



COATINGS

INDORAMA
VENTURES



ULTRASOLVE[®] SERIES

Propanol derivative
oxygenated solvents



Indorama Ventures' oxygenated solvents derived from propanol were designed to provide superior performance on application and being an alternative to Propylene Glycol Ethers series, ensuring high solvency power and low odor.

BENEFITS

- High solvency power
- Excellent film formation and final paint finish
- High efficiency as a tail solvent for Industrial Coatings
- Balanced evaporation rate that avoid damages on the coating
- Low hazard in GHS classification, low odor and low toxicity
- Enables excellent color stability on the final paint
- Range of products to serve different segments, such as automotive, industrial paints, wood and printing inks (rotogravure and flexography)



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FEATURES

PRODUCTS	HANSEN SOLUBILITY PARAMETERS (MPa ^{1/2} cm ³ mol ⁻¹)			PHYSICO-CHEMICAL PROPERTIES		
	ΔD	ΔP	ΔH	DENSITY (20/20°C)	BOILING POINT 760 mmHg (°C)	EVAPORATION RATE (BUTYL ACETATE = 100)
ULTRASOLVE® H 2400	16.1	8.7	13.5	0.913	151.0	17.0
ULTRASOLVE® H 2440	16.0	7.2	11.3	0.969	215.0	0.6
ULTRASOLVE® H 2300	16.0	5.0	6.2	0.940	174.0	8.0
ULTRASOLVE® M 2200	15.3	4.3	7.6	0.889	101.6	209.0

Delta D = Dispersion Energy

Delta P = Polar Energy

Delta H = Hydrogen Bond Energy





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FEATURES

PRODUCTS	APPLICATION	FUNCTION		
		ACTIVE SOLVENT	TAIL SOLVENT	COUPLING AGENT
ULTRASOLVE® H 2400	Printing Inks (flexography) and Industrial Paints	●	●	●
ULTRASOLVE® H 2440	Industrial Paints	●	●	●
ULTRASOLVE® H 2300	Automotive and Industrial Paints	●		
ULTRASOLVE® M 2200	Printing Inks (rotogravure and flexography) and Industrial Paints	●		





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PERFORMANCE TESTS

Solvent Dosage Optimization

ULTRASOLVE® H SERIES		RECOMMENDED DOSAGE (WT %) IN THE FORMULATION VERSUS TYPICAL SOLVENTS*				
		PMA	PM	PE	DPM	DPNB
ULTRASOLVE® H 2300	Propylglycol Acetate	50%				
ULTRASOLVE® H 2400	Propylglycol		50%	60%		
ULTRASOLVE® H 2440	Propyldiglycol				70%	80%

*e.g.: Ultrasolve H 2440 should be dosed at 70% wt versus DPM dosage, reducing the dosage of active solvent in the formulation by 30%.

- PM:** Propylene glycol monomethyl ether
- PMA:** Propylene glycol monomethyl ether acetate
- PE:** Propylene glycol monoethyl ether
- DPM:** Dipropylene glycol monomethyl ether
- DPNB:** Dipropylene glycol mono-n-butyl ether

