

vercet ™

ALKYD POLYESTERS

CREATING PERFORMANCE THROUGH CHEMISTRY

Building upon decades spent advancing materials chemistry innovation, NatureWorks offers solutions based on lactides and lactide intermediates that help innovators within the coatings, adhesives, sealants, and elastomers (C.A.S.E.), toner and surfactant industries realize:



Significant, measurable product performance benefits



Move through the R&D process more efficiently and with minimal risk



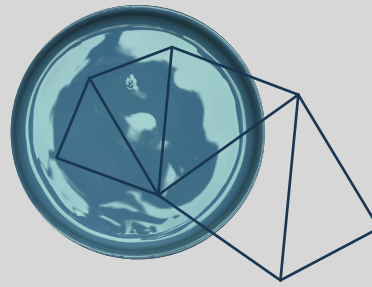
Decrease systems costs via an optimized supply chain

ALKYD POLYESTERS

CUSTOM SOLUTIONS FOR COATINGS

Using Vercet lactides as a component in your resins enables unique properties including a new way of creating low VOC solvent-borne coatings for substrates such as wood and metal.

COATINGS		
SUBSTRATES	MARKETS	PERFORMANCE BENEFITS
Wood Metal Anti-corrosion layers Primers	Furniture Flooring Architecture Decorative	Low viscosity alkyds for lower VOC's Improved flexibility Excellent substrate adhesion Superior abrasion resistance Improved ethanol spot resistance Pigmentable Renewably-sourced building block



We achieve this by coupling tunable Vercet™ lactide-based chemistries with the knowledge of scientists and engineers who understand how to dial in the full capabilities of this versatile product line.

