



AOS in Home Care Products:

An Oldie but Goodie

AOS - alpha olefin sulfonate



Which anionic surfactant do you rely on most today?

- A. Ethoxy sulfates (SLES / laureth sulfates)
- B. Linear alkylbenzene sulfonate (LAS)
- C. Alpha olefin sulfonate (AOS)
- D. A blend or something else

Audience Poll 1 of 5 — what is your current formulation base?

How much is 1,4-dioxane shaping your formulation decisions?

- A. It is already driving active reformulation
- B. We are monitoring it but have not changed formulas
- C. On our radar, but not yet a priority
- D. Not something we are currently tracking

Audience Poll 2 of 5 — how much regulatory pressure do you feel?

Agenda



The regulatory context



Home care trends with AOS



Calsoft[®] AOS

Regulatory pressure and new products are driving renewed adoption of AOS as a scalable, cost-effective surfactant platform in home care

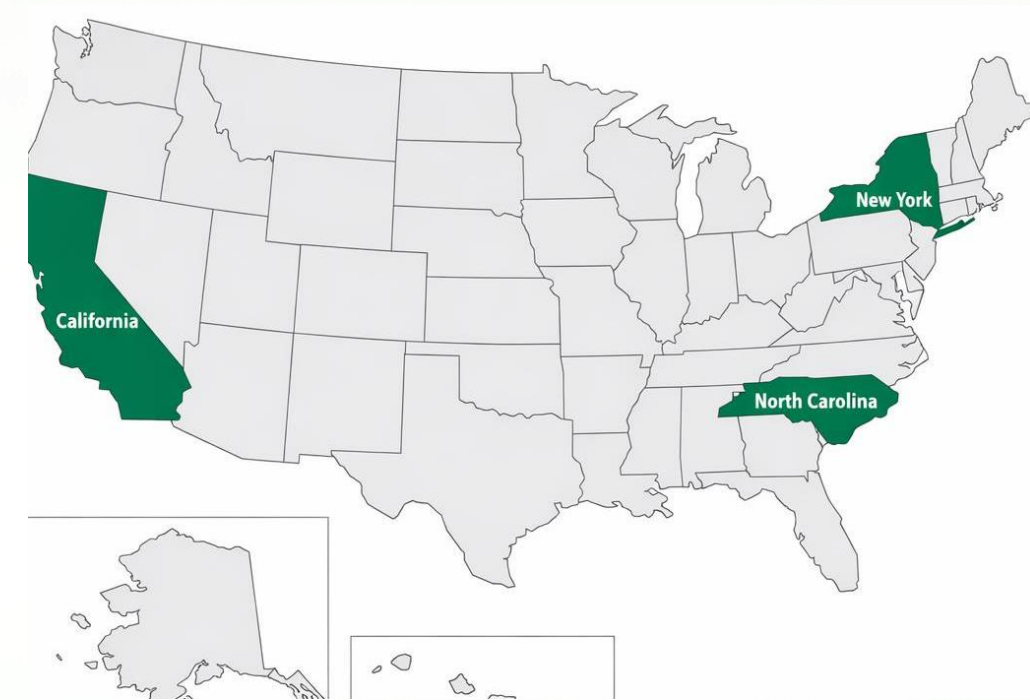
1,4-Dioxane in ethoxy sulfates under scrutiny

Why It Matters

- **Probable human carcinogen**; persistent groundwater contaminant
- Present as an **unintended byproduct** in ethoxy sulfates
- Increasing focus on **consumer exposure + drinking water pathways**

Regulatory Momentum (At-a-Glance)

- **U.S. Federal (EPA – TSCA)**
 - EPA is reassessing the **“unreasonable risk” finding** by Aug 2026
 - Likely outcomes: use restrictions, impurity limits, exposure controls
- **State-Level (Most Immediate Impact)**
 - **New York:** ≤ **1 ppm limit** in household cleaning products (in force)
 - **California:**
 - Proposition 65 warnings required
 - DTSC proposing **Priority Product listing** (>1 ppm) for detergents & shampoos (2026)
 - **North Carolina:** proposing monitoring and developing minimization plans for discharges directly or indirectly to surface waters (2026)
- **Global Signals**
 - **EU REACH:** Listed as **SVHC** → future authorization or phase-out risk
 - **Canada:** Tight drinking-water guidelines; impurity under federal scrutiny