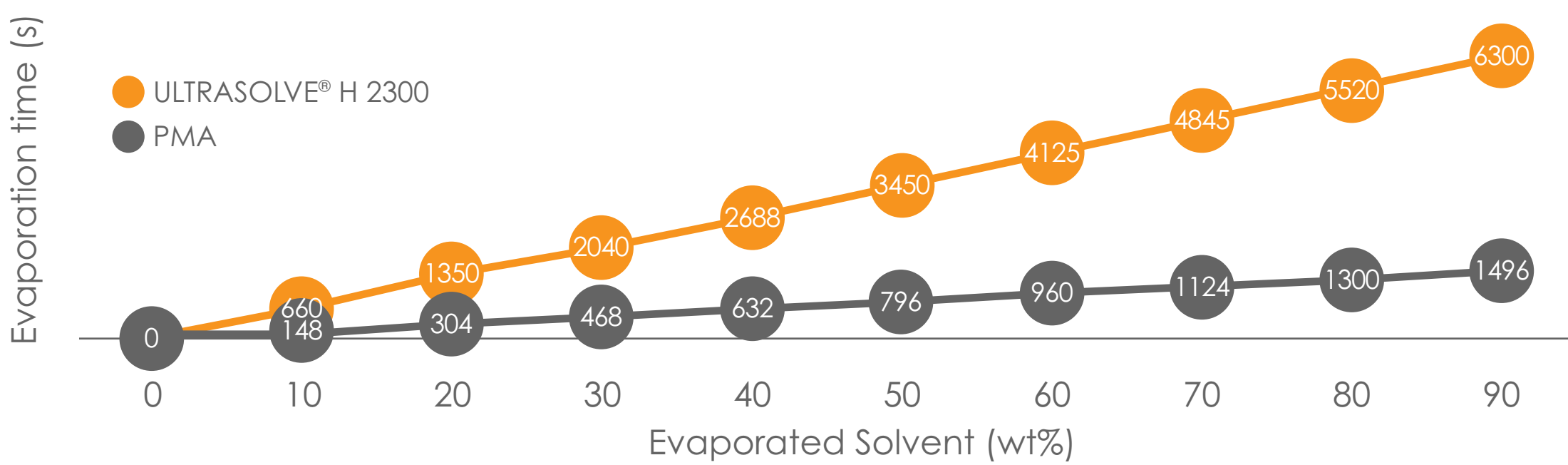




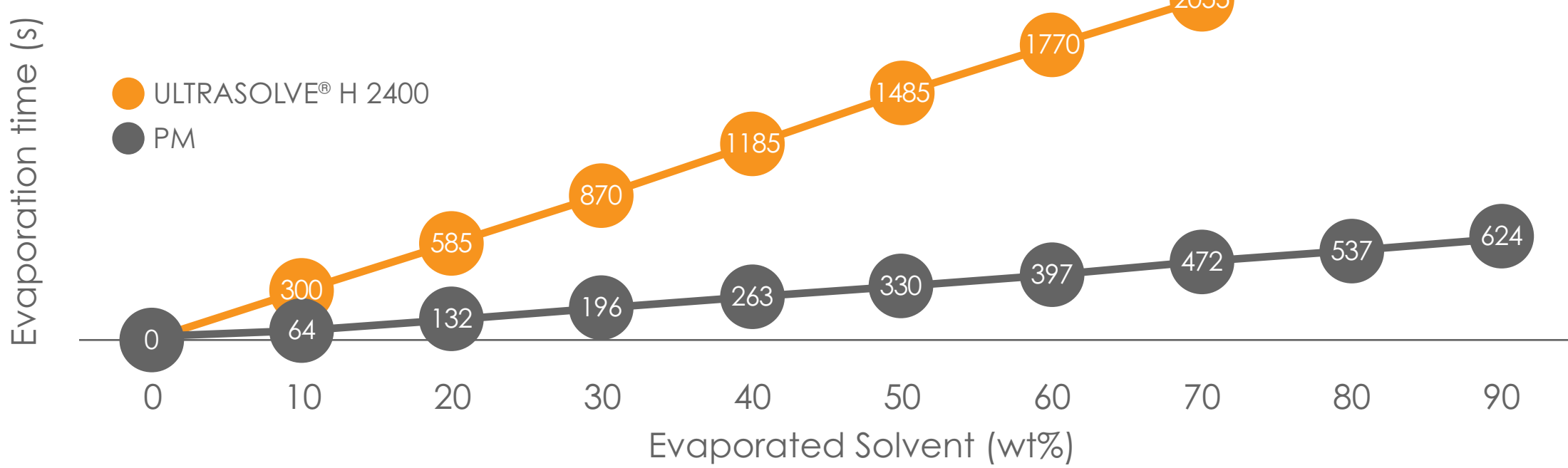
PERFORMANCE TESTS

Evaporation Curves

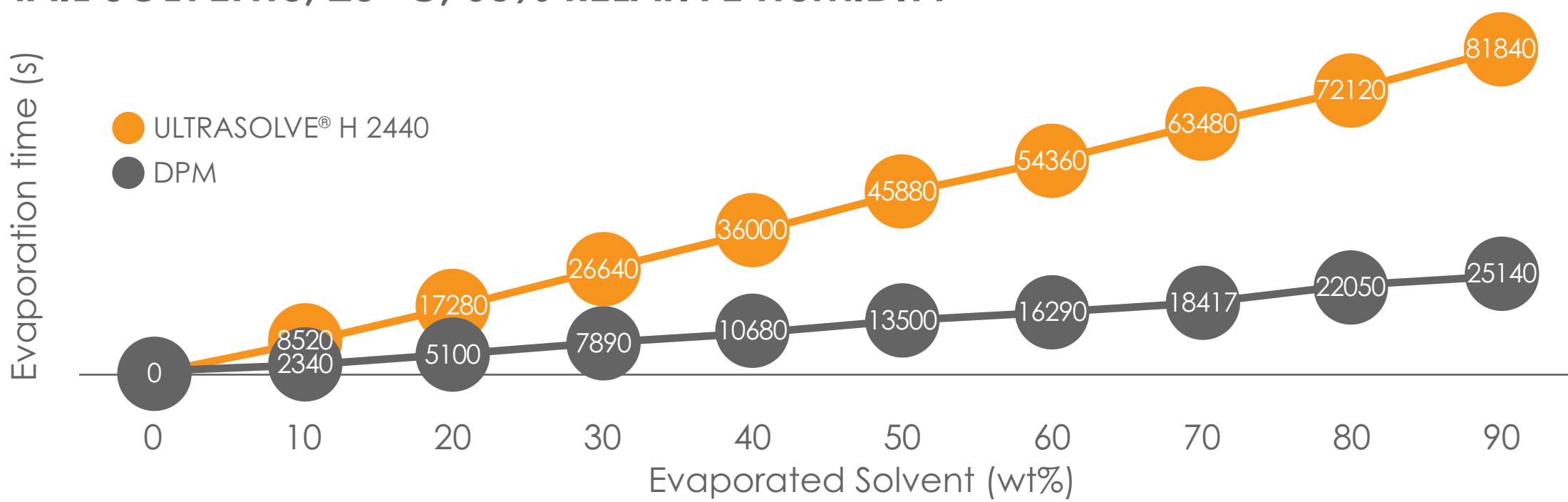
ULTRASOLVE® H 2300
25 °C, 65% RELATIVE HUMIDITY



