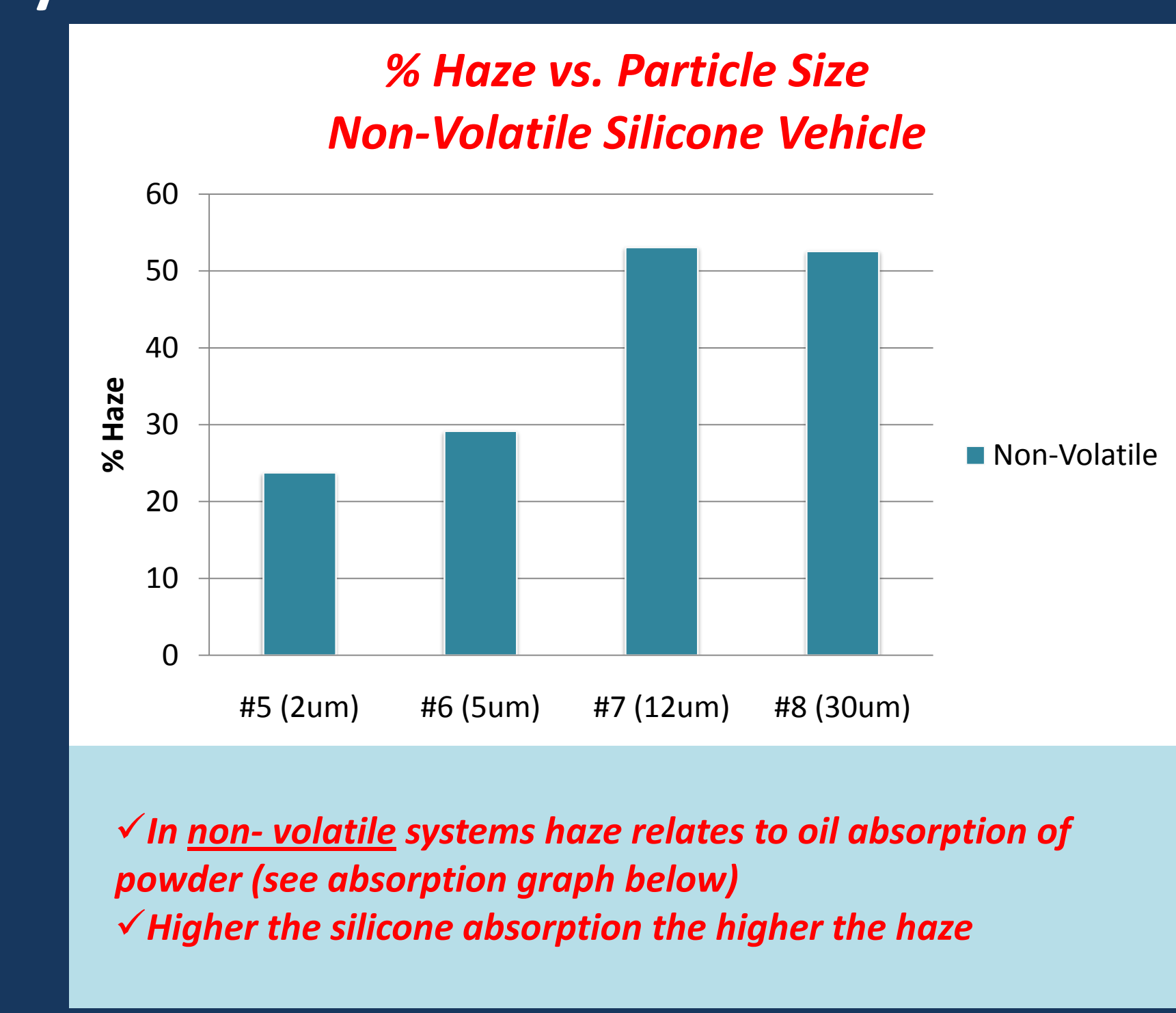
## O/W Model Formula: % Haze Studies

Ingredients	VOLATILE TRIALS				NON-VOLATILE TRIALS			
	#1	#2	#3	#4	#5	#6	#7	#8
Water	41.50	41.50	41.50	41.50	41.50	41.50	41.50	41.50
1,3 Butylene Glycol	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Sodium Chloride (1% AQ)	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
KF-6100	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
KF-6104	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Simulgel 600	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Aristoflex AVC (5% AQ)	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00
USG-105	20.00	20.00	20.00	20.00				
USG-107C					20.00	20.00	20.00	20.00
TMF-1.5 (61° c FP)	8.00	8.00	8.00	8.00				
DMF-A6 (174° c FP)					8.00	8.00	8.00	8.00
KSP-105	5.00				5.00			
KSP-100		5.00				5.00		
KSP-101			5.00				5.00	
KSP-102				5.00				5.00
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

