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RHEOLATE® HX
Highly effective associative thickeners for aqueous paints and coatings

HUNGAROCOAT, BUDAPEST, H; NOV 2018

Presented by Udo Schonhoff, Technical Sales Manager EMEA
Elementis, Cologne, Germany

RHEOLATE® HX series - Overview

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Technical background

- NiSAT-Associative thickeners
- RHEOLATE® HX technology and positioning

Practical examples

- System recommendations
  - ➢ Paints and coatings based on various binder technologies
- Reduction of complexity
- Additive combinations

Summary

NiSAT is an abbreviation for **N**on-**I**onic **S**ynthetic **A**ssociative **T**hickener

Technical background

RHEOLATE® NiSAT thickeners

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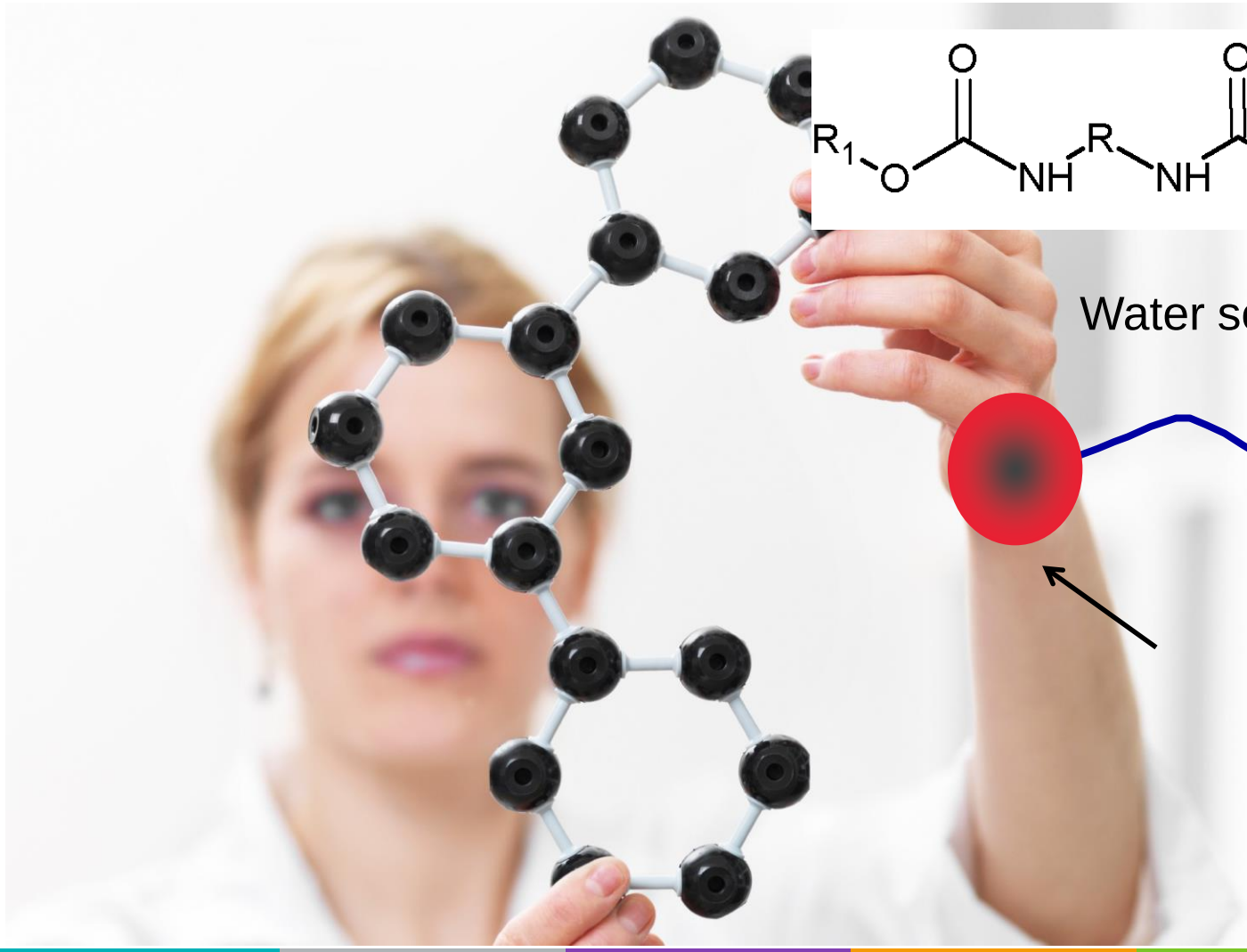
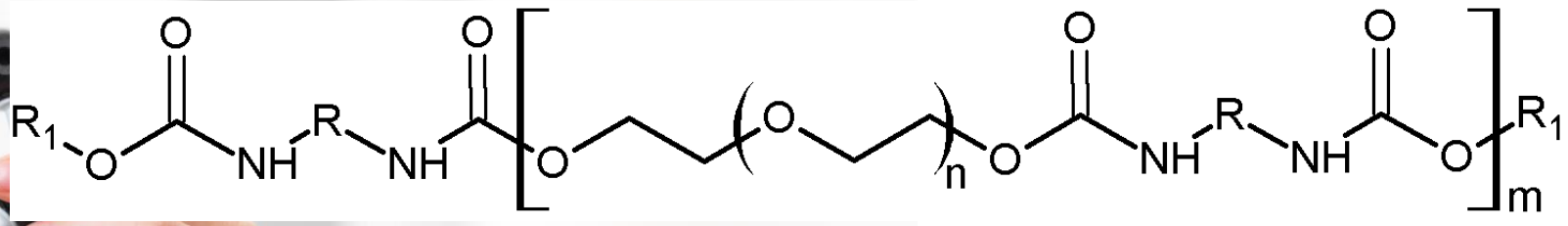
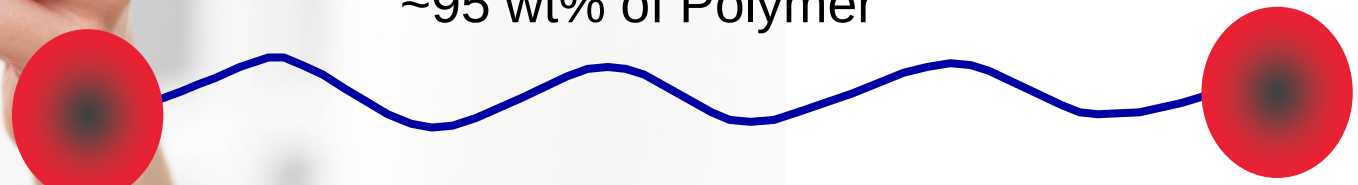
CHEMISTRY OF POLYETHER-POLYURETHANE





Water soluble nonionic polyether backbone
~95 wt% of Polymer



Hydrophobic caps

Mol. Wts. = 20000-50000 g/mol

NiSAT is an abbreviation for „**N**on**I**onic **S**ynthetic **A**ssociative **T**hickener“