ULTRASOLVE® H 2400
TAIL SOLVENTS, 25 °C, 65% RELATIVE HUMIDITY



ULTRASOLVE® H 2440
TAIL SOLVENTS, 25 °C, 65% RELATIVE HUMIDITY



Proper evaporation behavior to **ensure balanced evaporation**, aiding film formation and **preventing boiling**.



PERFORMANCE TESTS

ULTRASOLVE® H 2300

Thinner formulation for automotive basecoat

COMPOSITION (wt%)	FORMULATION 1 ULTRASOLVE® H 2300	FORMULATION 2 PMA
ULTRASOLVE® H 2300	5.5%	
Sec-Butyl Acetate	44.5%	40.0%
PMA		11.0%
Xylol	50.0%	49.0%
TOTAL	100%	100%

PHYSICO-CHEMICAL PROPERTIES	FORMULATION 1 ULTRASOLVE® H 2300	FORMULATION 2 PMA
Solubility parameters (J/cm ³) ^{1/2}		
ΔD	16.4	16.4
ΔP	2.4	2.6
ΔH	4.7	5.1
EVAPORATION RATE (BUTYL ACETATE = 100)	96	93

Delta D = Dispersion Energy

Delta P = Polar Energy

Delta H = Hydrogen Bond Energy



PERFORMANCE TESTS

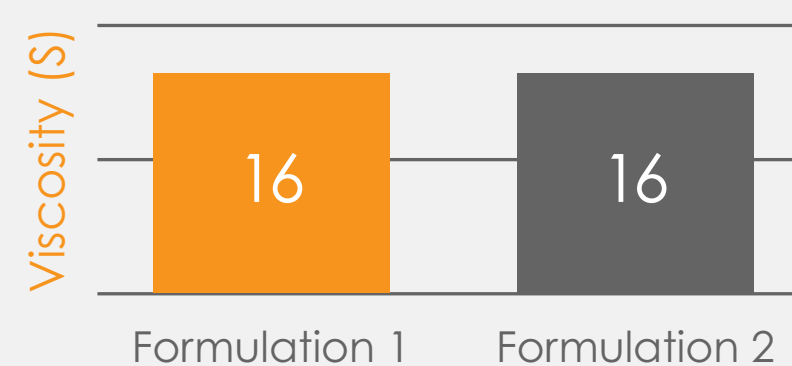
ULTRASOLVE® H 2300

Viscosity after Dilution

30% Thinner

70% Basecoat Poliester-based – Silver Color

VISCOSITY CF4, 25 °C



	COLOR				GLOSS			IQ	
	ΔL^*	Δa^*	Δb^*	ΔE^*	20°	60°	85°	DOI	HAZE
FORMULATION 1 ULTRASOLVE® H 2300	0.09	0.01	-0.01	0.06	96	104	98	92	12
FORMULATION 2 PMA	0.09	0.01	-0.01	0.10	94	103	97	90	12

Test conditions

- Coating System applied on carbon steel with air drying:
 - 1° Layer: Wash Primer
 - 2° Layer after 15 minutes: Primer surface
 - 3° Layer after 24 hours: Basecoat
 - 4° Layer after 30 minutes: Varnish
- Color Determination measured on the Spectrophotometer.
- Brightness determination measured on the Brightness Meter.
- DOI / HAZE determination measured on the Goniophotometer.