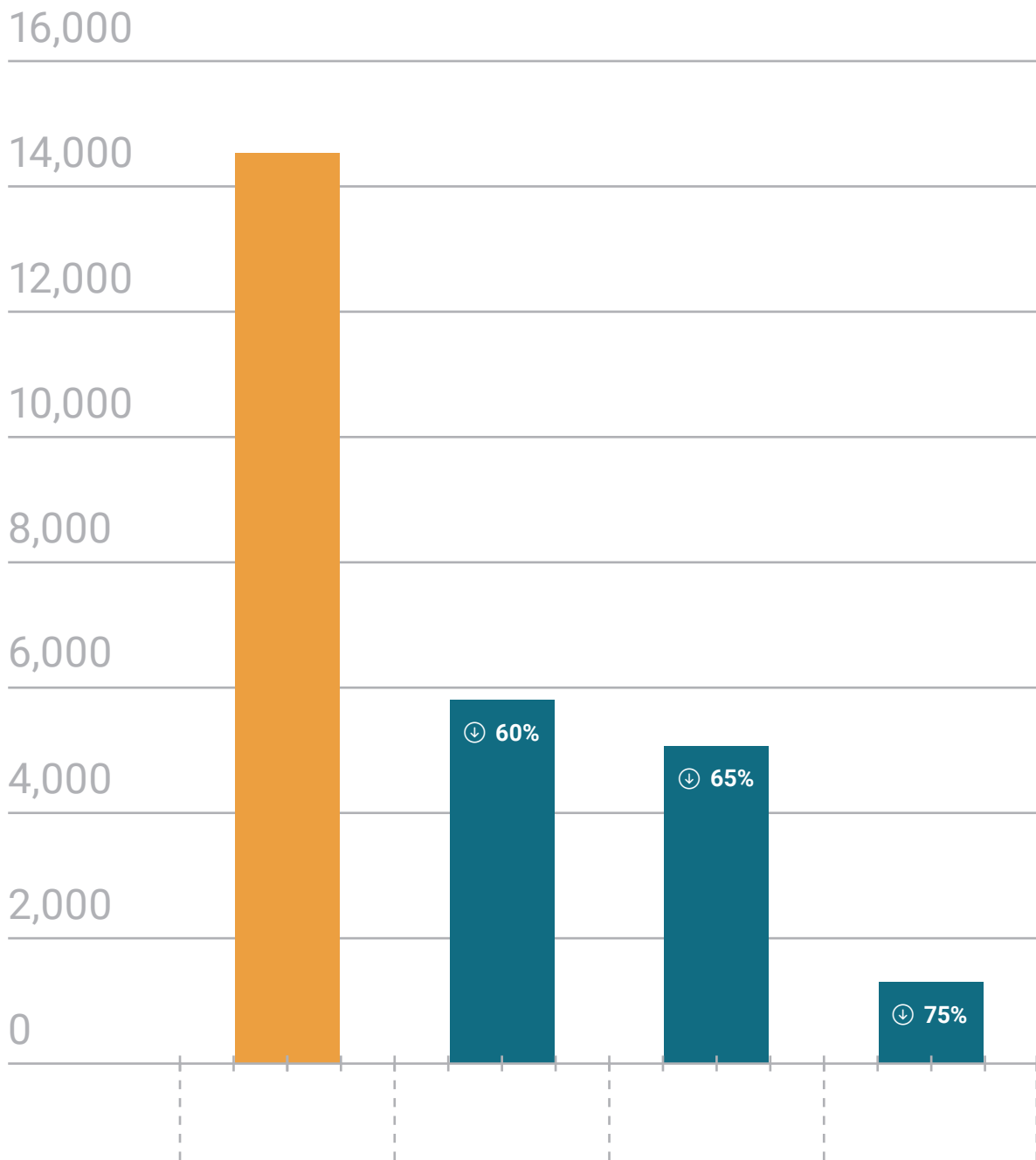
FORMULATION AND RESIN PROPERTIES VERCET MEDIUM OIL LENGTH ALKYDS

PROPERTY	CONTROL	15% VERCET LACTIDE	25% VERCET LACTIDE
Vercet Lactide Content [wt%]	0	15	25
Medium Oil Length, TOFA [wt%]	47.5	47.5	47.6
Phthalic Anhydride [wt%]	26.7	22.5	17.3
Pentaerythritol [wt%]	25.2	21.3	16.4
Benzoic Acid [wt%]	7.5	0	0
CAP Viscosity [mPa*s, 95°C, 300 RPM]	7,720	2,150	1,430
Solution Viscosity ¹ [60% Solids, mPa*s]	14,500	5,040	1,260
Final Acid Value [mg-KOH/g]	8.1	7.8	7.3
Final Hydroxyl Number [mg-KOH/g]	95	91	42.1

1. Alkyd coatings made from 60% solids in Varsol 40 / Xylene 4:1 onto clean degreased steel. Tri-metal drier, approximate DFT ~45µm.

LOW VOC'S FROM REDUCED COATING VISCOSITY

SOLUTION VISCOSITY
[60% solids,
mPa*s]