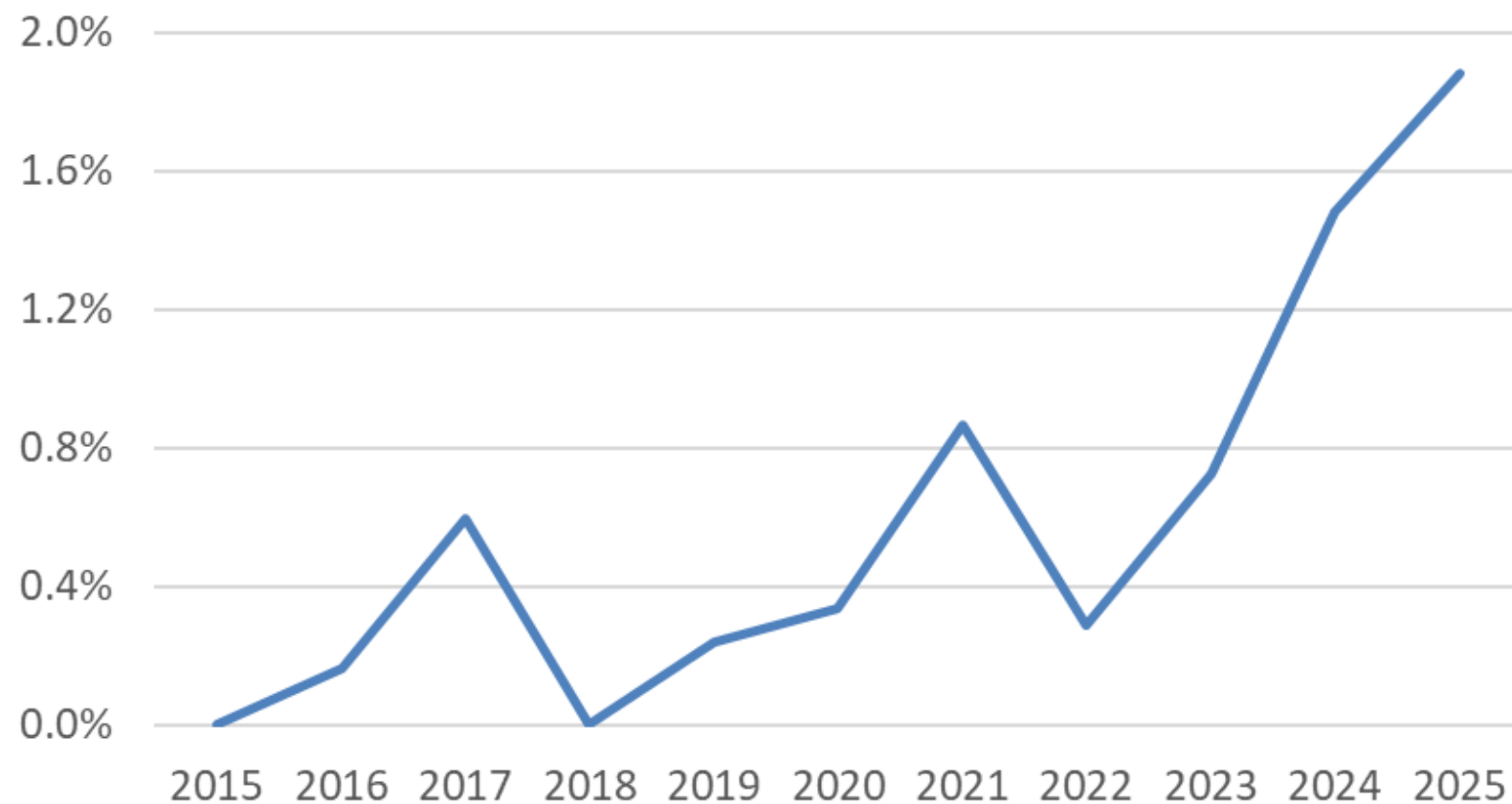


Implications for the Cleaning Industry

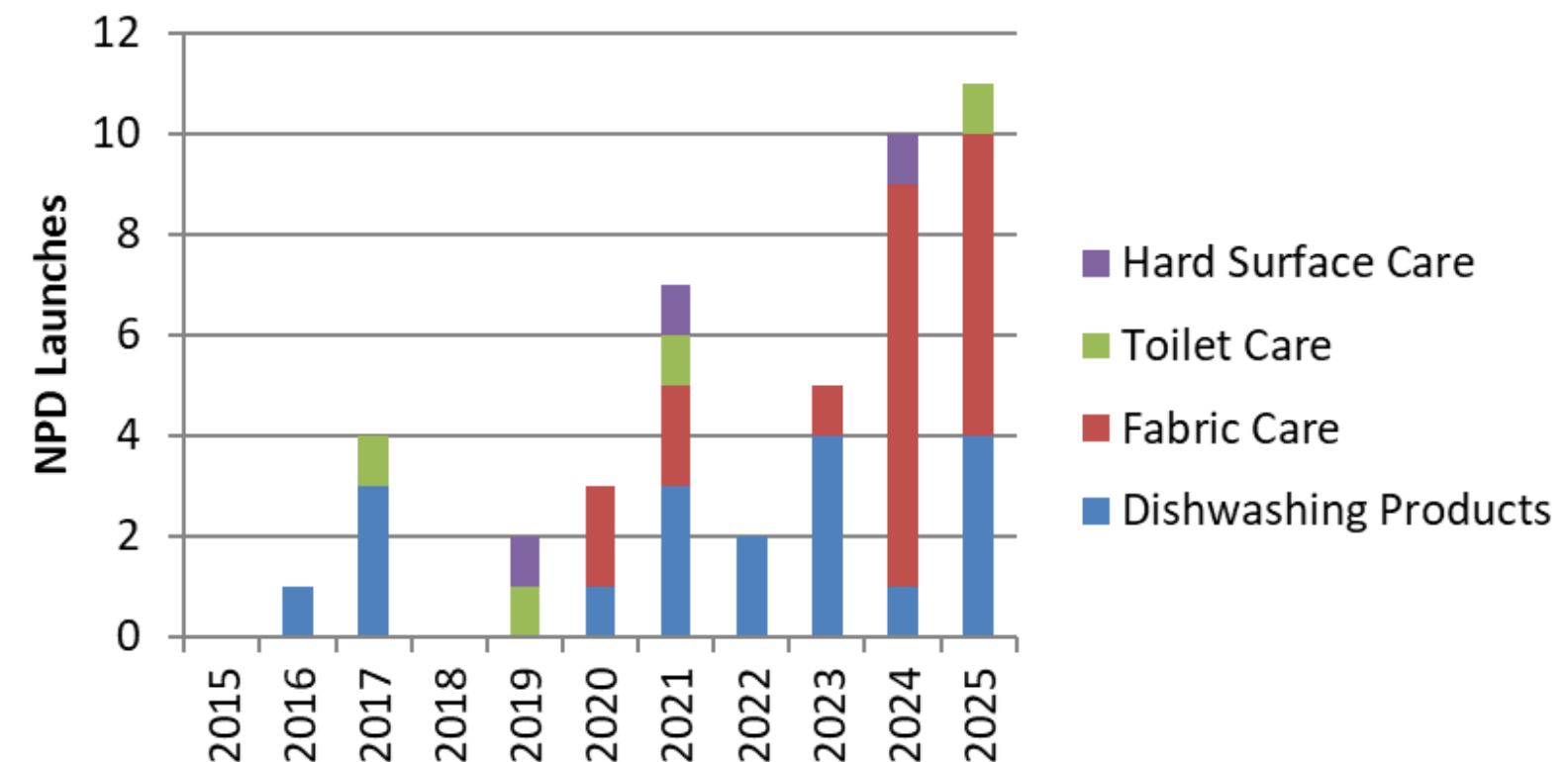
- **Ethoxy sulfates surfactants under pressure** → reformulation & purification costs
- **Finished-product compliance** increasingly driven by **state rules**, not federal
- **Supply chain transparency** (ppm-level specs, analytics) becoming mandatory

Use of AOS has been on the rise in North American Home Care Products

% of N. American NPD Launches with AOS



Home Care New Product Launches - Containing AOS



New products containing AOS now account for about 2% of home care new product launches

Source: Mintel GNPD (Global New Products Database)