RHEOLATE® NiSAT thickeners

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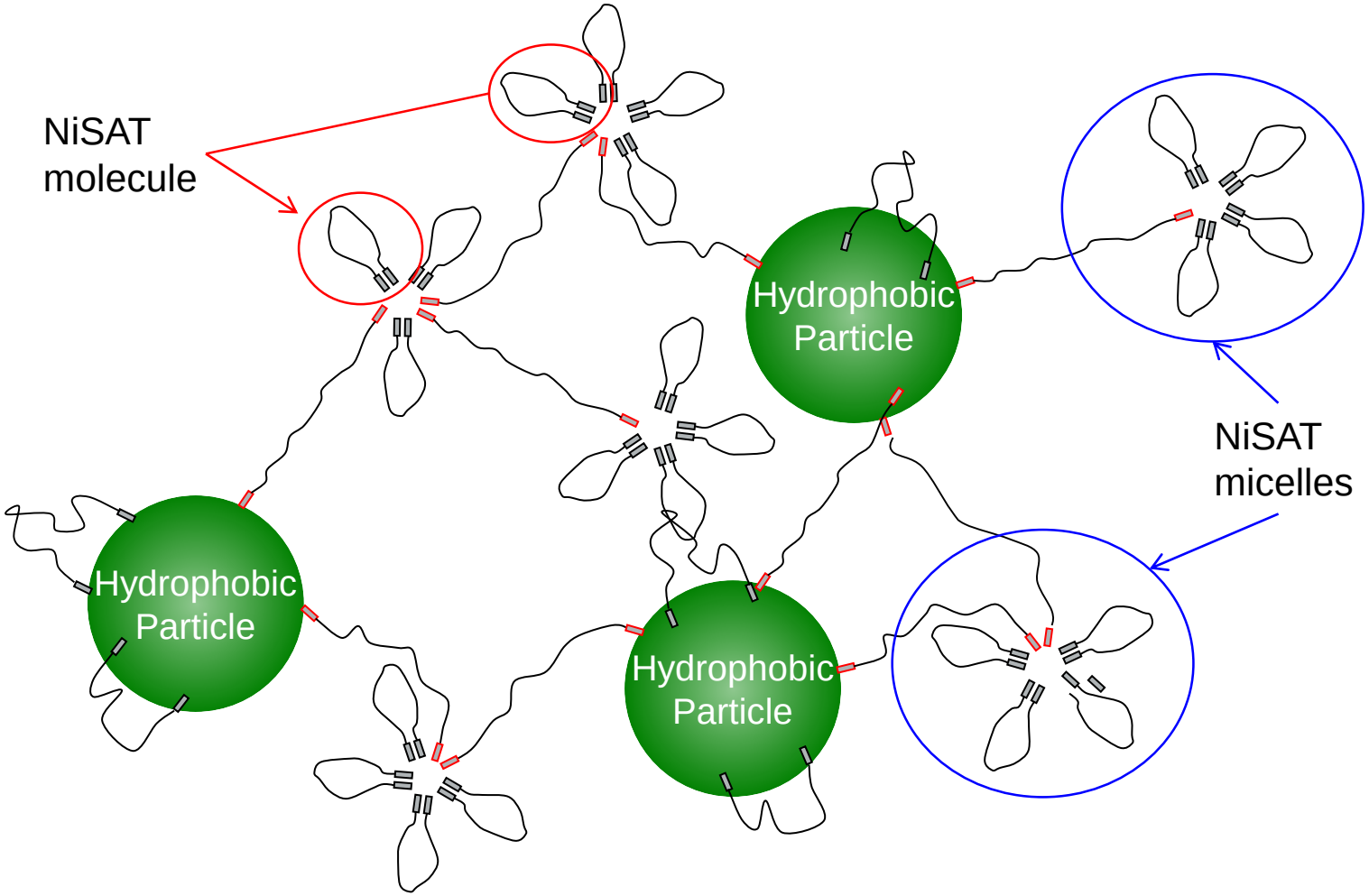
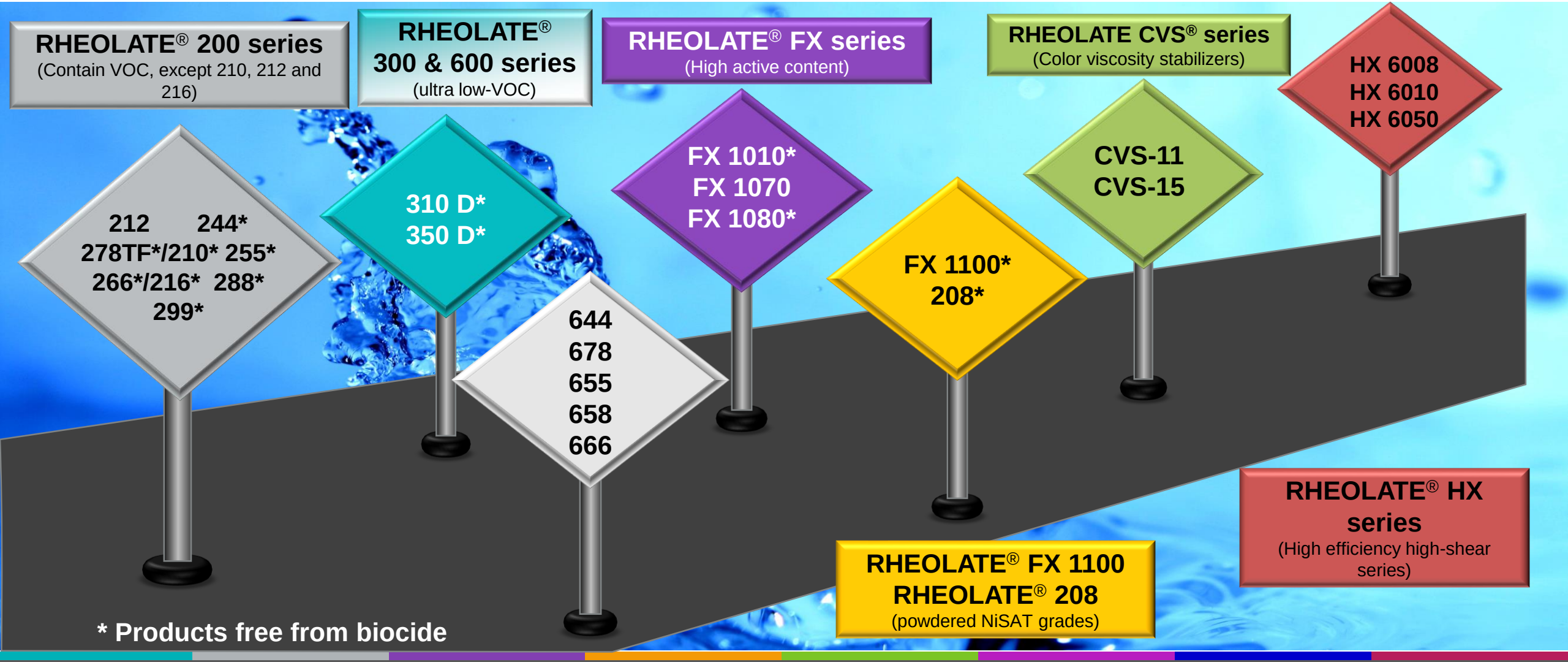
FULLY NETWORKED



NiSAT is an abbreviation for „**N**on**I**onic **S**ynthetic **A**ssociative **T**hickener“

RHEOLATE® - NiSAT thickeners

PRODUCT OVERVIEW



RHEOLATE® HX series

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OVERVIEW AND PRODUCT PROPERTIES

Properties	RHEOLATE® HX 6008	RHEOLATE® HX 6010	RHEOLATE® HX 6050
Flow character provided	Efficient high-shear viscosity builder with low and mid shear contribution	Efficient high shear viscosity builder to provide Newtonian flow character	Efficient high-shear viscosity builder with low and mid shear contribution
Active solids [%]	25	21	25
Odour/VOC [%]	Very low/<02	Very low/<02	Very low/<02
Dedicated latex technology	Acrylic Styrene Acrylic Aqueous alkyd	Acrylic Styrene Acrylic Vina-Veova VAE	VAE Vina-Veova Styrene-acrylic

VOC content determined in accordance with ASTM 6886-0; product viscosity in all cases below 3000 cps

RHEOLATE® HX series

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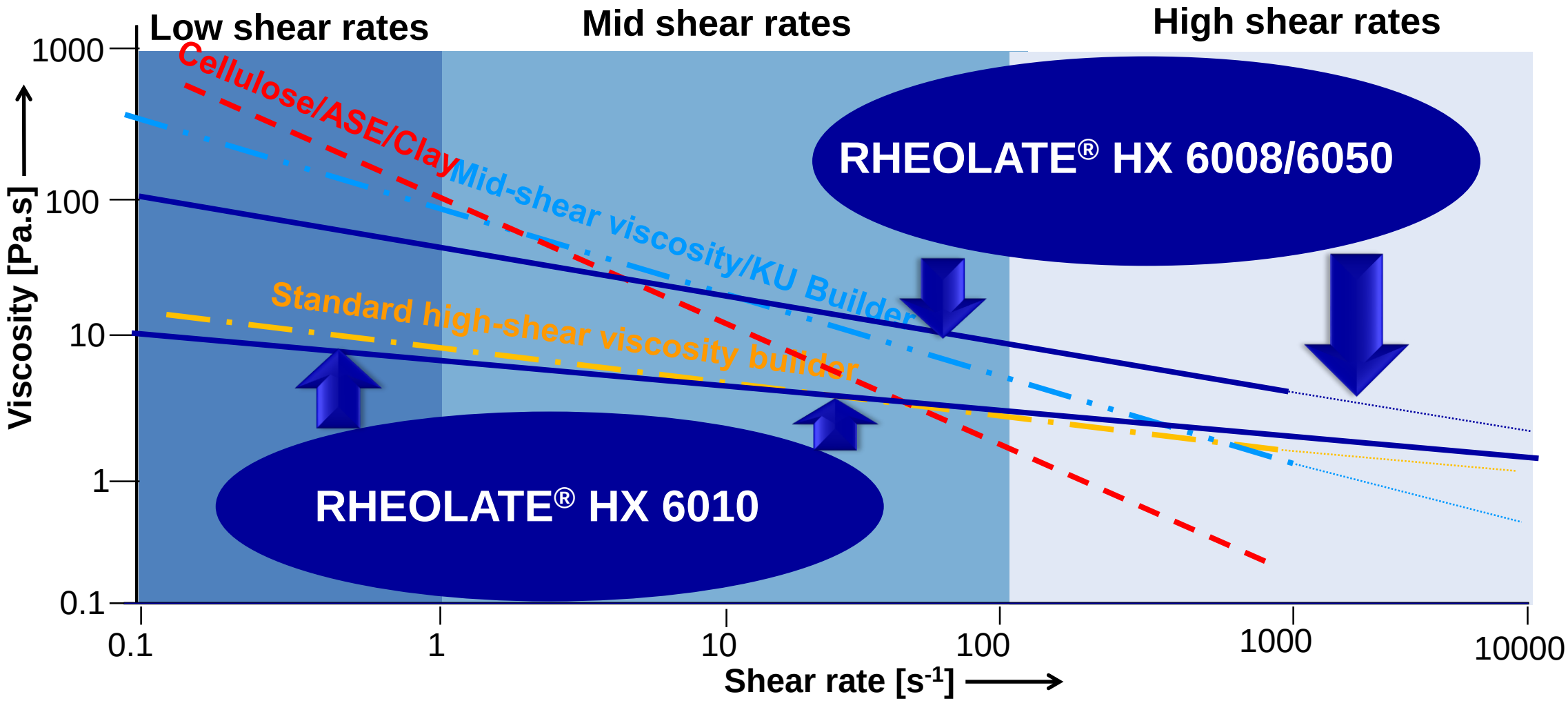
COMPARISON OF RHEOLOGY MODIFIERS