It is possible to **replace the active solvent** in the automotive thinner, for example PMA **up to 50%** in the formulation, maintaining the same evaporation rate, solubility parameters and desired properties in the final application, which makes the **formulator competitive!**



PERFORMANCE TESTS

ULTRASOLVE® H 2400

Formulations and Physico-chemical properties of Flexographic Thinners

THINNERS FORMULATION	FORMULATION 1 ULTRASOLVE® H 2400	FORMULATION 2 PM
ULTRASOLVE® H 2400	6.0%	
Propylene Glycol (Mono) Methyl Ether (PM)		15.0%
Ethyl Acetate	15.0%	15.0%
Ethanol	60.0%	55.0%
Isopropanol	19.0%	15.0%
TOTAL	100%	100%

THINNERS PHYSICO-CHEMICAL PROPERTIES		
Evaporation Time 90%, 25°C - (s)	63	64
Evaporation Rate (Butyl Acetate = 100)	157	154



PERFORMANCE TESTS

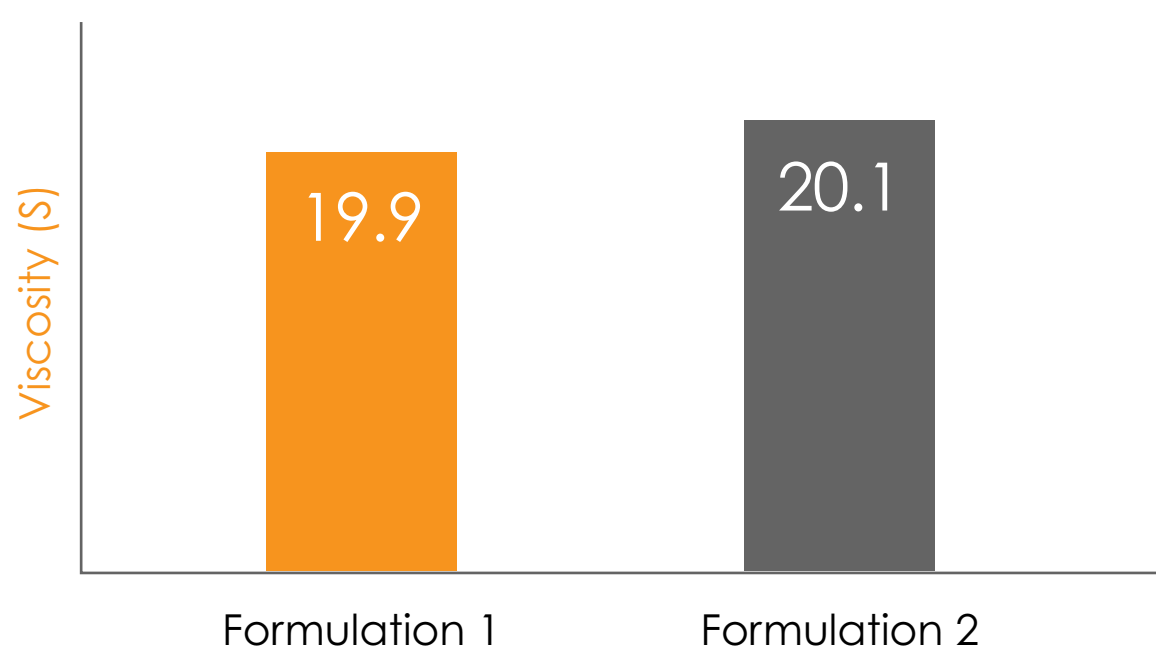
ULTRASOLVE[®] H 2400

Performance of thinner formulation in flexographic ink dilution

Viscosity and touch-drying time of magenta-colored nitrocellulose/polyurethane flexo ink after dilution with thinner to obtain viscosity at 20 s in a Zahn 2 cup