AOS adopted by small innovative brand owners

Some National & Private Label brands use AOS in Dish & Hard Surface Cleaners

Laundry
Company / Parent
Tru Earth
Cleanfinity
Good Juju Body & Home
Molly's Suds
Dizolve
Williams-Sonoma
Koala Eco Company
Rejoice International
Smart Vision
Savons Prolav
All Things Jill

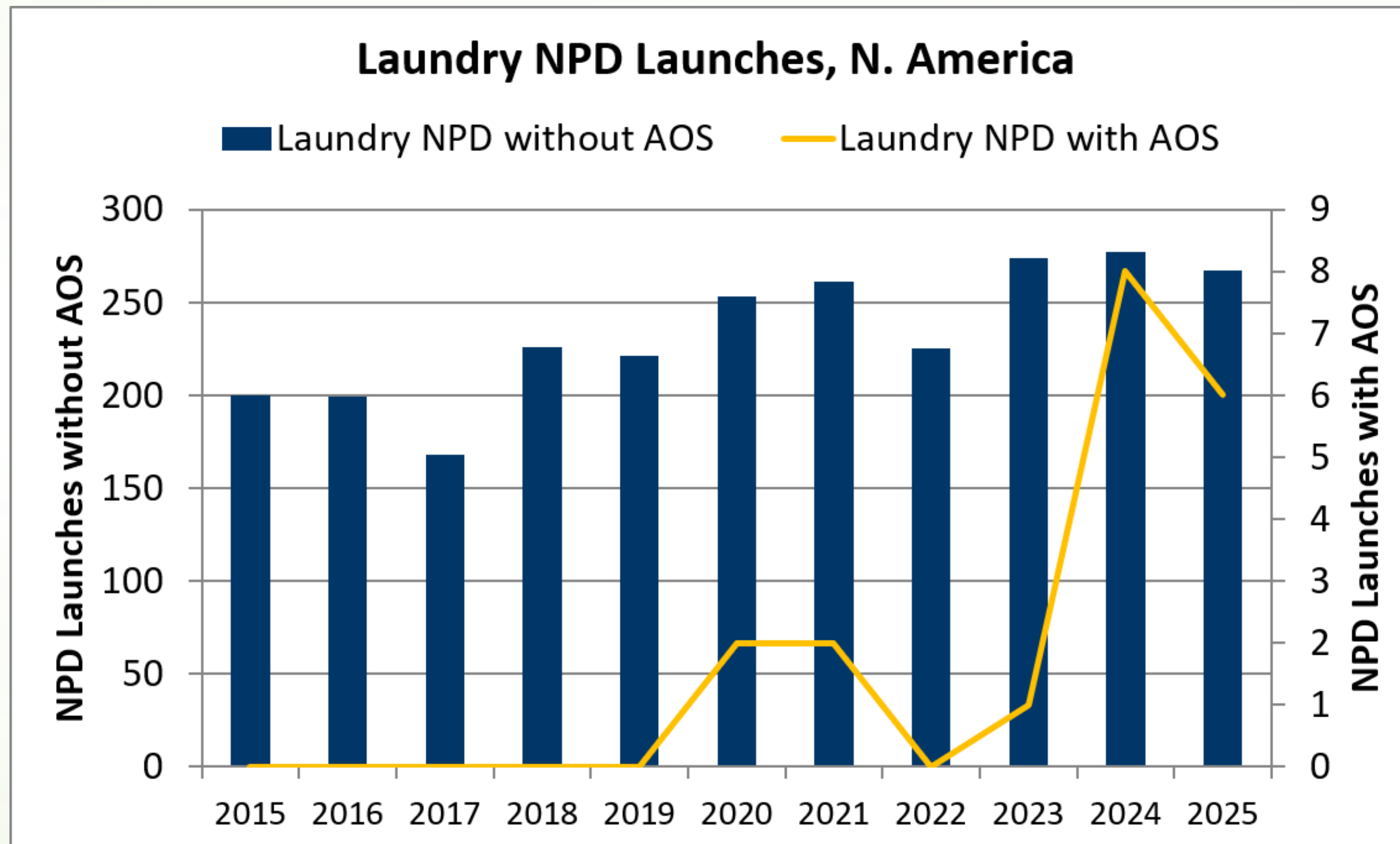
Private Label

Dishwash
Company / Parent
All Things Jill
Target
Brand Buzz
Aldi Süd
Southeastern Grocers
LG
Mint Cleaning
Rebel Green
Le Groupe Jean Coutu
Aldi Group
CVS Health
Dolgencorp / Dollar General Corporation
LG Household & Health Care
Aldi
Fresh Thyme Farmers Market
Save-A-Lot
Natural Flower Power
CVS Pharmacy
LG Household & Health Care / LG H&H
Costco Wholesale

Hard Surface & Toilet Care
Company / Parent
Henkel
SC Johnson & Son
Jusu Life
Reckitt Benckiser
The Dial Corporation
Jireh Trading & Marketing
Jelmar
Henkel Corporation