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Practical examples

RHEOLATE® HX – Latex dedication

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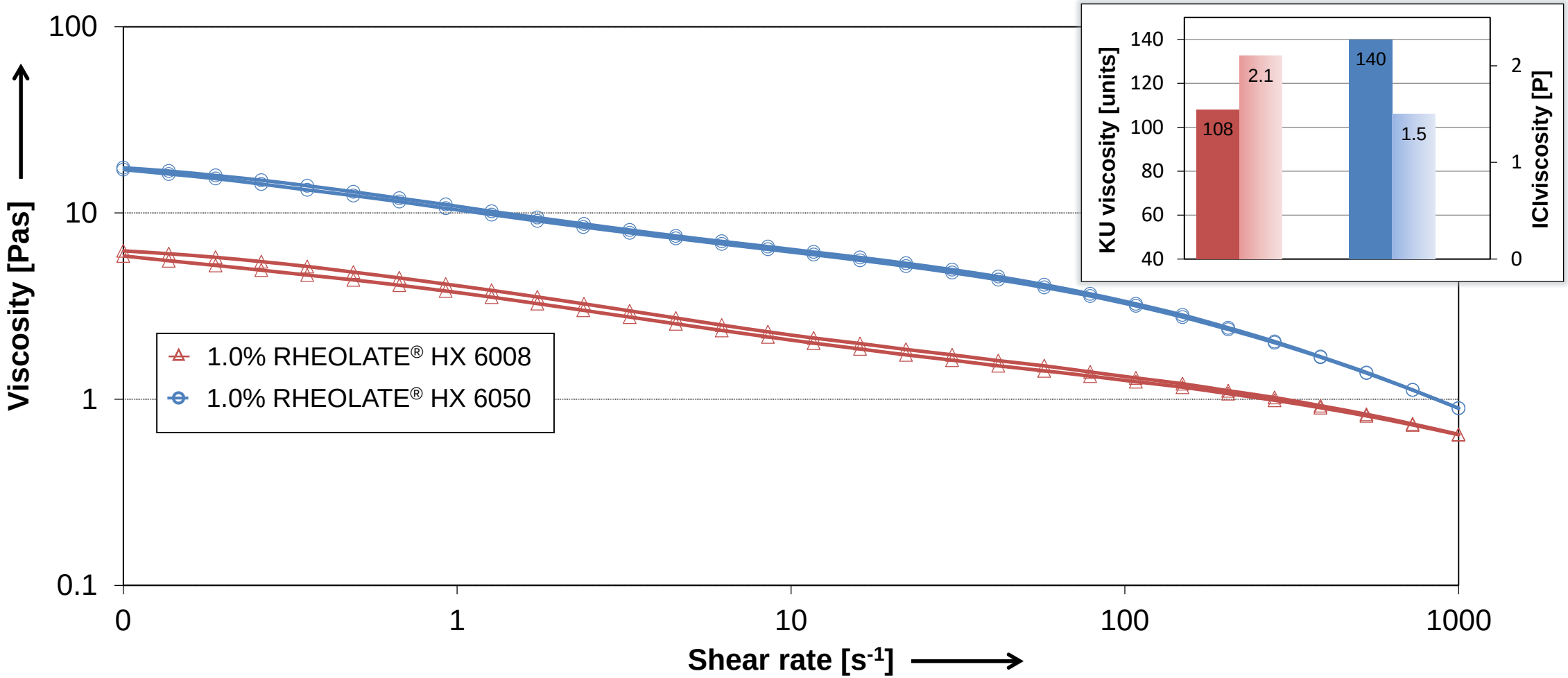
RHEOLOGICAL CHARACTERISTICS – PURE ACRYLIC PAINT PVC 30



Rheological data determined using the Anton-Paar MCR 300 rheometer, measuring geometry PP 50, at a temperature of 23°C; ICI viscosity indicates the viscosity at high shear rates of 10000 s^{-1}; KU describes the Krebs-Stormer viscosity; tested in a pure acrylic pvc 30% paint system; viscosity data of unthickened paint: ICI 0.2 and KU 47

RHEOLATE® HX – Latex dedication

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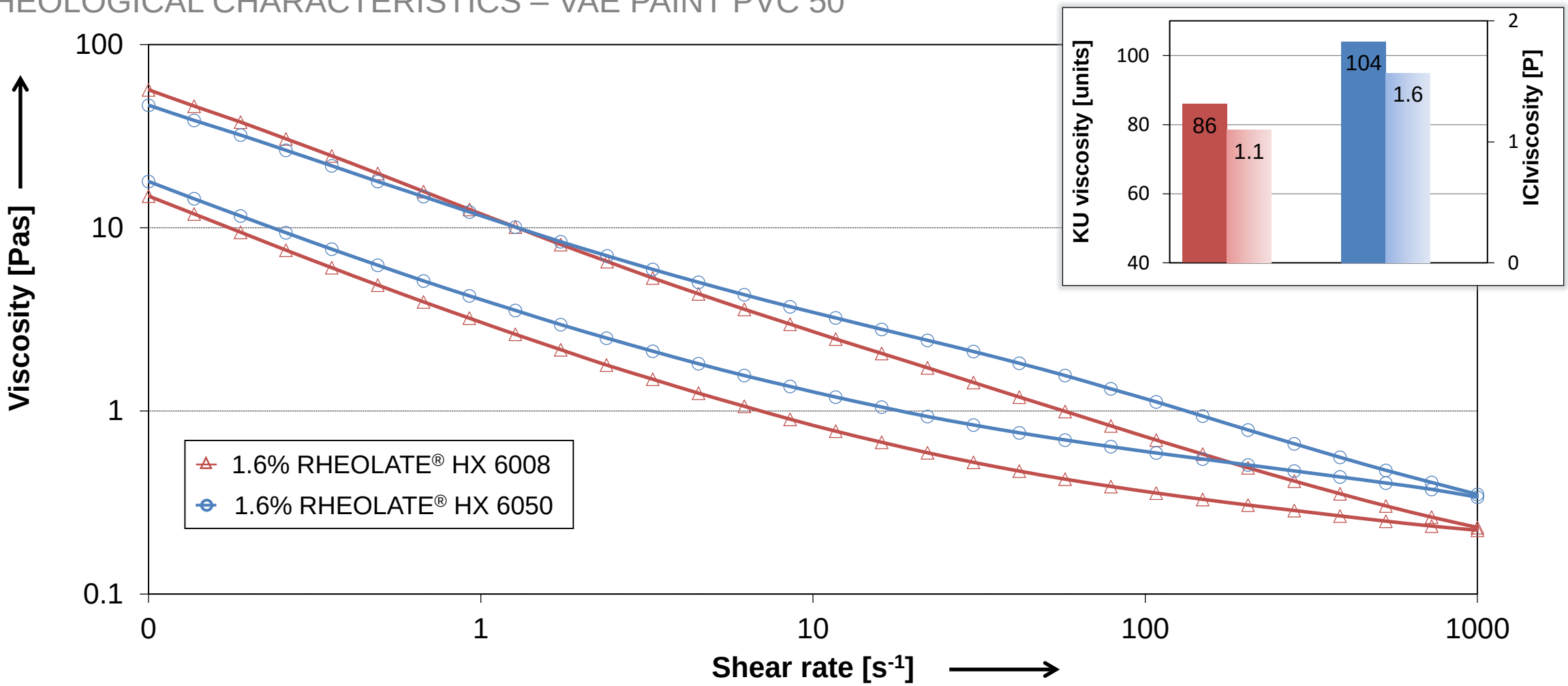
RHEOLOGICAL CHARACTERISTICS – VAE PAINT PVC 50