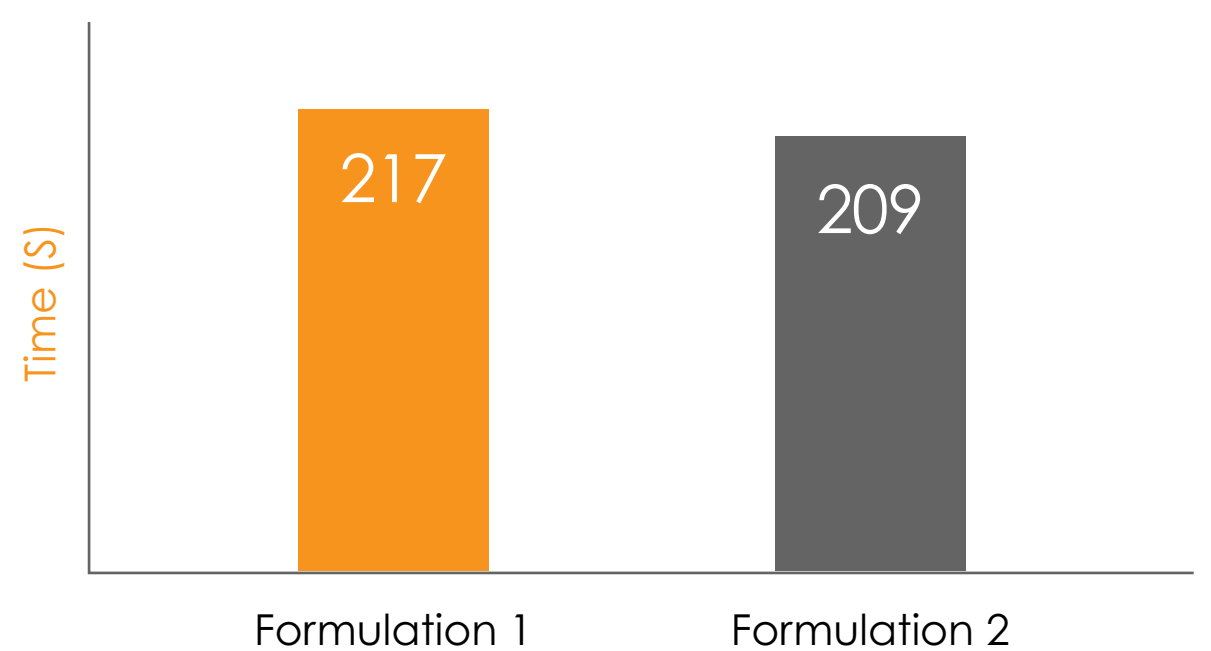
NITROCELLULOSE/PU

Viscosity Zahn 2, dilution 34%
with flexo thinner



NITROCELLULOSE/PU

Touch-drying time after dilution
with flexo thinner



It is possible to **replace the active retarding solvent in the formulation by up to 50%**. For example, compared to PM, **optimizing the evaporation rate** and the quality of the final print.



PERFORMANCE TESTS

ULTRASOLVE[®] H 2400

as coupling agent

Wood varnish formulation

	WATER-BASED VARNISH STANDARD (wt %)	WATER-BASED VARNISH WITH ULTRASOLVE [®] H (wt %)
Water soluble acrylic resin	90	90
DPM solvent	3.7	-
PnB solvent	3.7	-
ULTRASOLVE [®] H 2400	-	5.9
ULTRASOLVE [®] H 2440	-	1.5
Surface Additives	2	2
UV absorber	0.6	0.6
	100%	100%

HANSEN SOLUBILITY PARAMETERS (J/cm³)^{1/2}

	WATER-BASED VARNISH STANDARD (wt %)	WATER-BASED VARNISH WITH ULTRASOLVE [®] H (wt %)
ΔD	15.4	16.1
ΔP	5.1	8.4
ΔH	10.2	13.1

(RELATIVE ENERGY DIFFERENCE)

Acrylic resin	0.8	0.7
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Delta D = Dispersion Energy