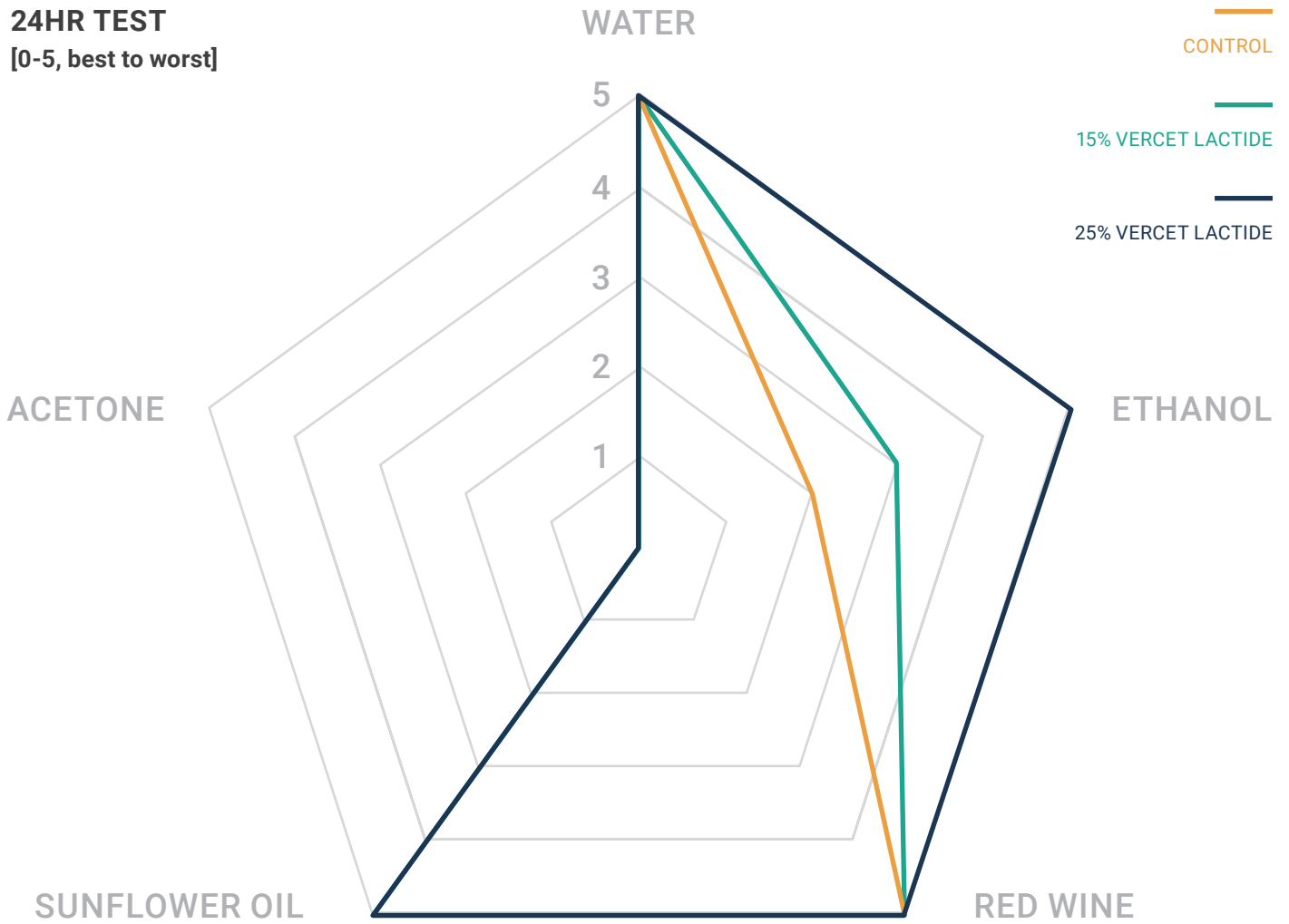


	CONTROL	7.5% VERCET LACTIDE	15% VERCET LACTIDE	25% VERCET LACTIDE
SOLUTION VISCOSITY	14,500	5,760	5,040	1,260
Δ REFERENCE		⬇ 60%	⬇ 65%	⬇ 75%

MEASURABLE PERFORMANCE

RESISTANCE TO STAINING & BLISTERING

24HR TEST
[0-5, best to worst]