Rheological data determined using the Anton-Paar MCR 300 rheometer, measuring geometry PP 50, at a temperature of 23°C; ICI viscosity indicates viscosity at high shear rates of 10000 s^{-1}; KU is the Krebs-Stormer viscosity; tested in a Vinylacetate/Ethylene (VAE) based pvc 50% paint system; viscosity data of unthickened paint: ICI 0.35 and KU 65

RHEOLATE® HX series

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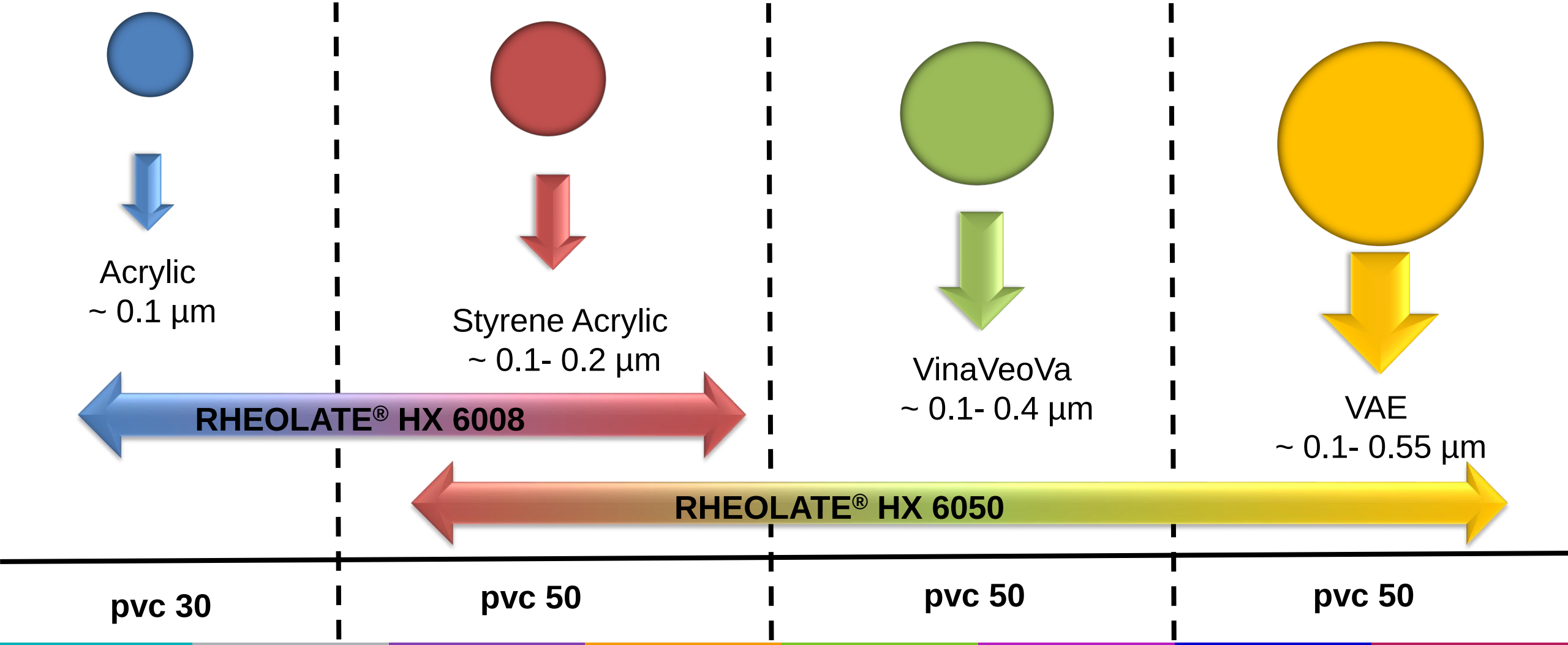
DEDICATION TO LATEX TYPES AND PARTICLE SIZE IN FORMULATIONS



Complexity in formulation and production

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Todays formulating practice:
Combination of high shear and low to mid shear thickener

ICI + KU

Can RHEOLATE® HX help to simplify?

RHEOLATE® HX – Complexity reduction

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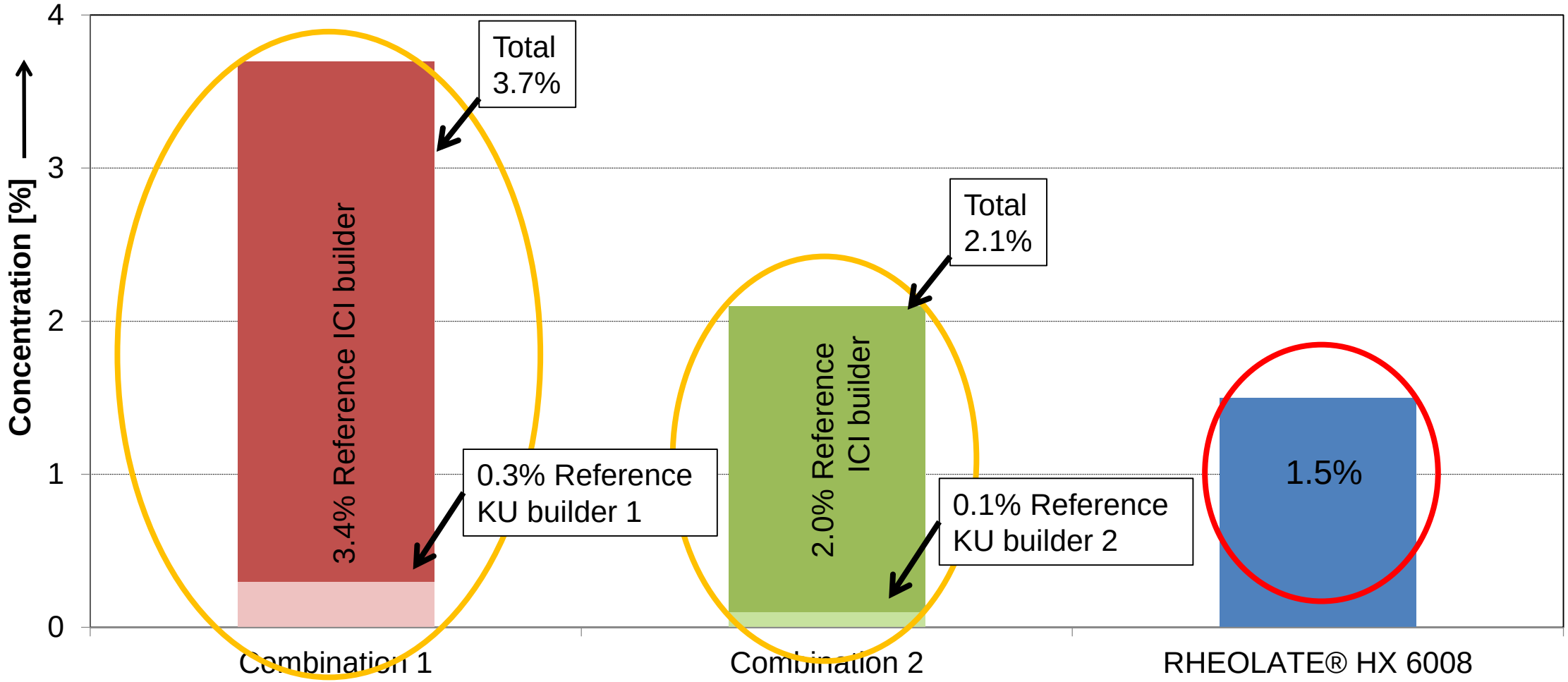
REQUIRED CONCENTRATION – ACRYLIC PAINT PVC 50



Concentration required to achieve Krebs-Stormer (KU) viscosity of ca. 118 ±1 units **and** a high-shear (ICI) viscosity of about 3 +/- 0.2 P; ICI viscosity indicates the viscosity at high shear rates of 10000 s^{-1}; KU describes the Krebs-Stormer viscosity; tested in a pure acrylic pvc 30% paint system