Delta P = Polar Energy

Delta H = Hydrogen Bond Energy



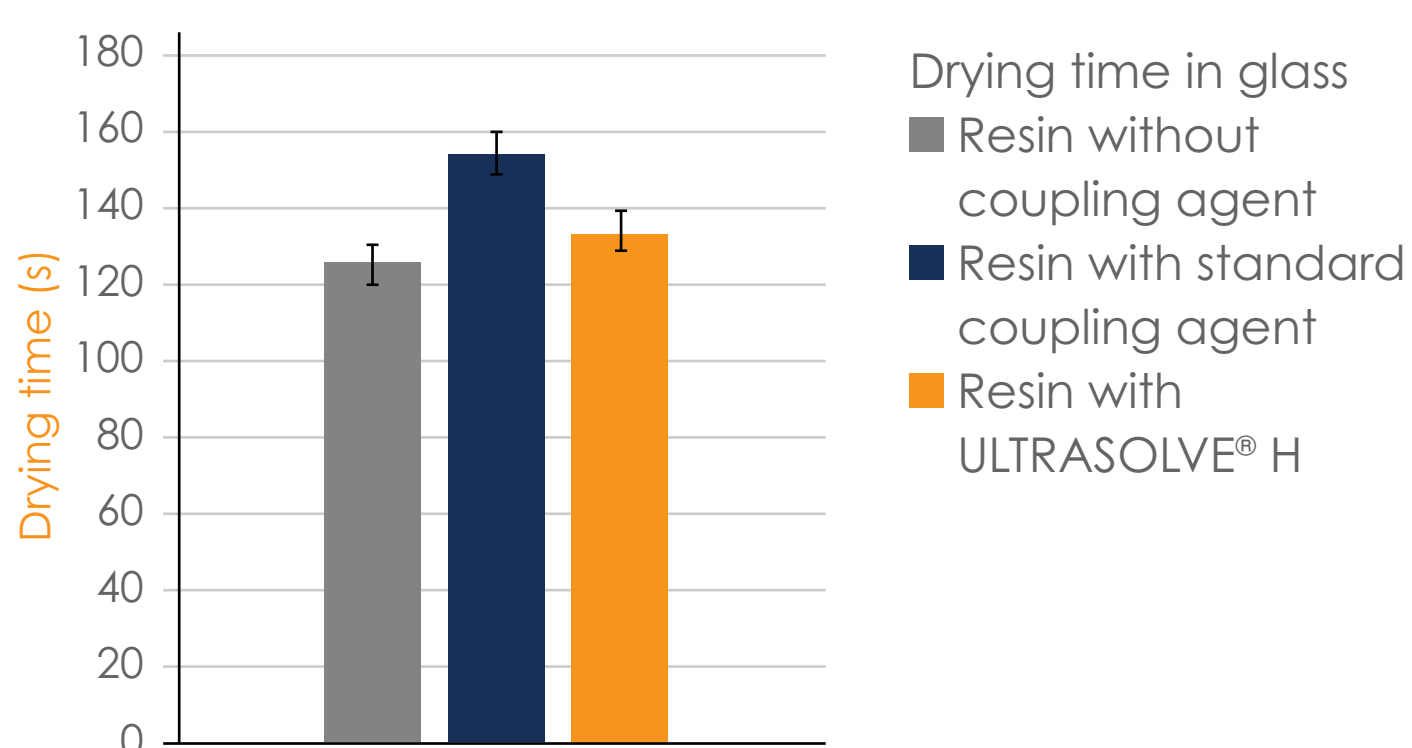
PERFORMANCE TESTS

ULTRASOLVE® H 2440

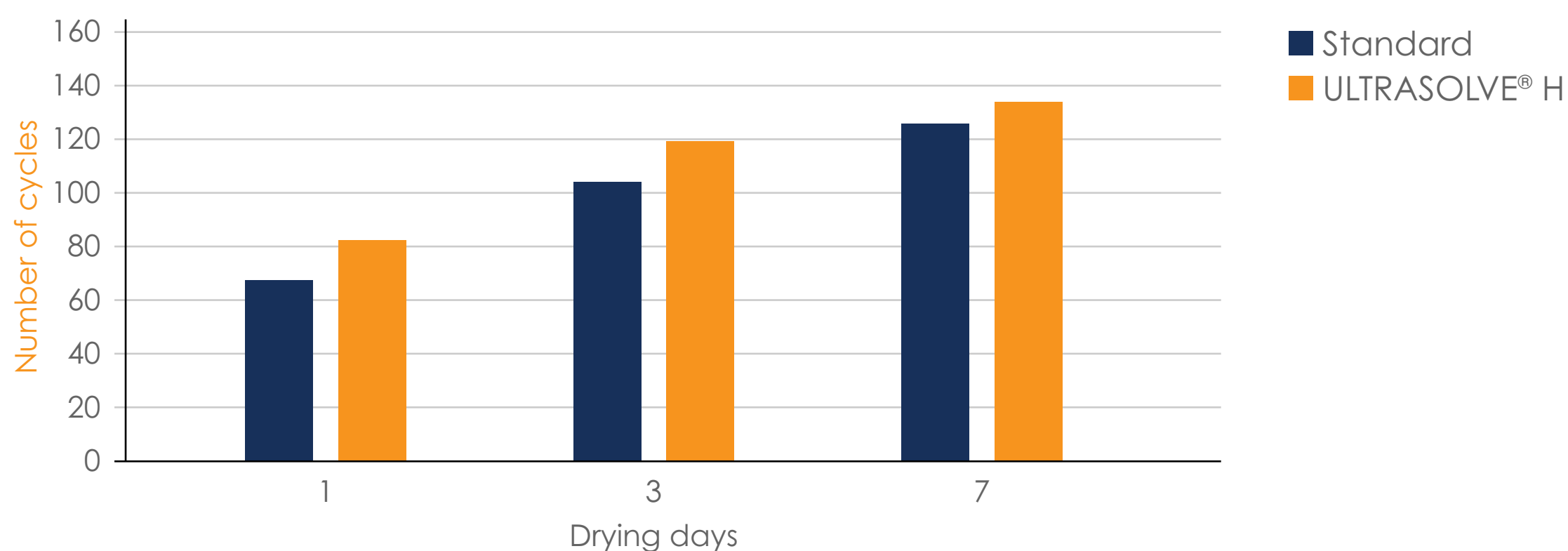
as coupling agent



INITIAL TOUCH-DRYING TIME



KONIG HARDNESS EVOLUTION



ULTRASOLVE® H 2440 as Coupling Agent provide **excellent appearance and good hardness evolution**, guaranteeing good **mechanical resistance** to the film. Shorter drying time, allowing shorter intervals between coats without impact performance.