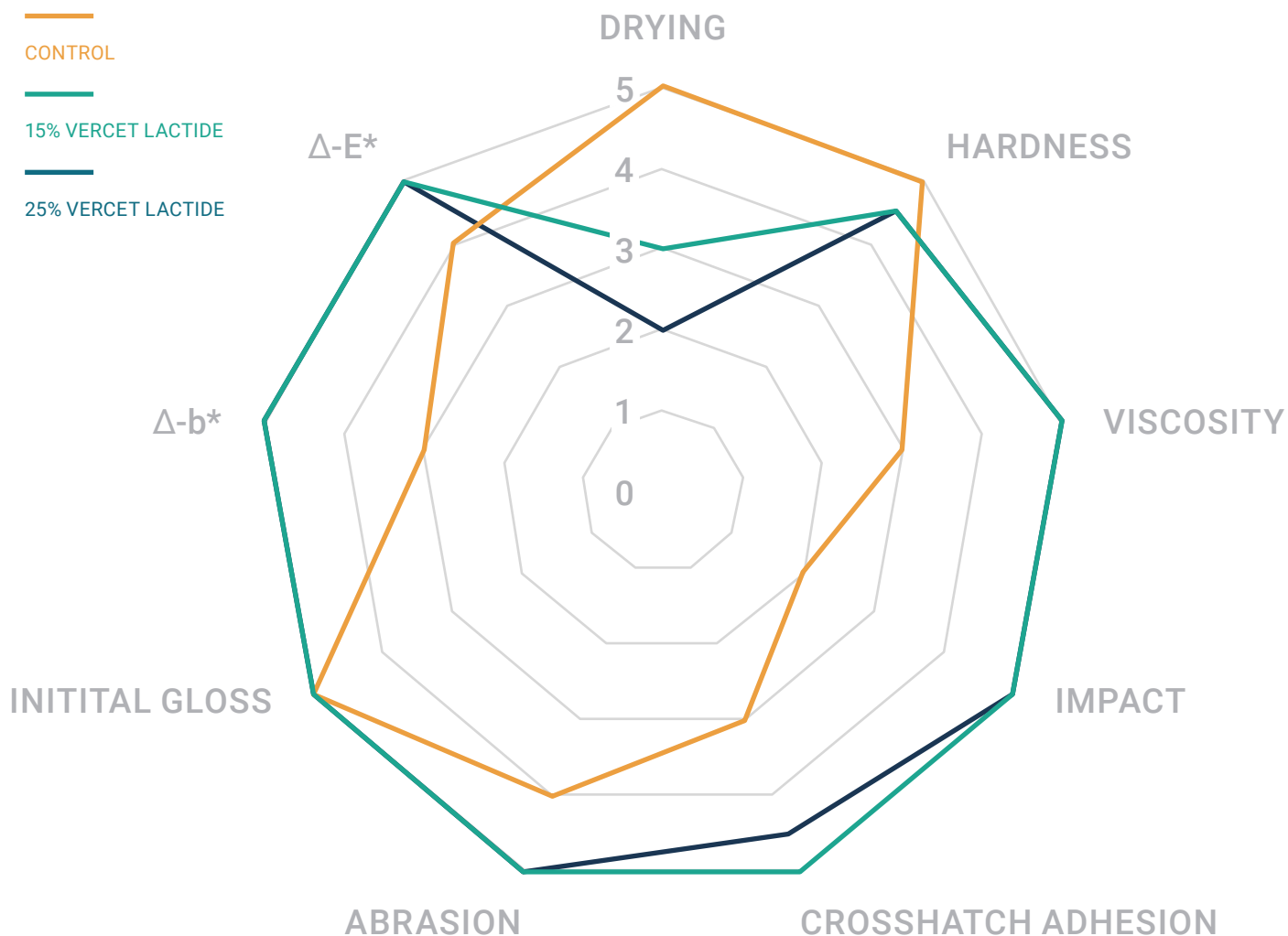


		CONTROL	15% VERCET LACTIDE	25% VERCET LACTIDE
WATER	3 HR	0	0	0
	24 HR	0	0	0
RED WINE	3 HR	0	0	0
	24 HR	0	0	0
SUNFLOWER OIL	3 HR	0	0	0
	24 HR	0	0	0
ETHANOL [95%]	3 HR	5	0	0
	24 HR	5	3	2
ACETONE	3 HR	5	5	5
	24 HR	5	5	5