RHEOLATE® HX – Complexity reduction

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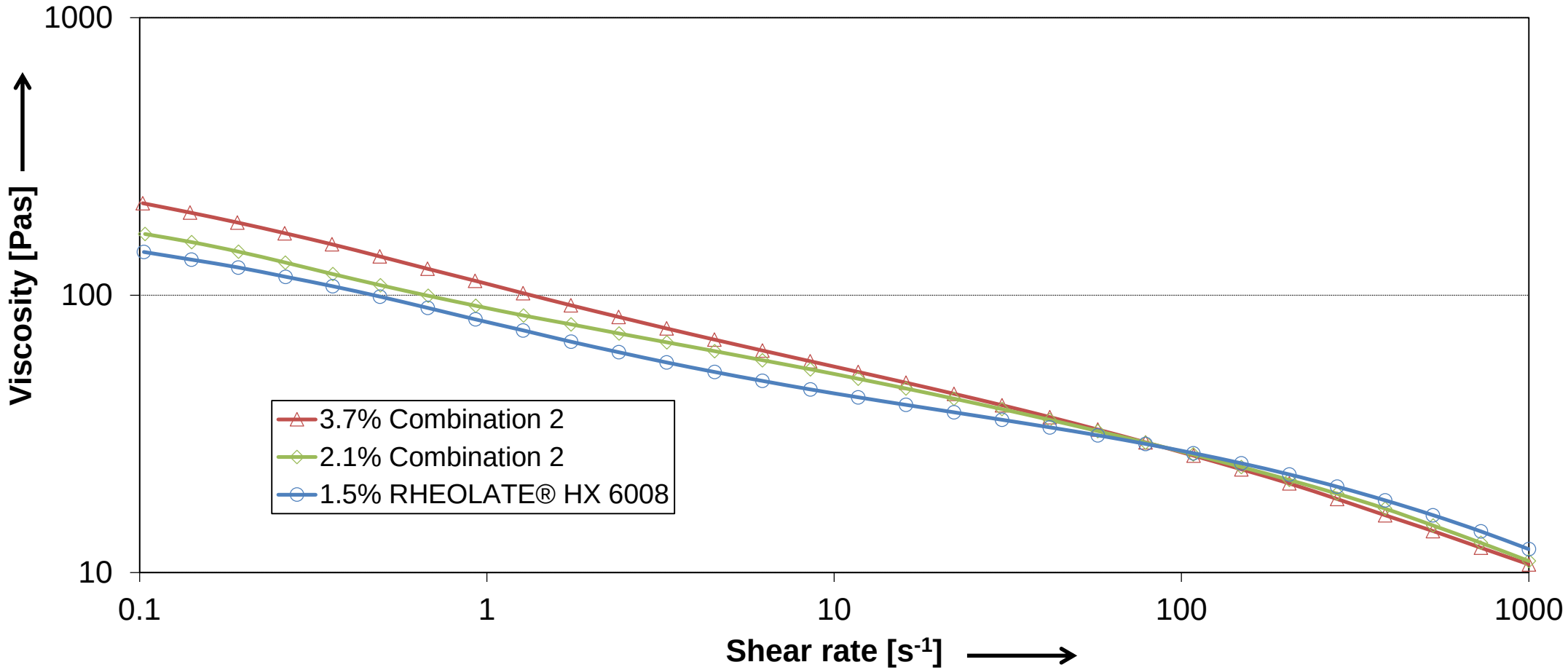
RHEOLOGICAL CHARACTERISTICS – ACRYLIC PAINT PVC 50



Paint adjusted to a Krebs-Stormer (KU) viscosity of ca. 118 ±1 units **and** a high-shear (ICI) viscosity of about 3 +/- 0.2 P; ICI viscosity indicates the viscosity at high shear rates of 10000 s^{-1}; KU describes the Krebs-Stormer viscosity; tested in a pure acrylic pvc 30% paint system; Rheological data determined using the Anton-Paar MCR 300 rheometer, measuring geometry PP 50, at a temperature of 23°C

RHEOLATE® HX – Complexity reduction

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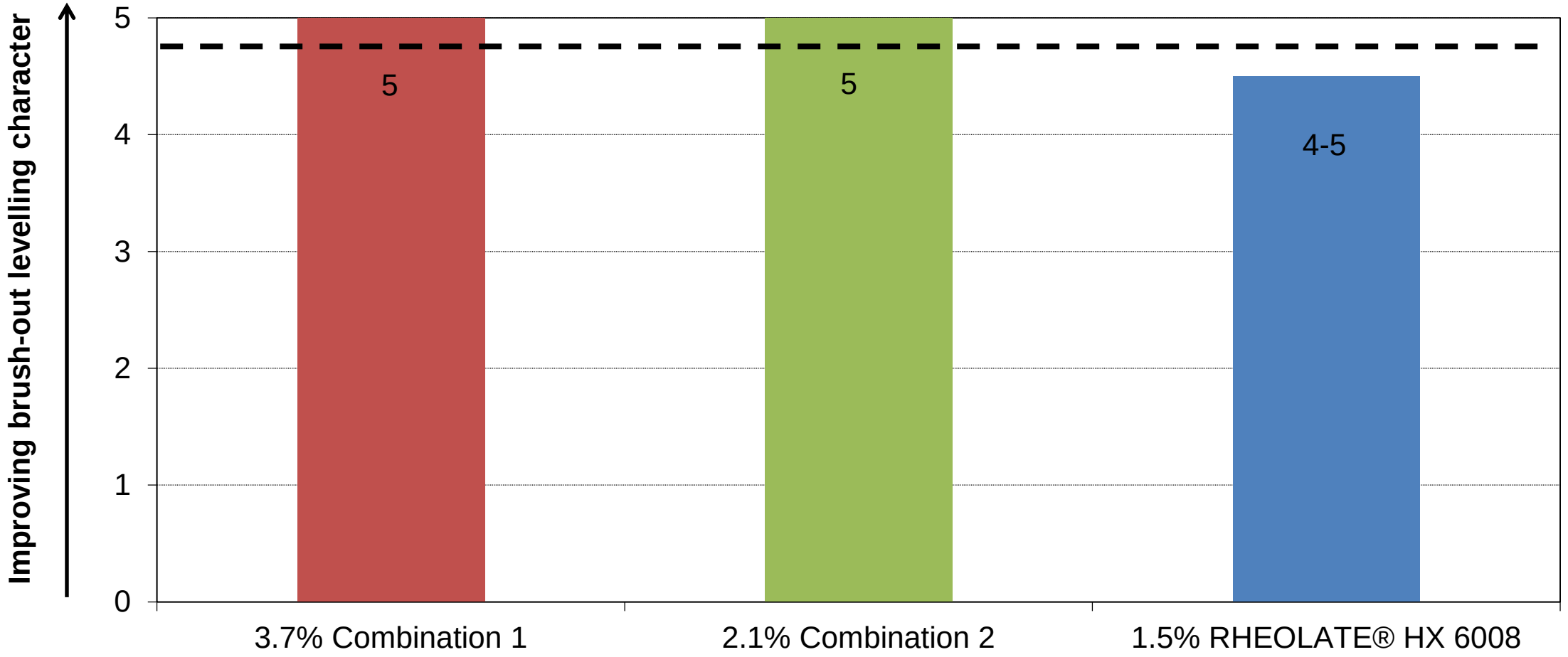
BRUSH-OUT LEVELLING – ACRYLIC PAINT PVC 50



Paint adjusted to a Krebs-Stormer (KU) viscosity of ca. 118 ±1 units **and** a high-shear (ICI) viscosity of about 3 +/- 0.2 P; ICI viscosity indicates the viscosity at high shear rates of 10000 s^{-1}; KU describes the Krebs-Stormer viscosity; tested in a pure acrylic pvc 30% paint system; 25g of paint brushed out equally on leneta chart; levelling was evaluated relatively after 24 h drying time at room temperature Measuring range: 0 = poor/5 = excellent; The larger the bar, the better the result