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PERFORMANCE TESTS

ULTRASOLVE® M 2200

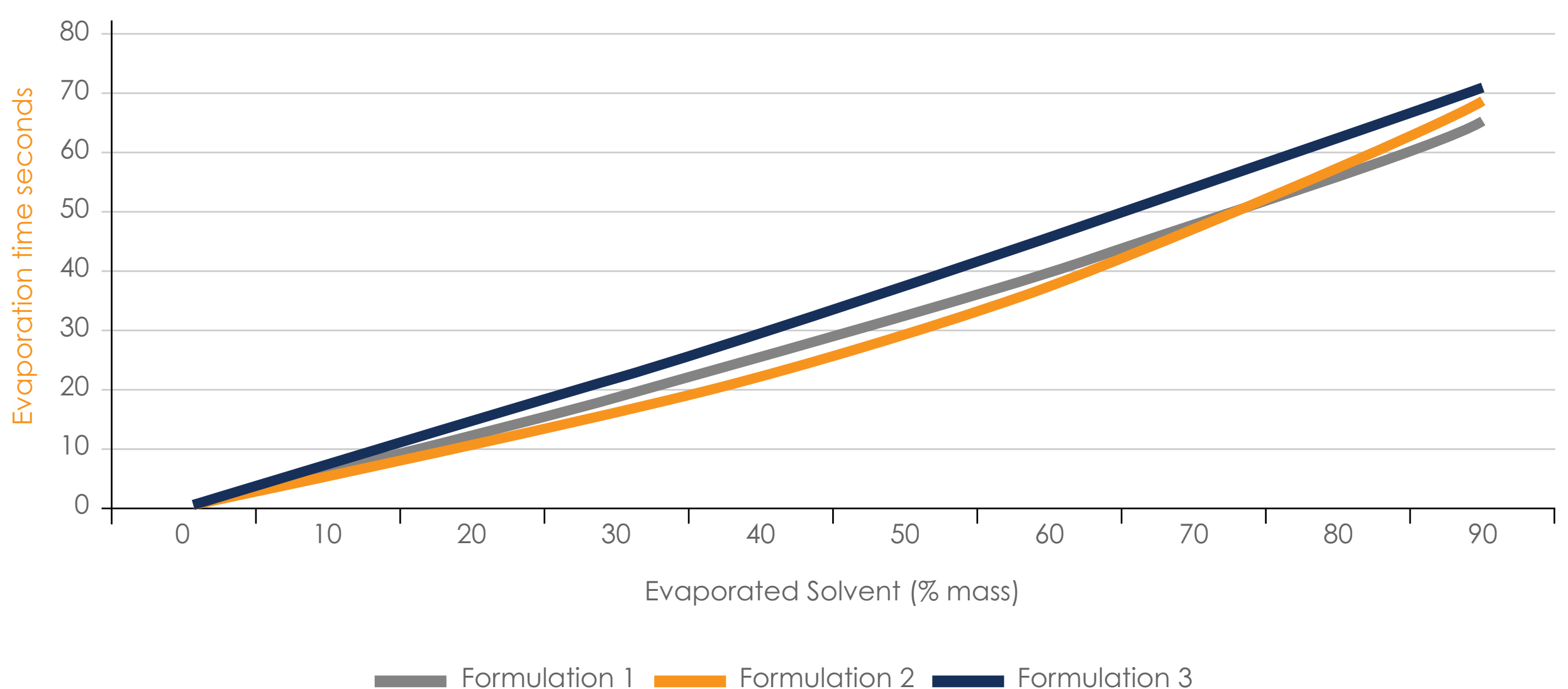
Suggestive formulations

Suggestive formulation for printing inks with ULTRASOLVE® M 2200

COMPOSITION	FORMULATION 1	FORMULATION 2	FORMULATION 3
	Propylene Glycol Methyl Ether	ULTRASOLVE® H 2400	ULTRASOLVE® M 2200
Anhydrous Ethanol	57%	60%	50%
N-Propanol	-	-	30%
ULTRASOLVE® M 2200	-	-	20%
Ethyl Acetate	17%	15%	-
Isopropanol	18%	19%	-
ULTRASOLVE® H 2400	-	6%	-
Propylene Glycol Methyl Ether	8%	-	-
TOTAL	100%	100%	100%