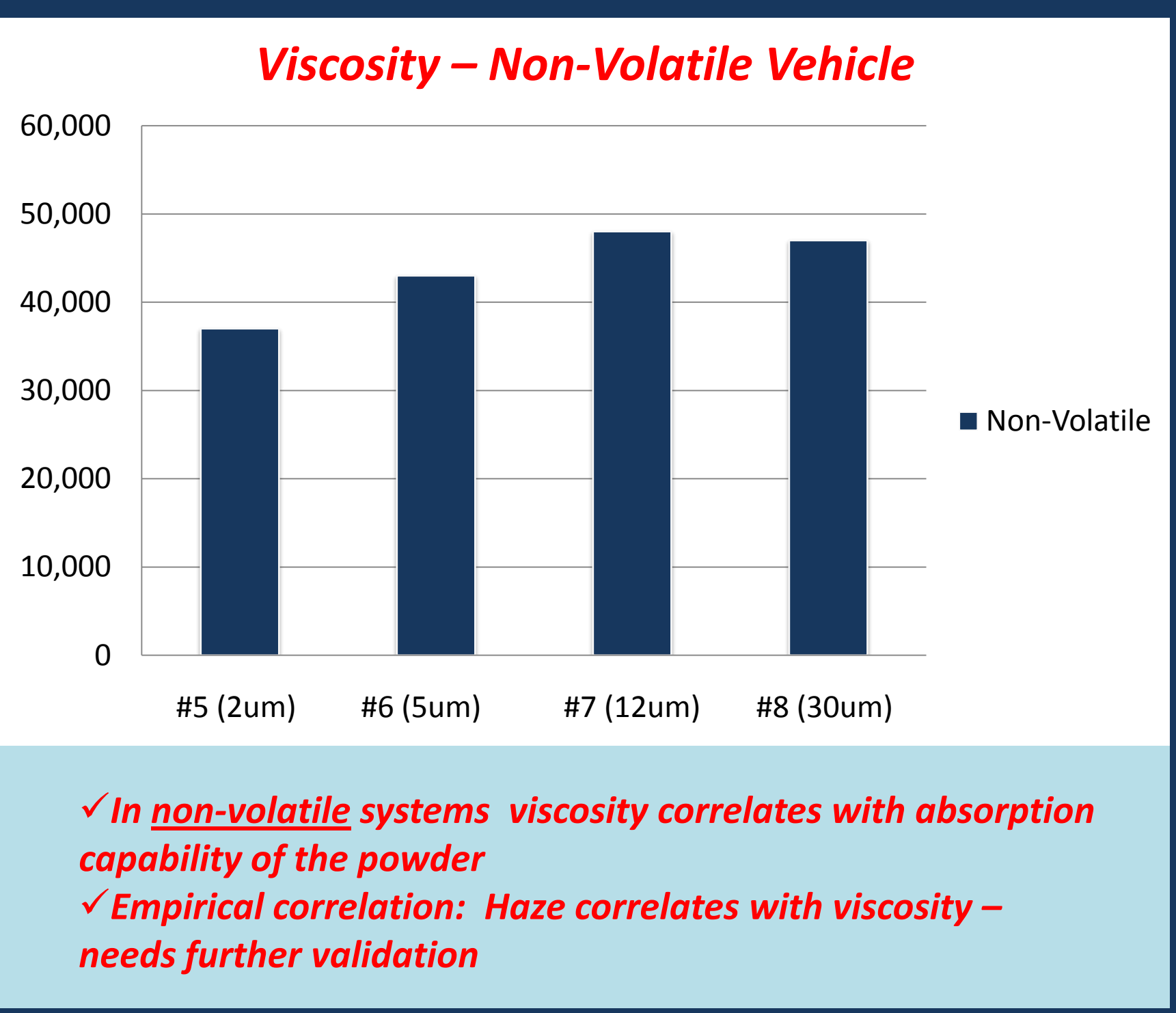
## Results: Soft Focus Effect of Silicone Hybrid Powders:



- ✓ In **volatile** systems haze relates to particle size
- ✓ **Smaller particle size gives higher surface area of a given concentration, thus higher haze**
- ✓ **Small particle size is favored**