RHEOLATE® HX – Complexity reduction

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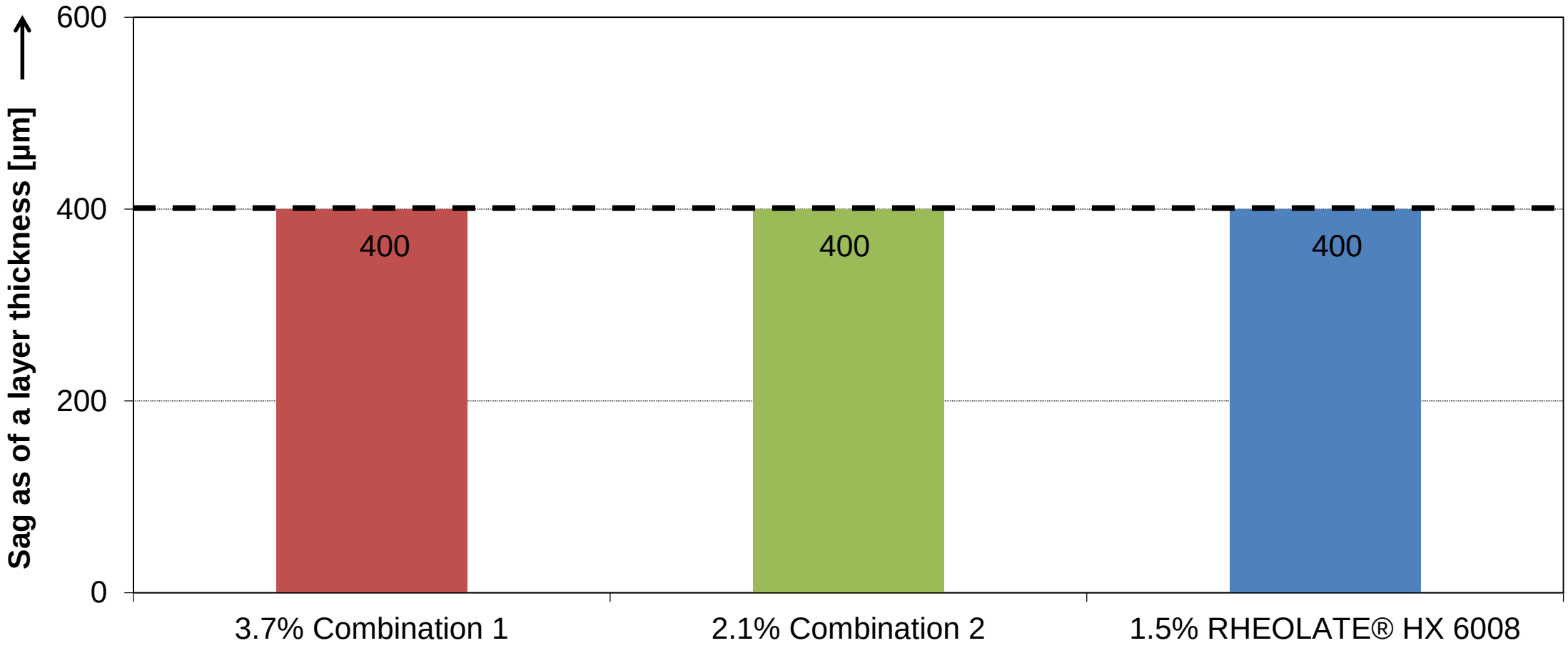
SAG CONTROL – ACRYLIC PAINT PVC 50



Paint adjusted to a Krebs-Stormer (KU) viscosity of ca. 118 ±1 units **and** a high-shear (ICI) viscosity of about 3 +/- 0.2 P; ICI viscosity indicates the viscosity at high shear rates of 10000 s^{-1}; KU describes the Krebs-Stormer viscosity; tested in a pure acrylic pvc 30% paint system; Sag stability tested using test blade 1000 -100µm; the larger the bar, the better the result

RHEOLATE® HX – Complexity reduction

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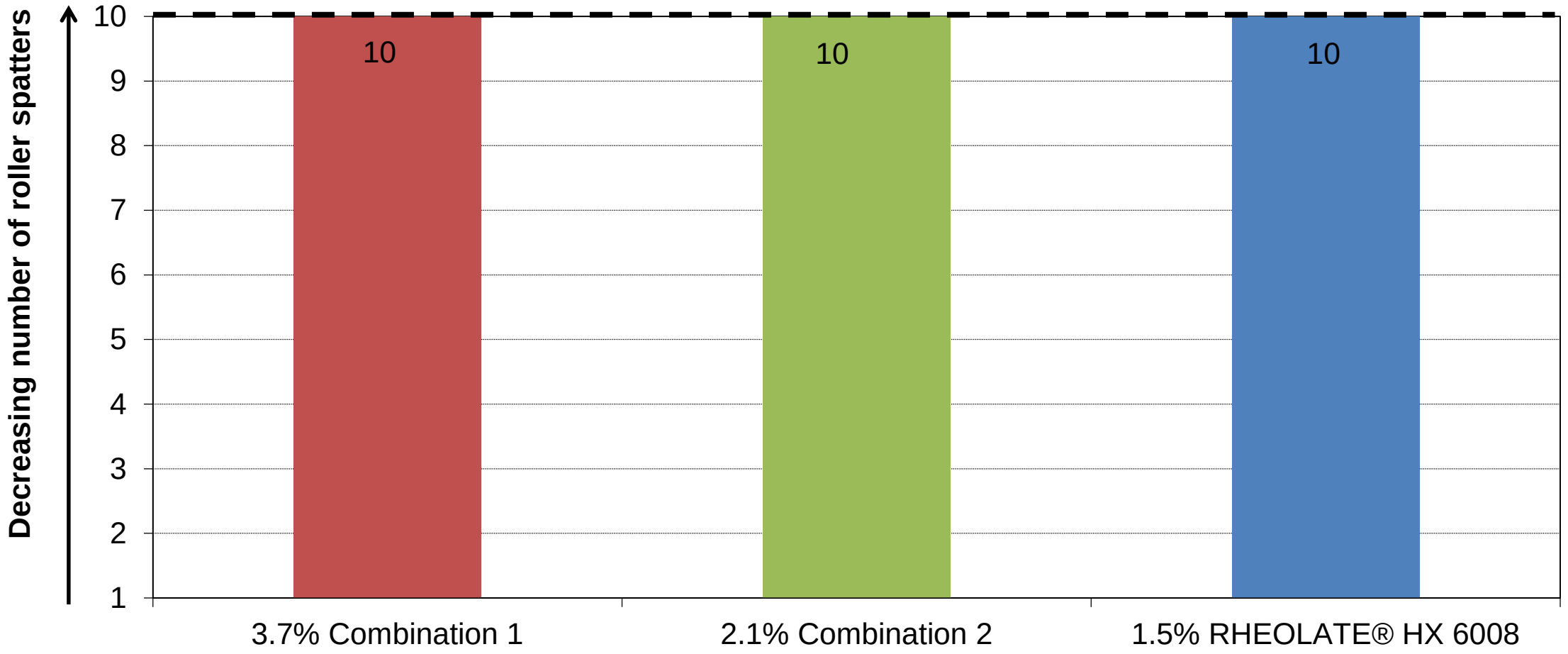
ROLLER/SPATTER CONTROL – ACRYLIC PAINT PVC 50



Paint adjusted to a Krebs-Stormer (KU) viscosity of ca. 118 ±1 units **and** a high-shear (ICI) viscosity of about 3 +/- 0.2 P; ICI viscosity indicates the viscosity at high shear rates of 10000 s^{-1}; KU describes the Krebs-Stormer viscosity; tested in a pure acrylic pvc 30% paint system; 40g of paint rolled on vertical wall (10 times up & down); Spatters collected on black chart underneath and judged visually; the larger the bar the better the result

RHEOLATE® HX – Performance comparison

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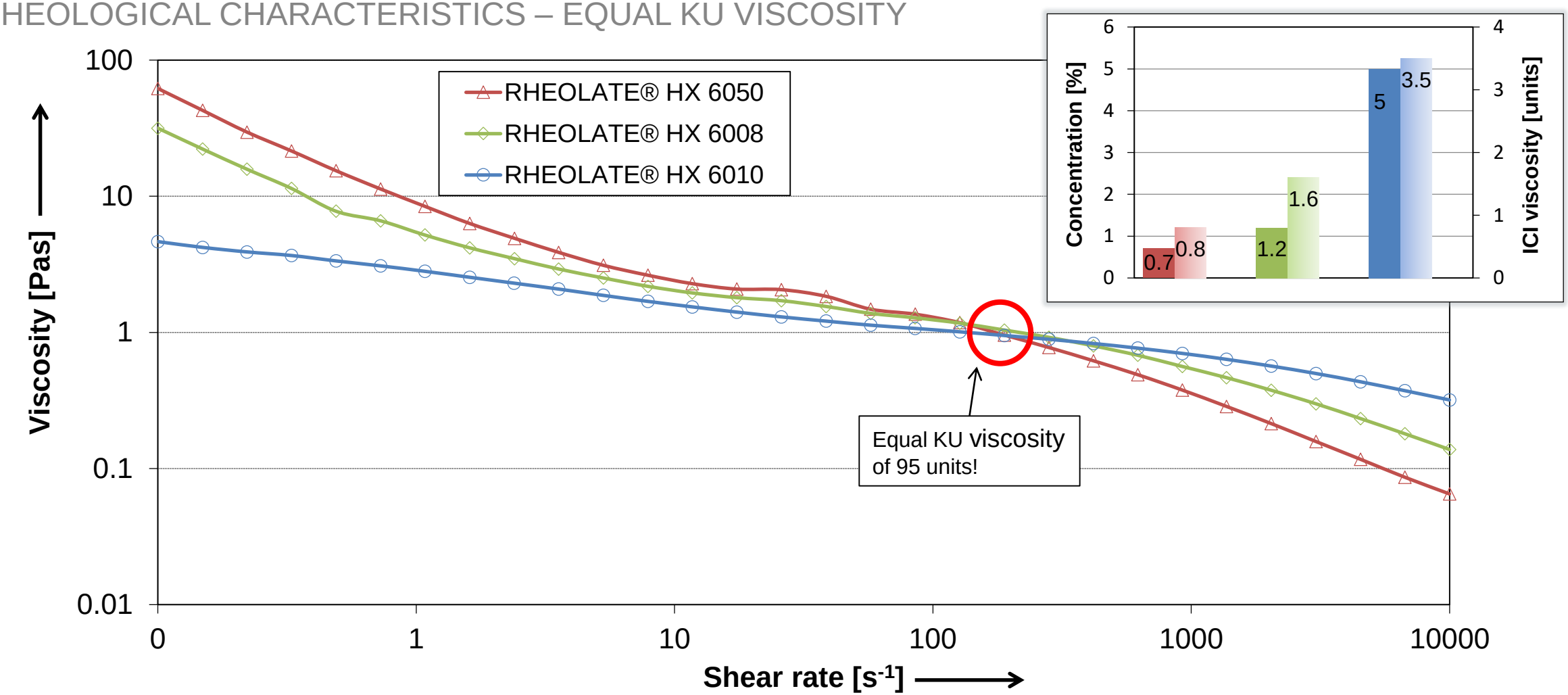
RHEOLOGICAL CHARACTERISTICS – EQUAL KU VISCOSITY