0-5, best to worst

MEASURABLE PERFORMANCE

MECHANICAL PROPERTIES



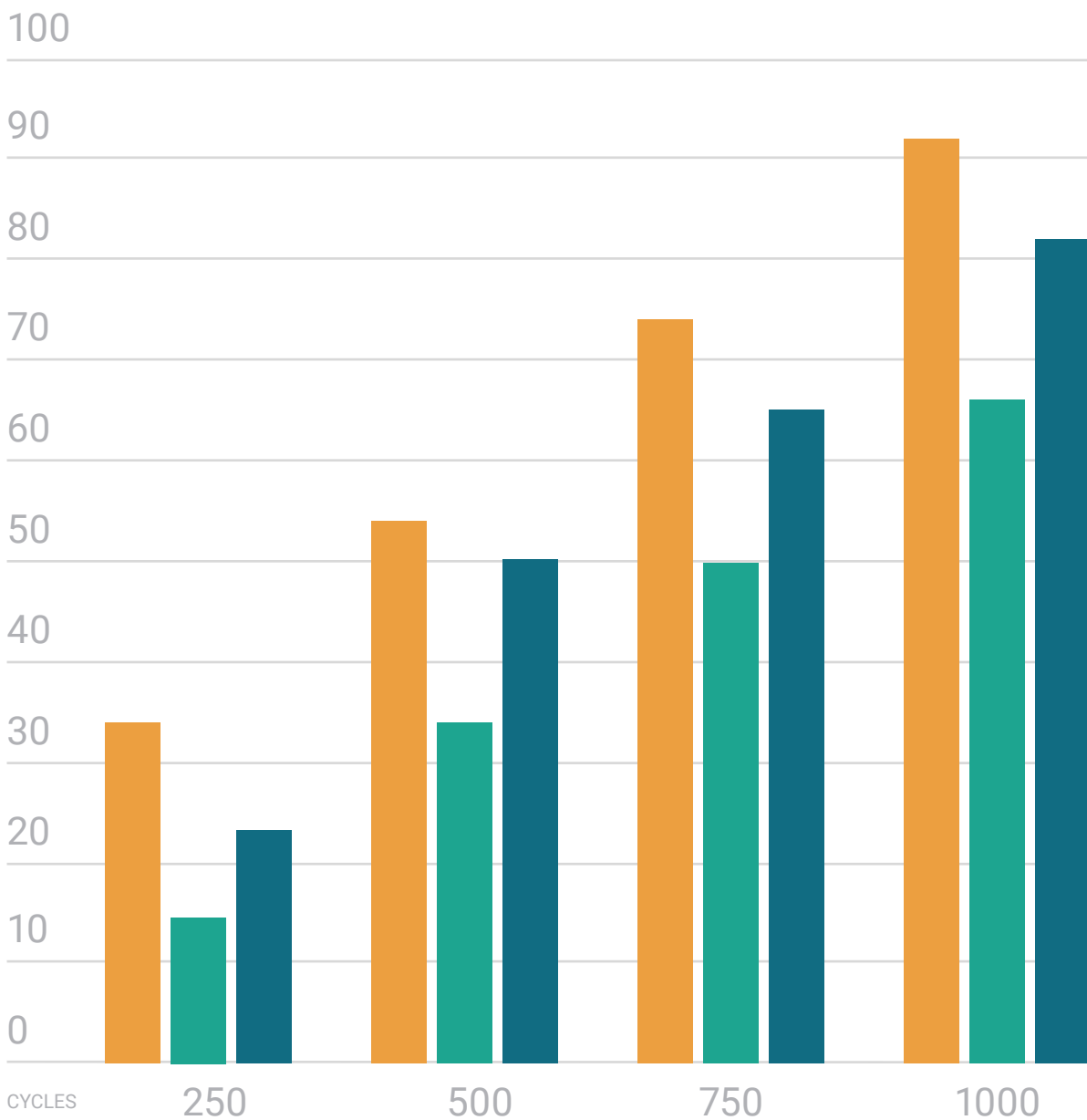
	CONTROL	15 % VERCET LACTIDE	25% VERCET LACTIDE
DRY FILM THICKNESS [μm]	45-50	45-50	45-50
20g TACK FREE TIME [hrs]	5.5	7.5	18-24
PERSOZ PENDULUM HARDNESS [%]			
10 DAYS	20	16	13
20 DAYS	38	35	22
30 DAYS	39	35	27
DROP IMPACT, 1000g [R/F, cm]	< 5/10	100/100	100/100
CROSSHATCH ADHESION TO STEEL [0-5, best to worst]	5	2	0
ADHESION TO OAK PULL OFF [MPa]	5.2	7.3	6.3
MANDREL BEND [mm]	4	< 3	< 3
60° GLOSS [0 / 7 / 14 / 28 days]	83 / 75 / 69 / 70	82 / 71 / 63 / 59	84 / 72 / 64 / 59
UV STABILITY Δ -b* [7 / 14 / 28 days]	0.7 / 1.06 / 1.32	0.94 / 0.96 / 1.09	0.4 / 0.69 / 1.01
UV STABILITY Δ -E* [7 / 14 / 28 days]	0.77 / 1.18 / 1.46	1 / 1 / 1.11	0.5 / 0.77 / 1.09

All properties tested via relevant ISO test methods.