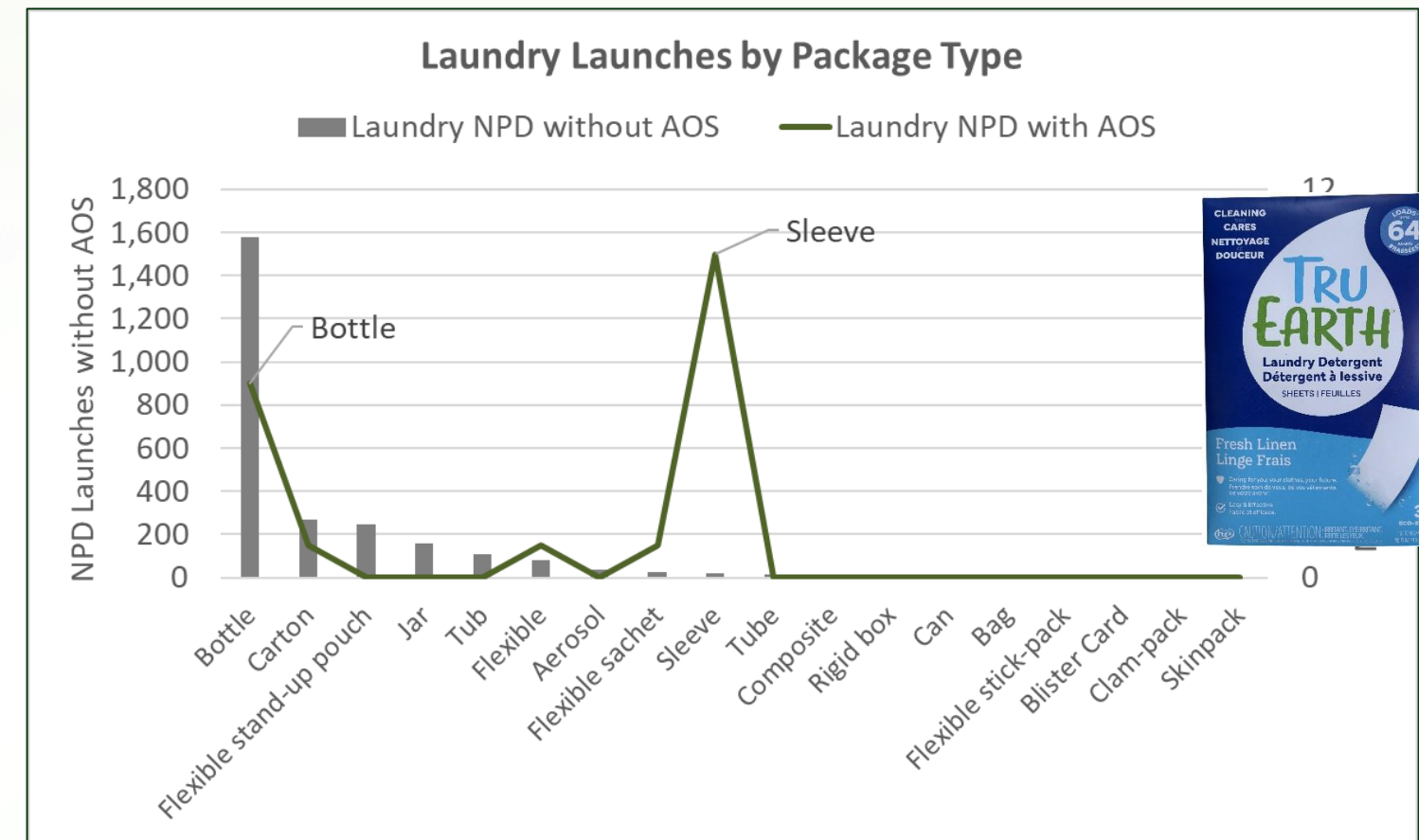
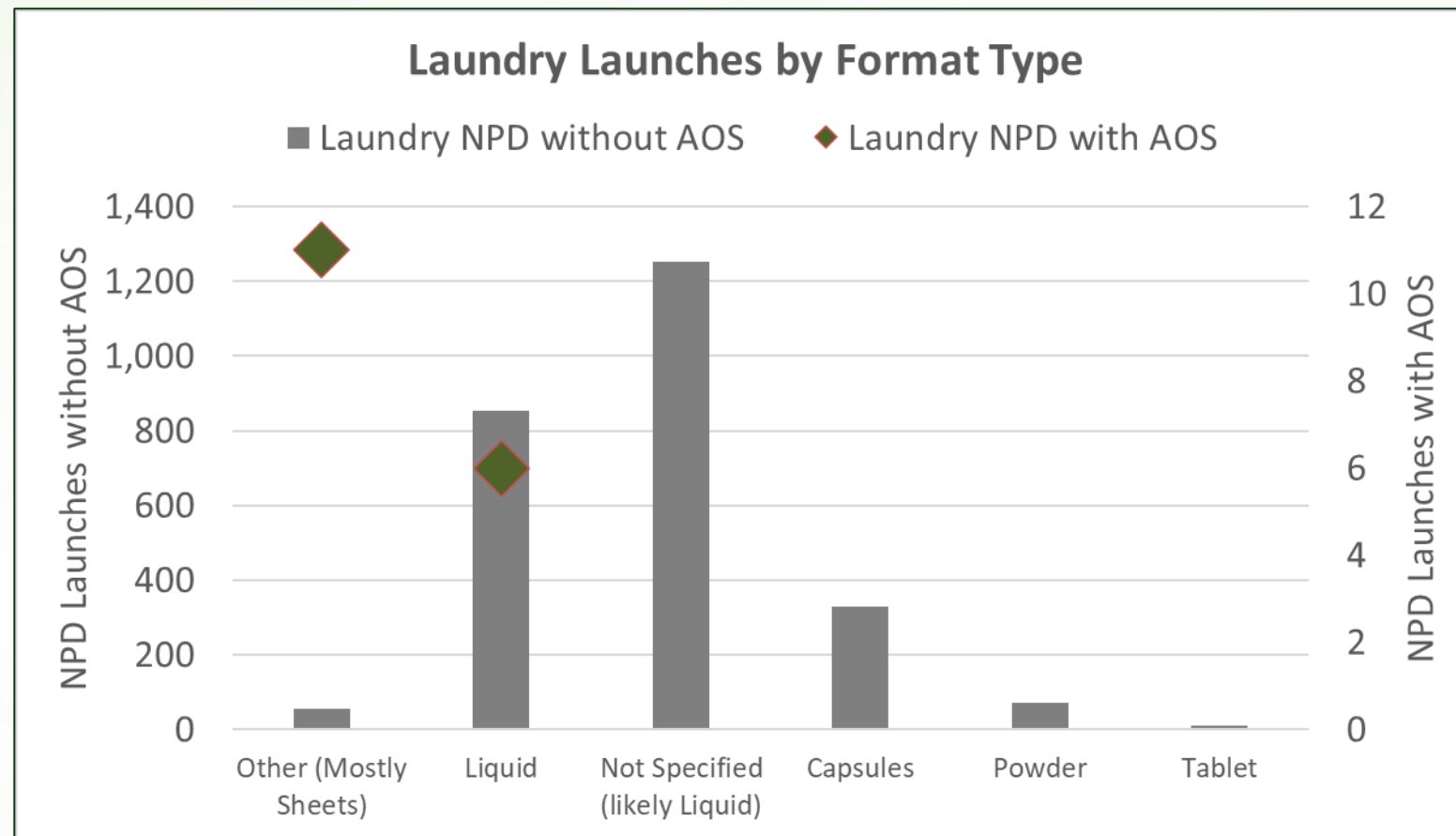
National Brand