Evaporation curves for different thinners

Evaporation Curve, 25 °C, 65% RH

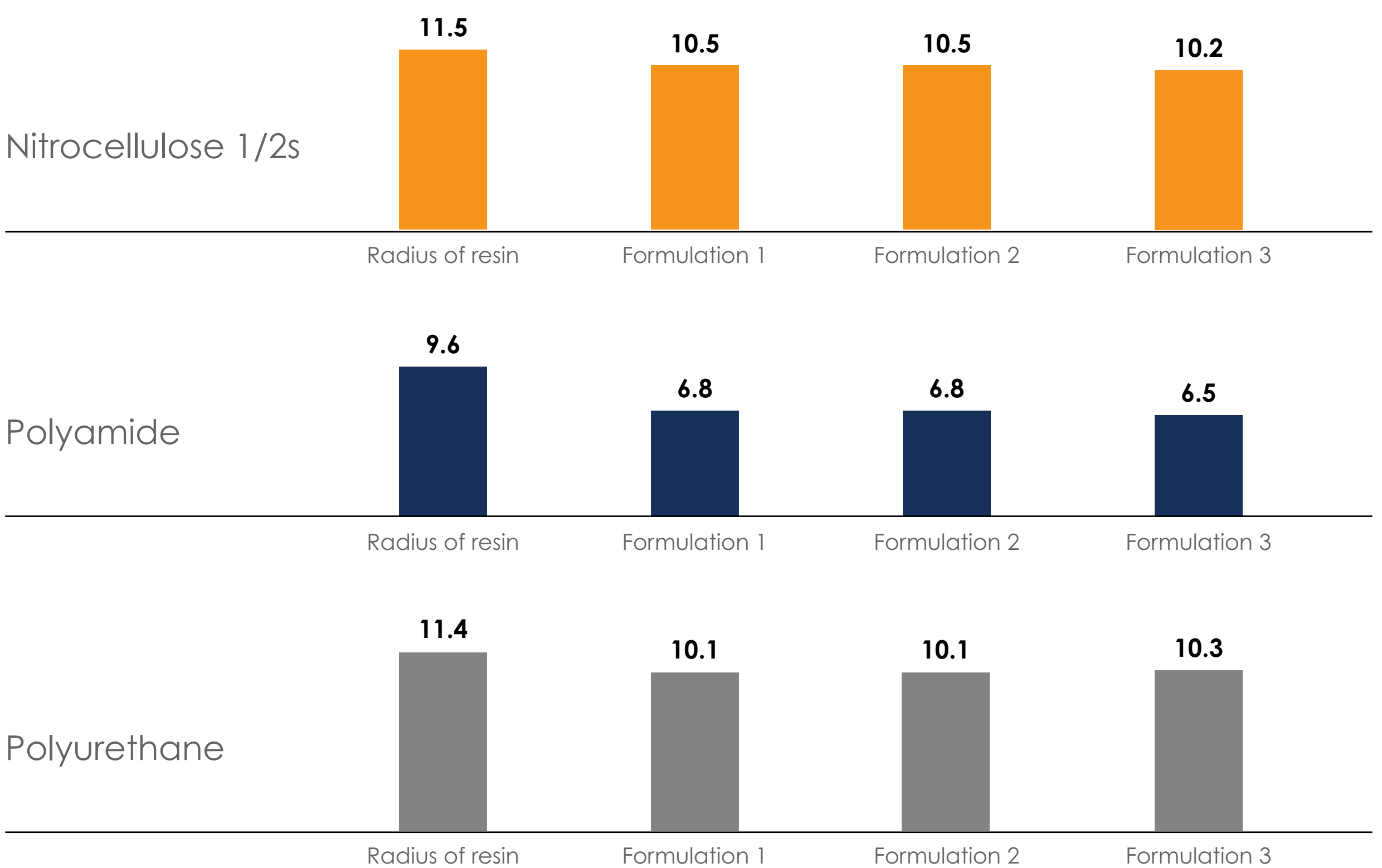




PERFORMANCE TESTS

ULTRASOLVE[®] M 2200

Hansen solubility parameters



Ultrasolve[®] M 2200 support the **balance of evaporation rate** of paints during flexographic and rotogravure processes, in addition to presenting **excellent compatibility** with the main resins used in these systems.

If you are looking for superior performance on application,
ULTRASOLVE[®] SERIES
is what you need!
Contact us and request a sample.

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