Rheological data measured with the Anton-Paar MCR 301 rheometer, geometry PP 50, at a temperature of 23°C; ICI viscosity indicates the viscosity at high shear rates of 10000 s^{-1}; KU describes the Krebs-Stormer viscosity; All samples adjusted to equal KU viscosity of 95 units; Pure acrylic pvc 30 paint

RHEOLATE® HX – Performance comparison

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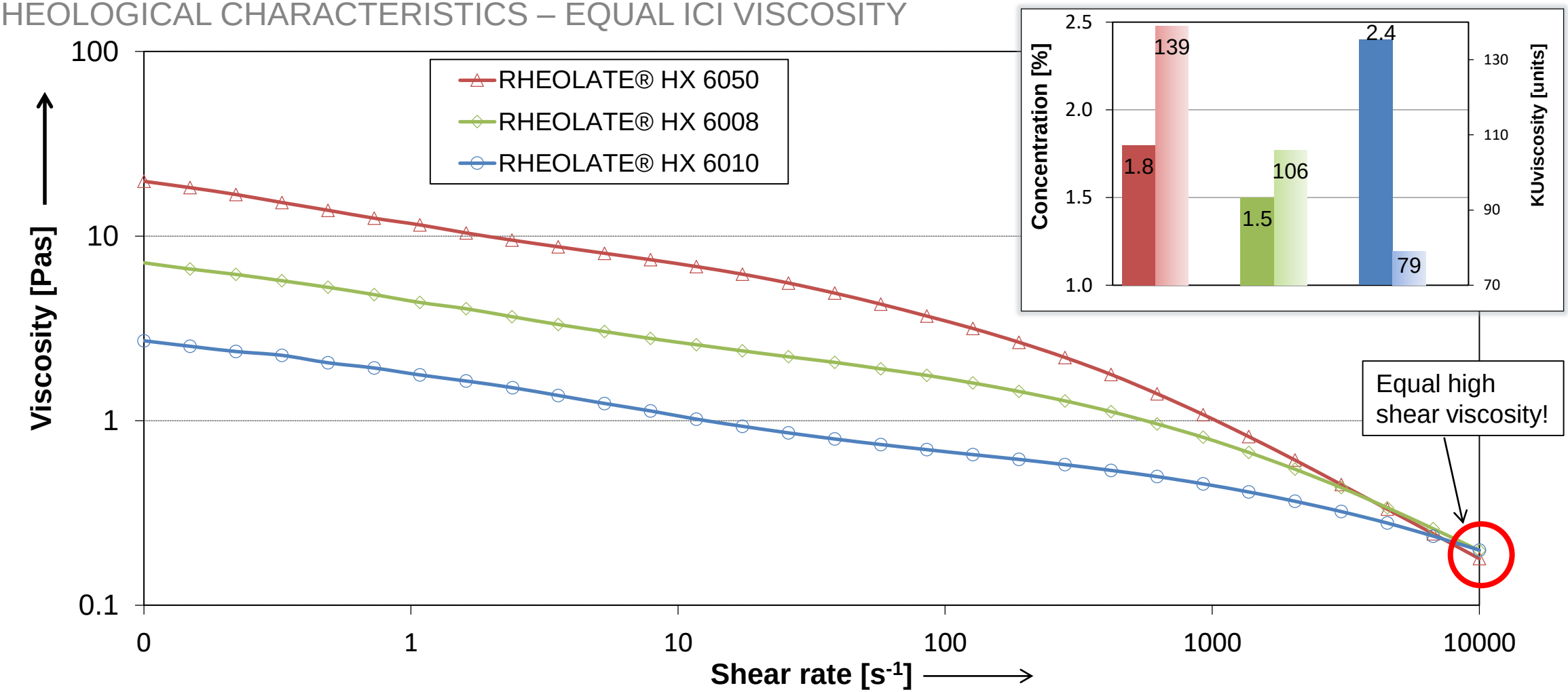
RHEOLOGICAL CHARACTERISTICS – EQUAL ICI VISCOSITY



Rheological data measured with the Anton-Paar MCR 301 rheometer, geometry PP 50, at a temperature of 23°C; ICI viscosity indicates the viscosity at high shear rates of 10000 s^{-1}; KU describes the Krebs-Stormer viscosity; All samples adjusted to equal ICI viscosity of 2.0 Poise; Pure acrylic pvc 30 paint

RHEOLATE® HX – Efficiency in AQ alkyd paint

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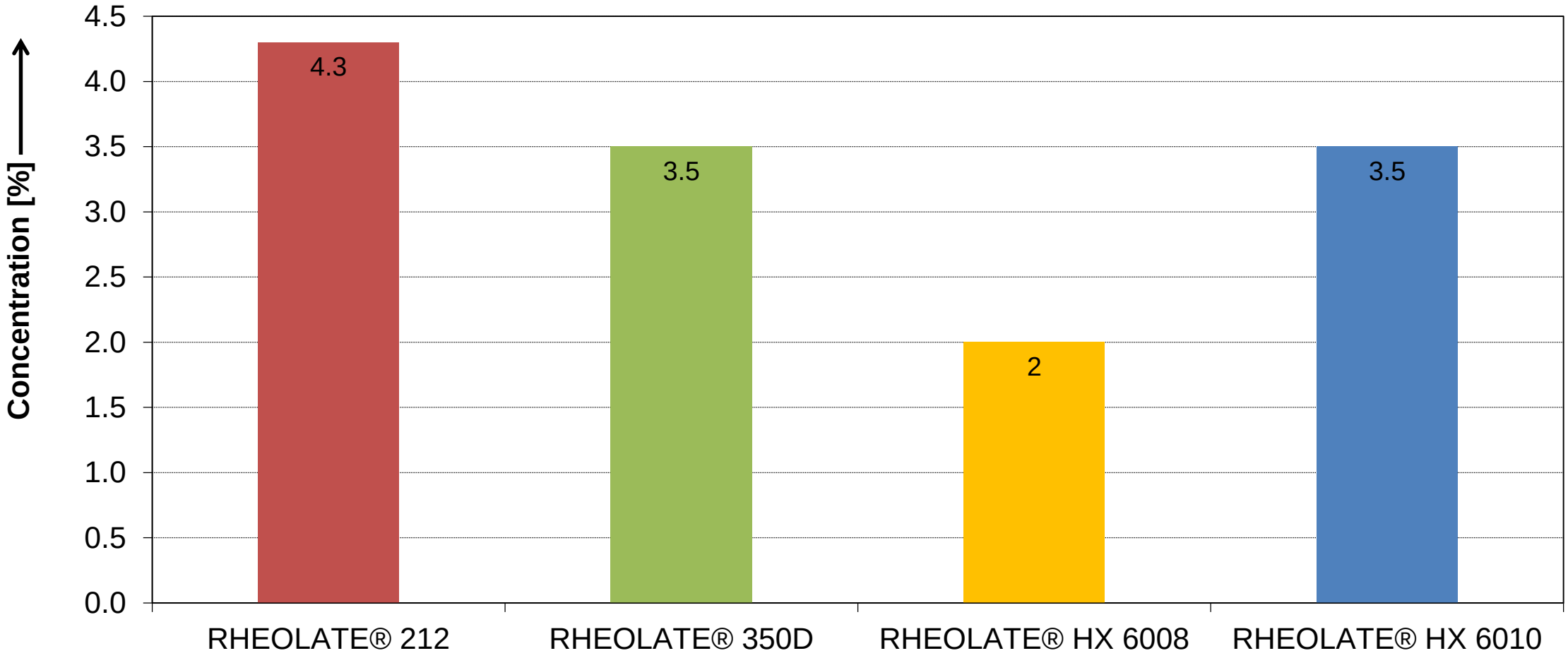
CONCENTRATION TO ACIEVE EQUAL HIGH-SHEAR VISCOSITY