A sharp uptick in AOS-based laundry NPD launches in 2024



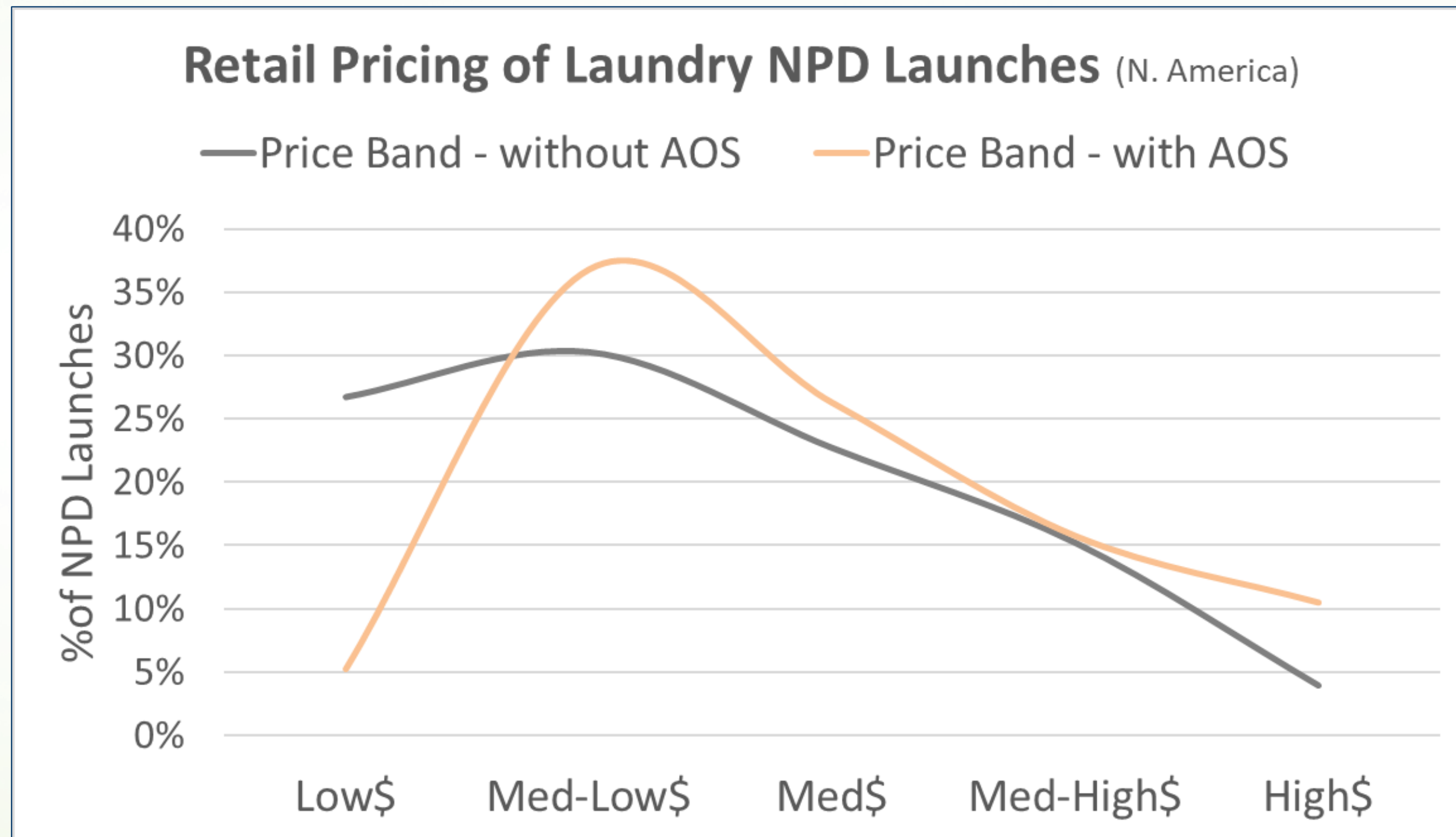
Source: Mintel GNPD

Adopters of AOS launching laundry sheets



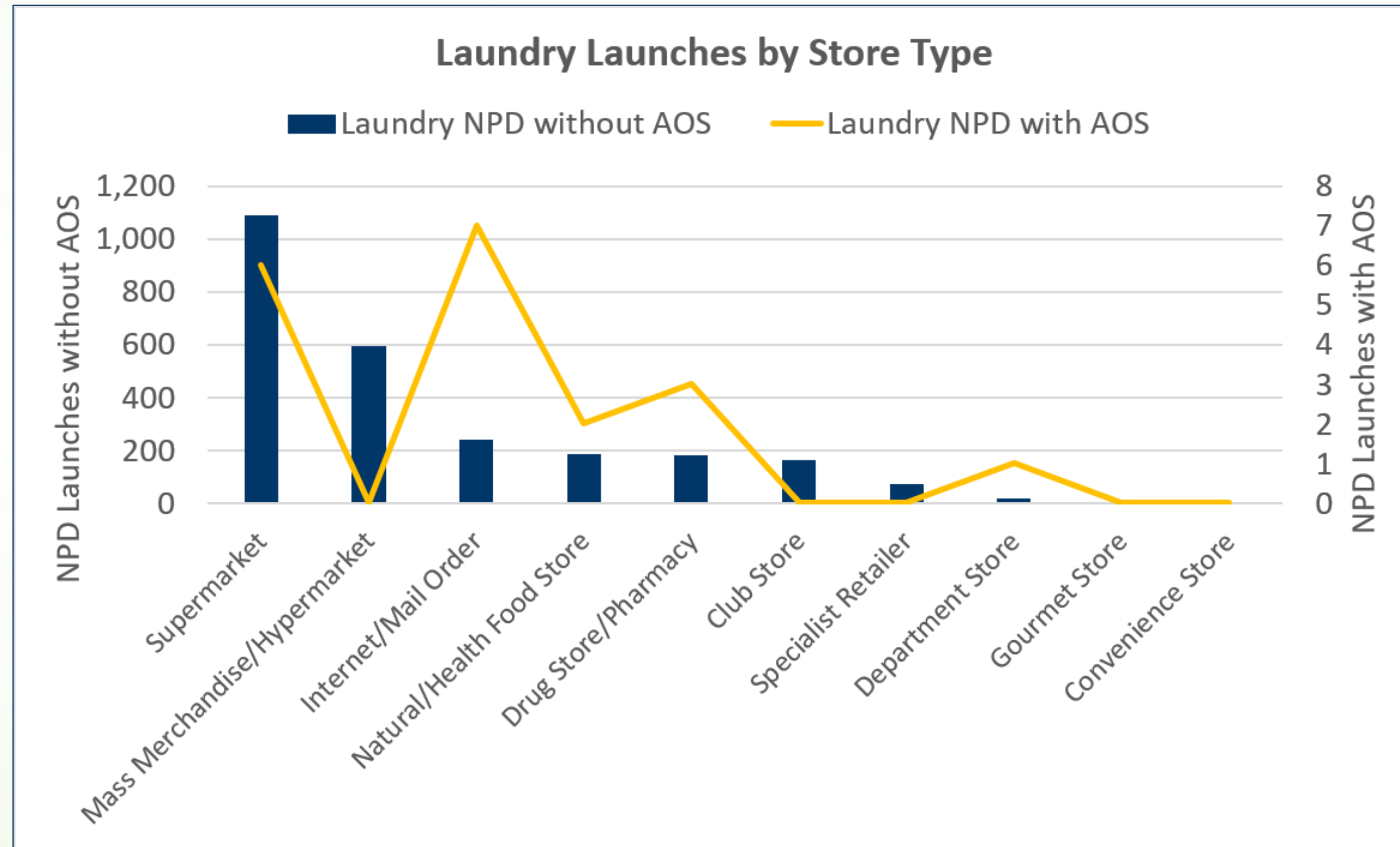
Laundry Company / Parent
Tru Earth
Cleanfinity
Good Juju Body & Home
Molly's Suds
Dizolve
Williams-Sonoma
Koala Eco Company
Rejoice International
Smart Vision
Savons Prolav
All Things Jill