MEASURABLE PERFORMANCE

MECHANICAL PROPERTIES

TABER
ABRASION
[mg-LOSS¹]



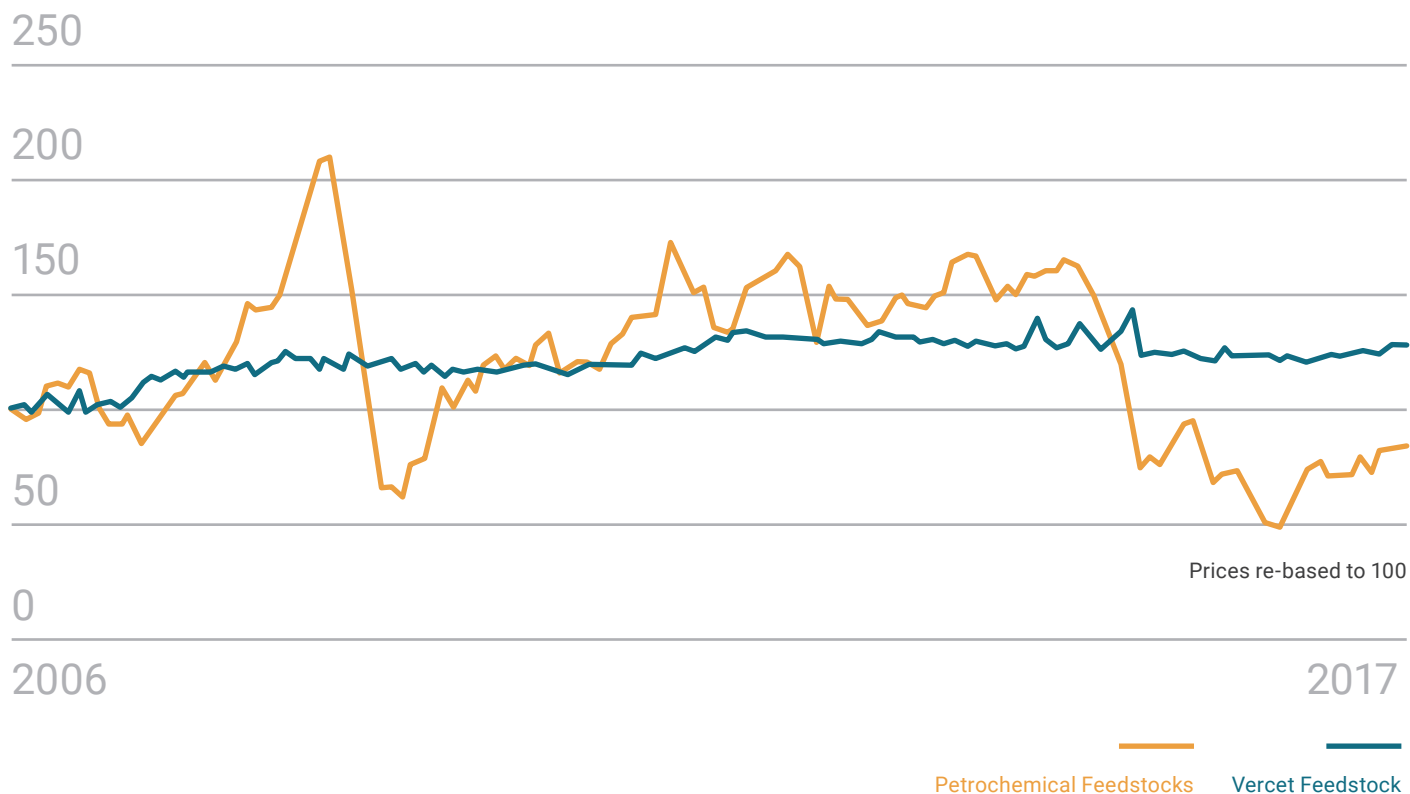
	250	500	750	1000
CONTROL	34	54	74	92
15% VERCET LACTIDE	15	34	50	65
25% VERCET LACTIDE	23	50	65	82

Cycles, CS-10 wheel type, 1000g, 60 RPM

BENIGN BY DESIGN

REDUCING VOLATILITY IN PRICING THROUGH ALTERNATIVE FEEDSTOCKS

Renewably-sourced Vercet lactide-based products bring sensible, elegant, and cost-effective solutions based squarely on the principles of green chemistry to supply chains that, until now, were coupled with traditional fossil-petroleum solutions and their inherent price volatility.



HOW CAN WE HELP YOU?

To learn more about Vercet custom solutions, please contact a member of our Performance Chemicals team.

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