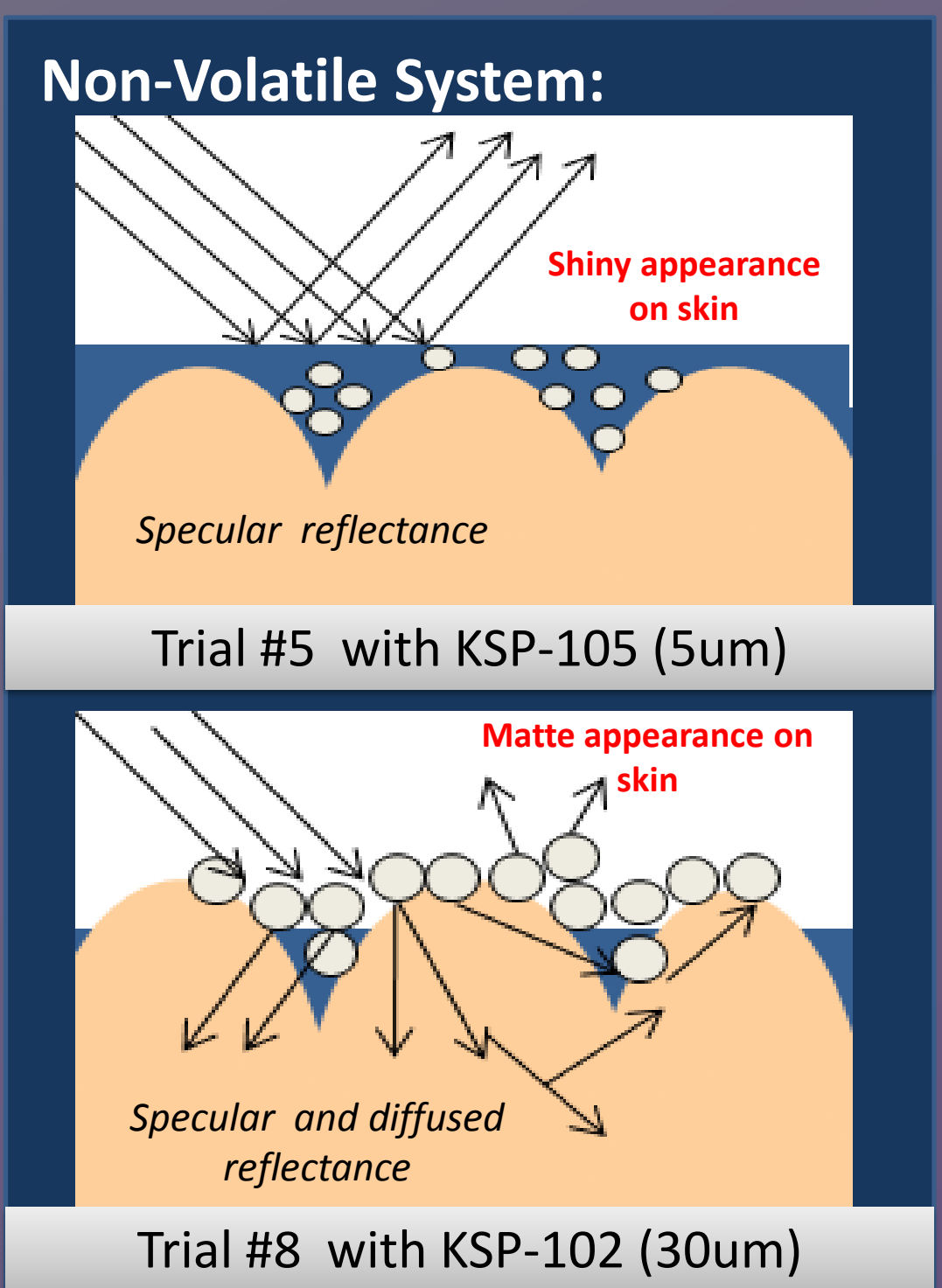
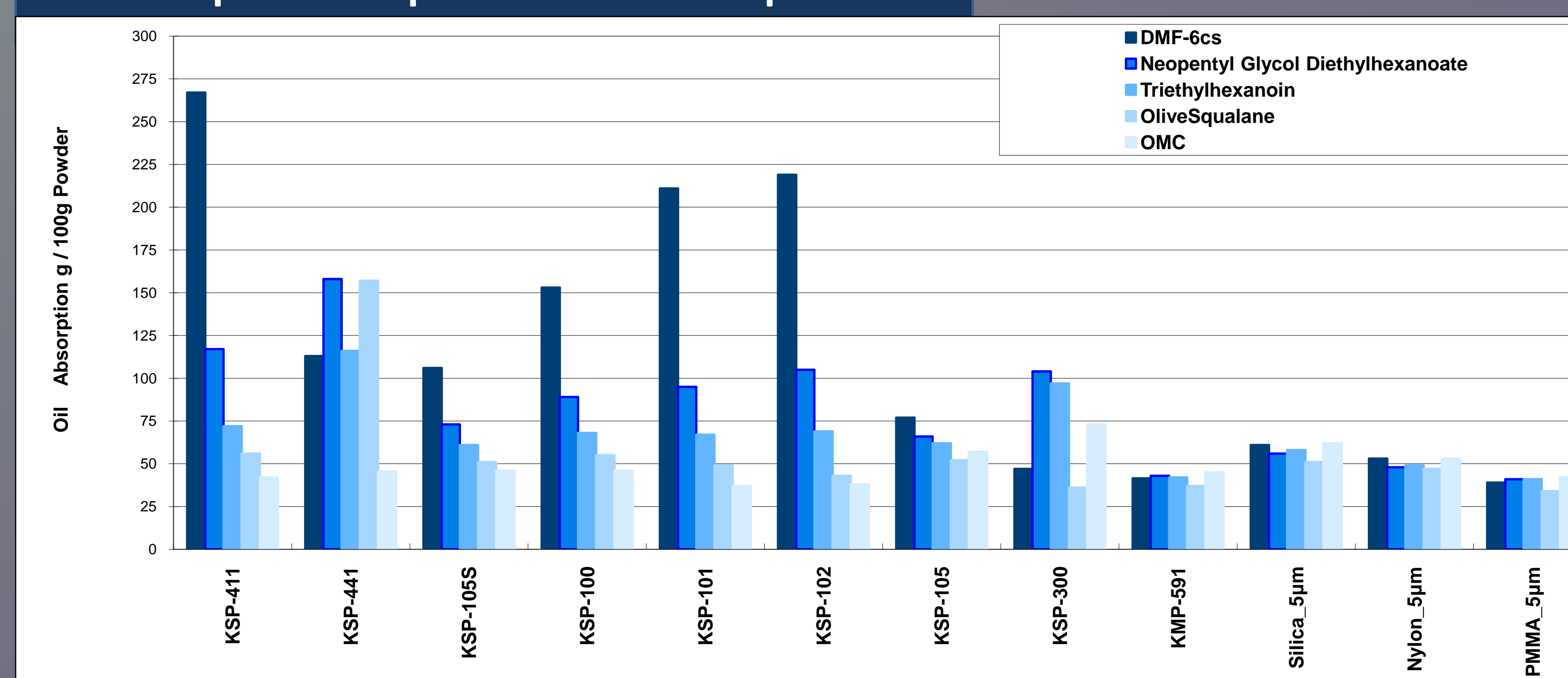