Retail prices of AOS-based laundry launches are positioned towards higher premium



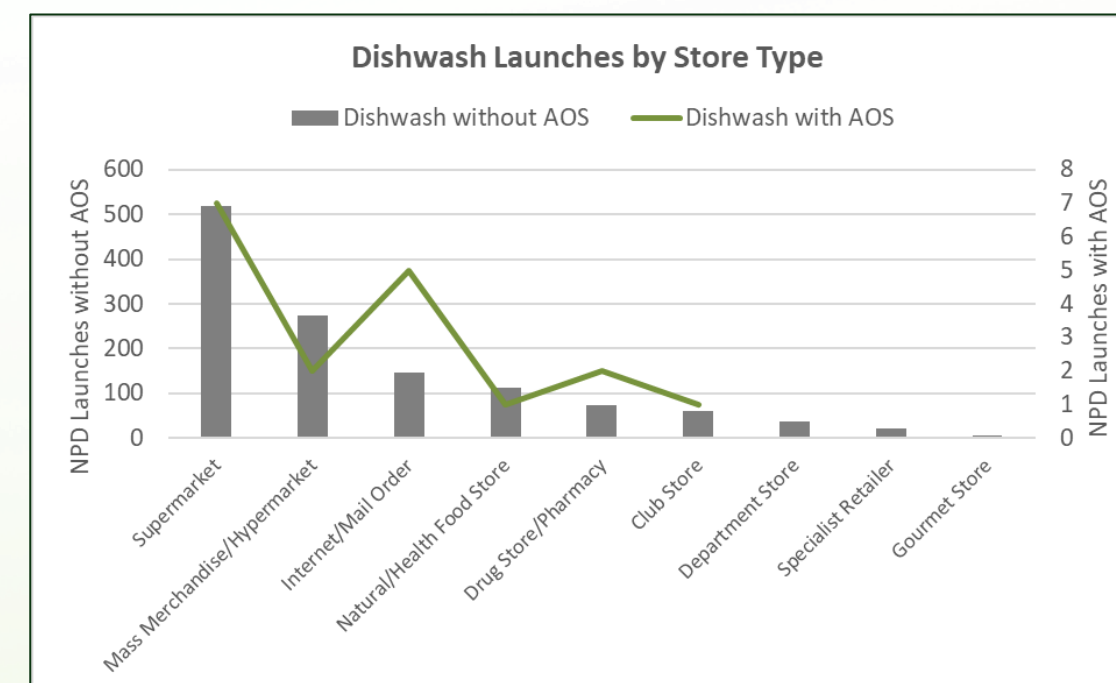
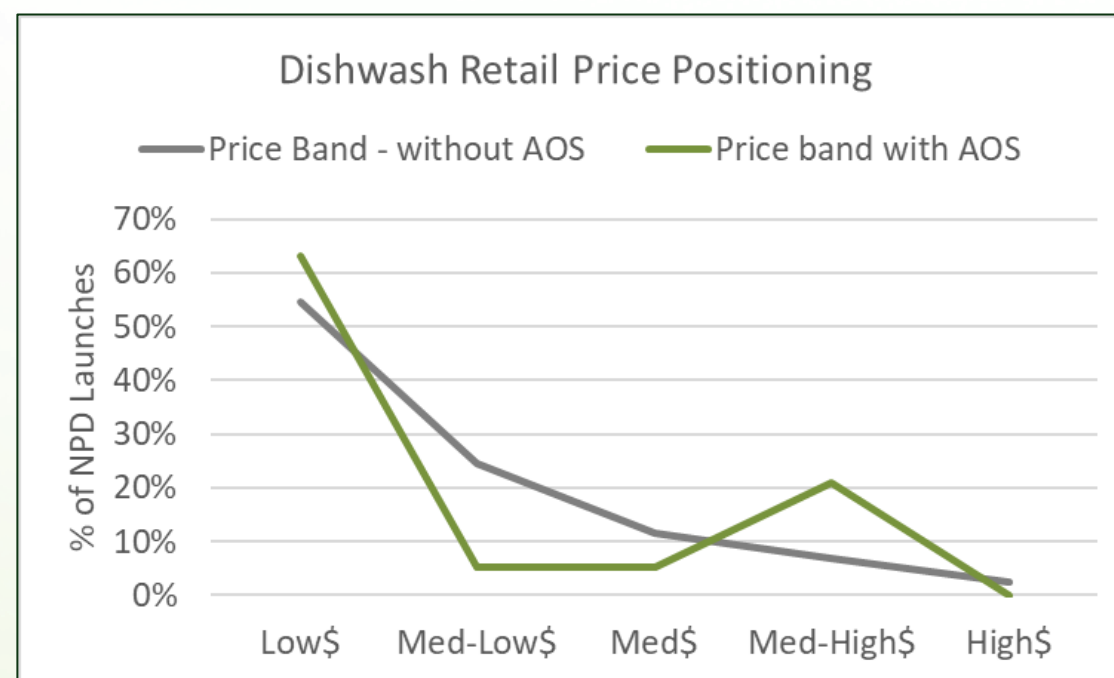
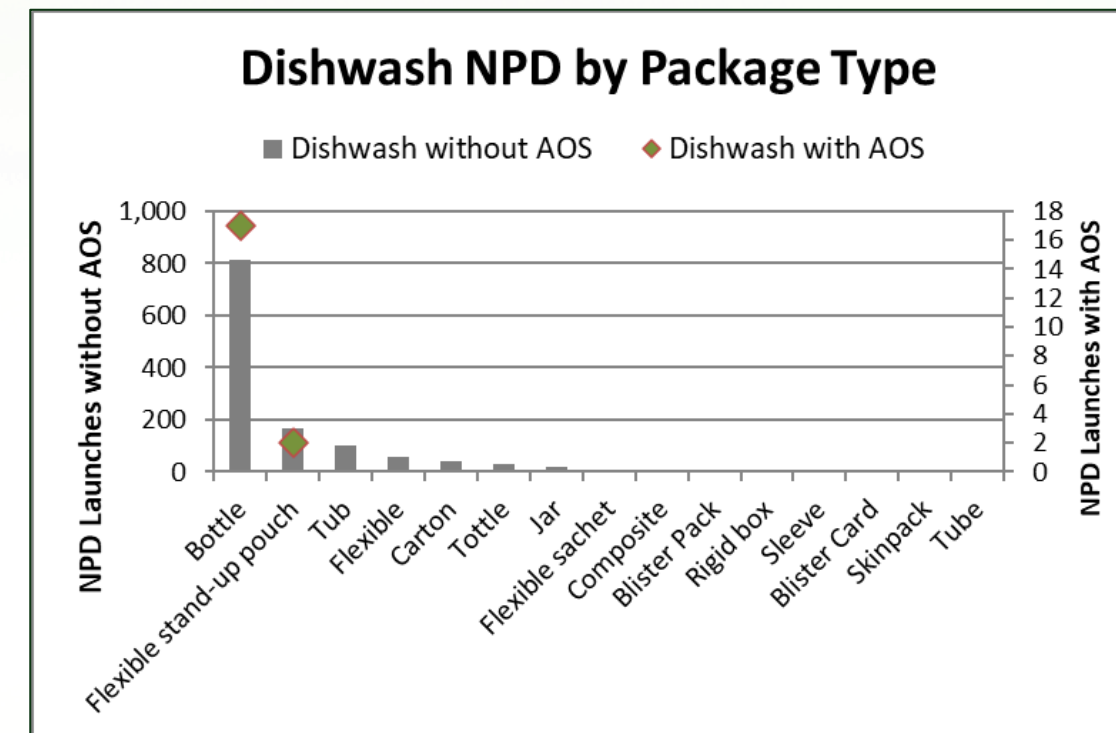
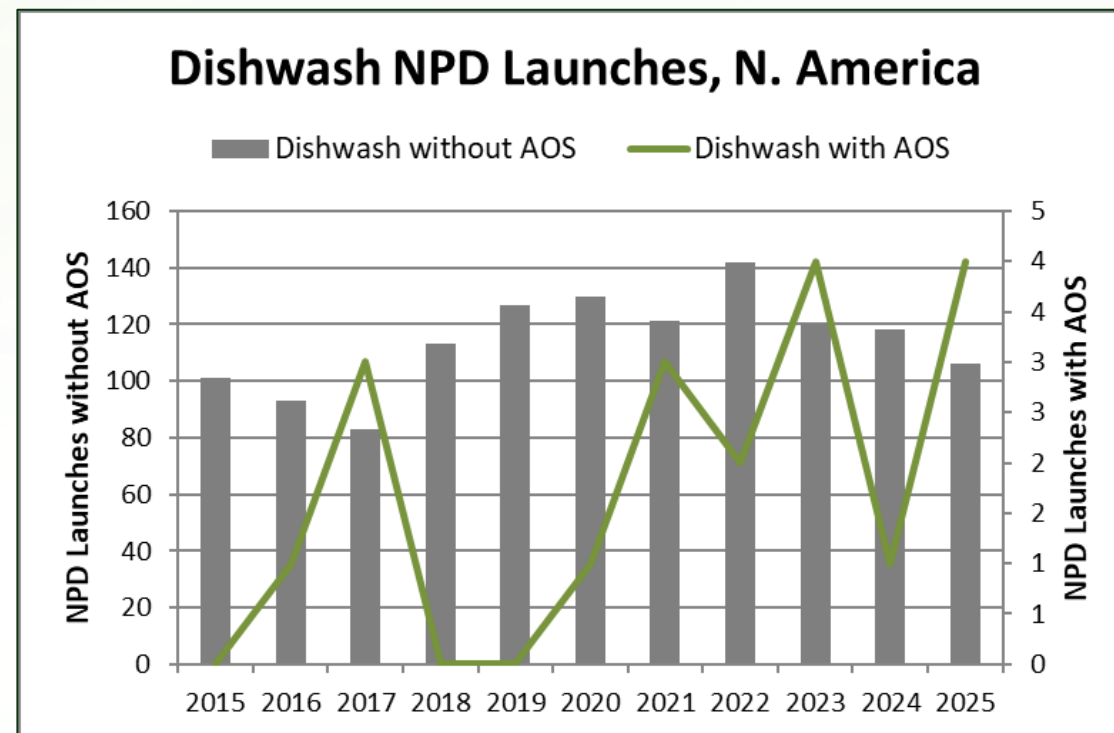
Source: Mintel GNPD

AOS-based laundry products are sold primarily in supermarkets & online



Source: Mintel GNPD

Dishwash launches with AOS account for less than 2% of NPD launches with slightly higher price positioning & higher internet sales than launches without AOS



Source: Mintel GNPD

Outlook

- The continued rise of AOS in home care products signals a shift toward high-performance, sustainable cleaning solutions.
 - Comply with 1,4-dioxane & sulfate-alternative requirements
- Companies investing in AOS-based innovation are well positioned to capture premium market segments and respond to evolving consumer preferences.
- Pilot Chemical Company announced its plan to double the volume of alpha olefin sulfonate (AOS) that it supplies to the household, industrial and institutional (I&I), and personal care markets.

Pilot's Middletown, Ohio Plant



What is your biggest hurdle when moving away from your #1 choice of anionic surfactant?