Concentration necessary to achieve equal high-shear (ICI) viscosity of 4.0 units; Rheological data determined at a temperature of 23°C; ICI viscosity indicates the viscosity at high shear rates of 10000 s^{-1}; tested in an aqueous PU-alkyd based paint

Adjustment of individual flow

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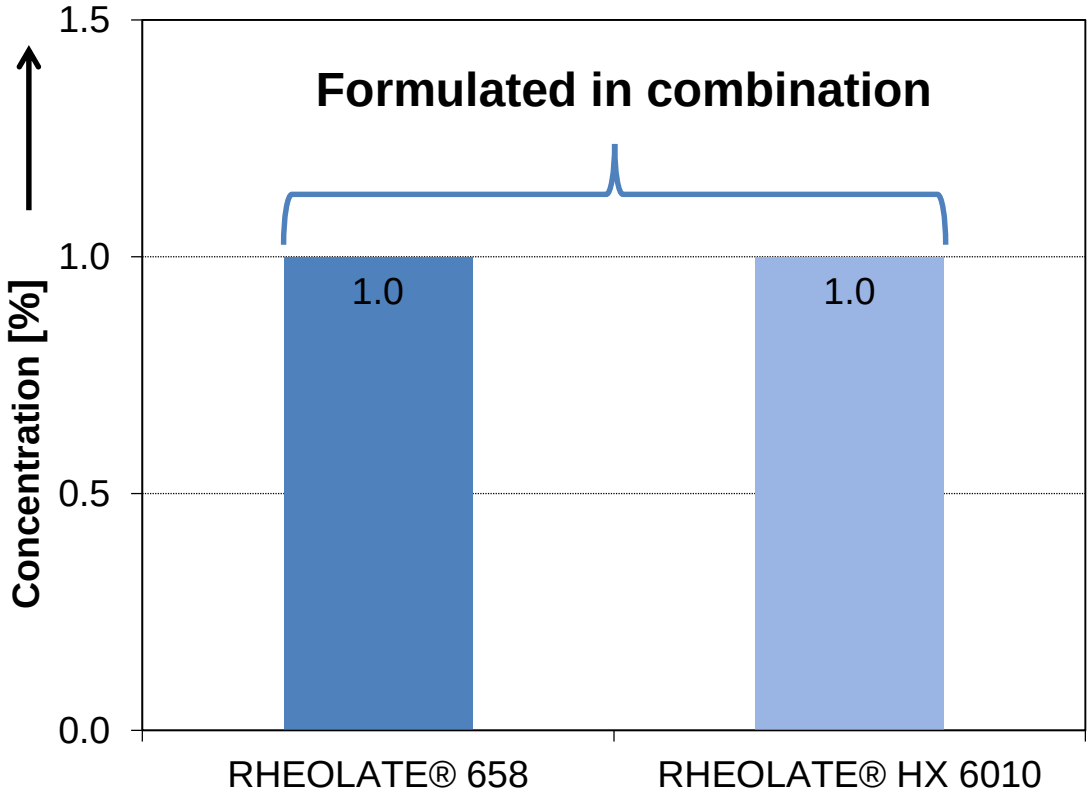
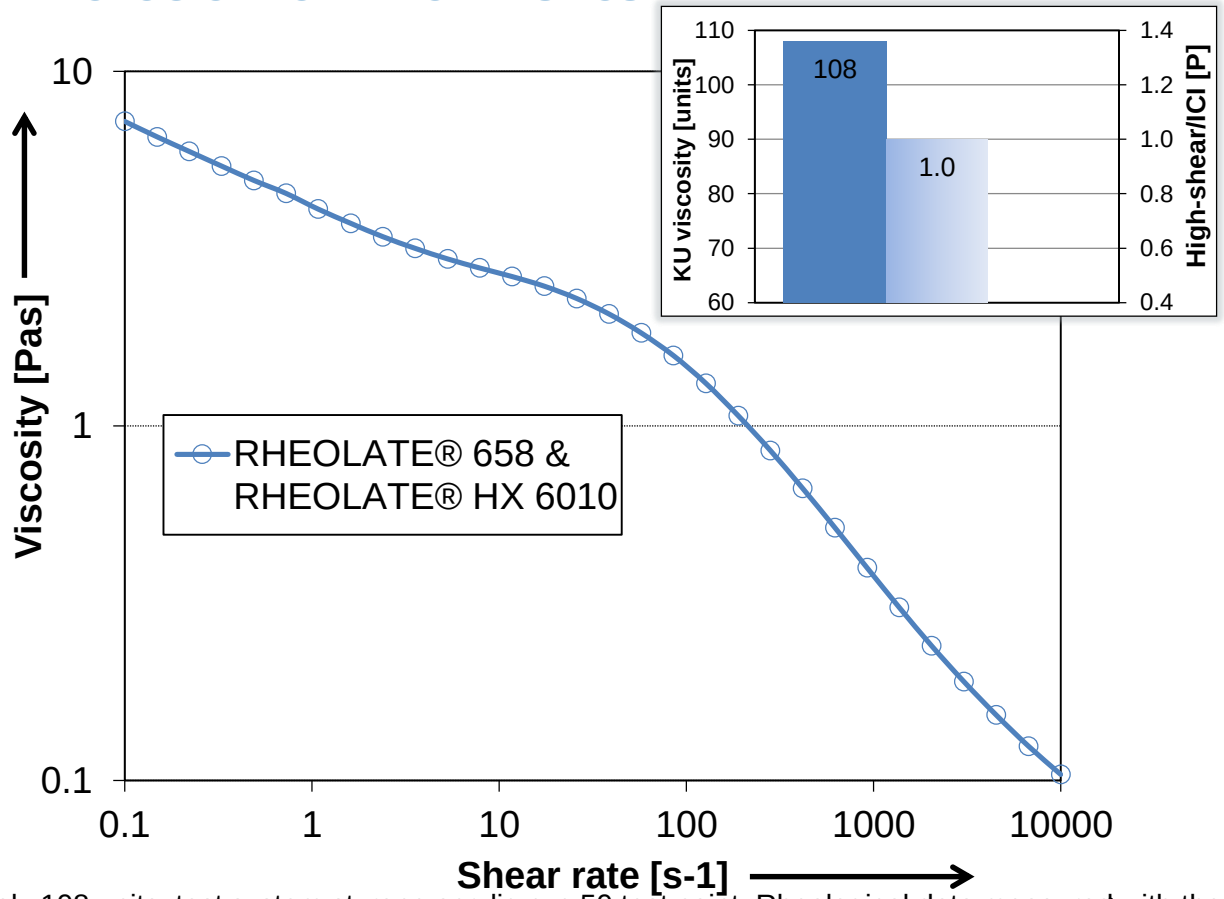
ADJUSTMENT OF DESIRED FLOW CHARACTERISTICS

EFFICIENCY – CONCENTRATION TO ACIEVE EQUAL KU



RHEOLOGICAL CHARACTERISTICS



KU describes the Krebs-Stormer viscosity; All samples adjusted to equal KU viscosity of approximately 108 units; test system styrene acrylic pvc 50 test paint; Rheological data ~~measured~~ with the Anton-Paar MCR 301 rheometer, geometry CP 25, at a temperature of 23°C; ICI viscosity indicates the viscosity at high shear rates of 10000 s^{-1}; KU describes the Krebs-Stormer viscosity

Conclusion

Conclusion

RHEOLATE® HX 6008 & 6050

- Highly effective high shear viscosity build with mid shear contribution
- Works across broad range of chemistries
- Allows significant reduction of concentration
- Ability to replace typically applied additive combination (mid and high shear viscosity builder)
  - ❖ Provides less complex formulation and production
  - ❖ Allows reduction of raw material portfolio
- Does not affect secondary paint performance

RHEOLATE® HX 6010

- Highly effective high shear viscosity build
- Typical application in combination with low/mid shear NiSAT
  - e.g. RHEOLATE® 658

Contact details

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