- ✓ In **non-volatile** systems haze relates to oil absorption of powder (see absorption graph below)
- ✓ **Higher the silicone absorption the higher the haze**



- ✓ In **non-volatile** systems viscosity correlates with absorption capability of the powder
- ✓ **Empirical correlation: Haze correlates with viscosity - needs further validation**

## Oil absorption comparison of various powders:



Trial/Powder Type	USG-105 (Volatile)				USG-107C (Non-Volatile)				Resin Powder (Comp.)
	#1	#2	#3	#4	#5	#6	#7	#8	
Viscosity cP (Initial)	34,000	46,000	55,000	68,000	37,000	43,000	48,000	47,000	38,000
Emulsion Appearance Ranking (whitest = 1)	1	2	3	4	1	2	3	4	3
Playtime	medium/long	medium	medium	medium/short	long	medium/long	medium	medium	long
Letter "A" Test (Relates to soft focus)	A	A	A	A	A	A	A	A	A

**Summary**

- In general hybrid powders are more effective than resin powders
- In **volatile** emulsion systems the selection rules are the same as anhydrous systems - the smaller the particle size the higher the % haze
- In **non-volatile** systems oil absorbing powders contribute significantly to the visual effect
- In **mixed** systems - maximize volatility and incorporate oil absorbing powders
- In-vitro measurements correlate with in-vivo studies