- A. Maintaining cleaning and foam performance
- B. Cost-in-use
- C. Compatibility with existing formula systems
- D. Skin mildness and consumer acceptance

Audience Poll 3 of 5 — tell us where the friction is

Calsoft® Alpha Olefin Sulfonates

These alpha olefin sulfonates (AOS) couple high foam and performance with mildness

Product	Alkyl Chain	Active
AOS-1245	C12 / Linear	45
AOS-40	C14-16 / Linear	40
AOS-40 HP	C14-16 / High pH	40
AOS-40 BZ	C14-16 / Benzoate	40
AOS-FS	C14-16 / Freeze Stable	40

AOS Product Characteristics

- ✓ High stable foams
- ✓ Hard water tolerant
- ✓ Excellent cleaning and degreasing
- ✓ Mildness on hands
- ✓ Perfect for many PC and H I & I applications
- ✓ CleanGredients option



Calsoft® Alpha Olefin Sulfonates

Calsoft® AOS-40 is compatible with traditional surfactants

Fine Fabric Wash

Ingredient	Description	% w/w
Water		to 100%
Calsoft® AOS-40	Sodium Alpha Olefin Sulfonate	20.00
Calfoam® ES-302 4 Max.	Sodium Laureth Sulfate	10.00
Masamide® REP	Surfactant Blend	4.00
Caltaine® C-35	Cocamidopropyl Betaine	10.00
Sodium Citrate		3.00
Preservative, dye, perfume		Q.S.

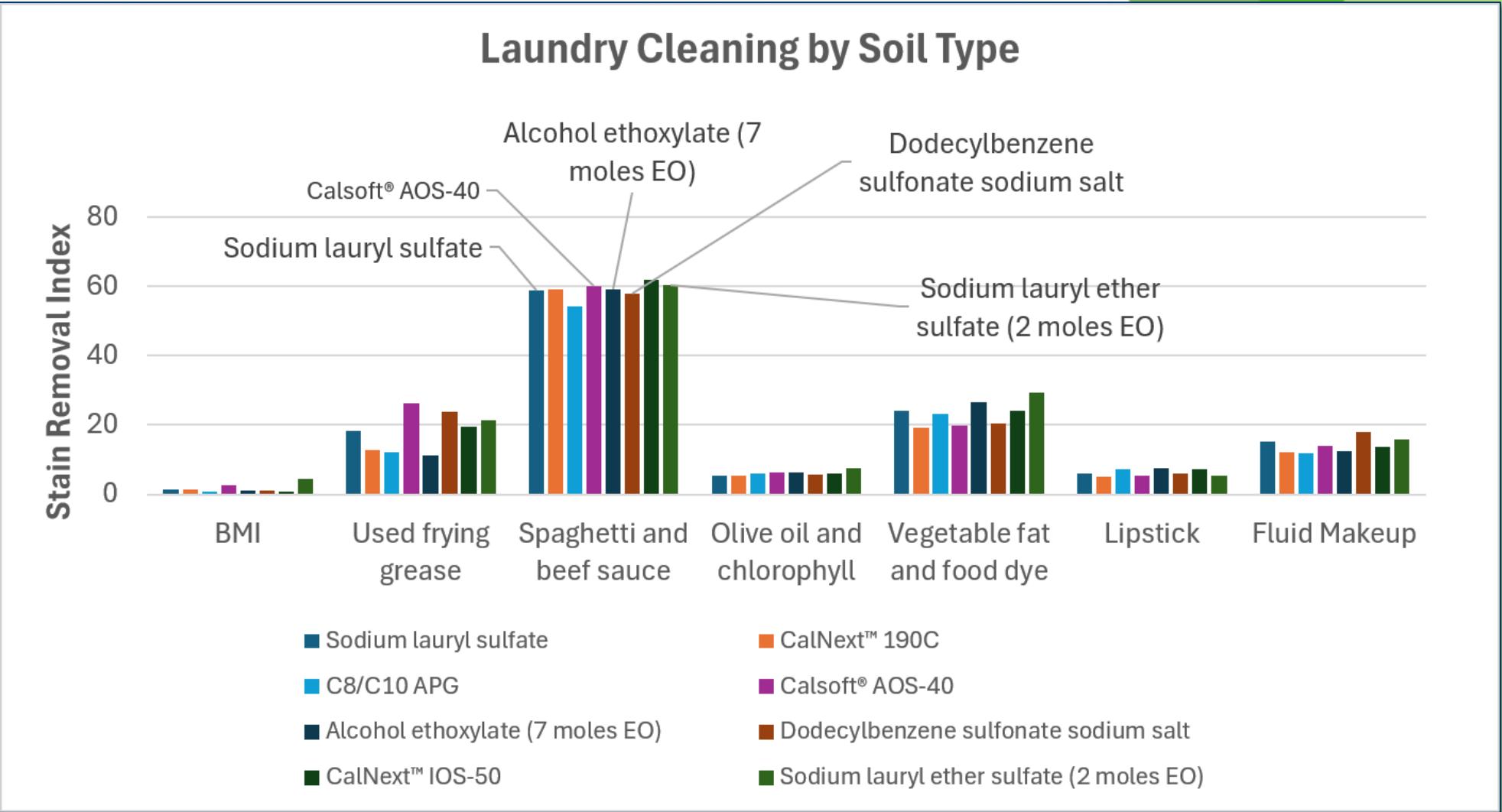
All-Purpose Cleaner – High Foam

Ingredient	Description	% w/w
D.I. Water		To 100%
Sodium Citrate		2.00
Metso Pentabeads 20	Sodium Metasilicate Pentahydrate	0.50
Sodium carbonate		1.00
Calsoft® AOS-40	Sodium C ₁₄₋₁₆ Alpha Olefin Sulfonate	5.00
Macat® AO-14	Myristamine Oxide	3.00
Masodol® 1-7	Alcohol Ethoxylate	0.50
Preservative, Perfume, Dye		Q.S.

Dish Wash Liquid with CleanGredients® listed Surfactants

Ingredient	Description	% w/w
Water		to 100%
Calsoft® L-40	Sodium Alkylbenzene Sulfonate	10.00
Calsoft® AOS-40	Sodium C ₁₄₋₁₆ Alpha Olefin Sulfonate	15.00
Macat® LB	Lauryl Betaine	8.00
Macate® AO-12	Lauramine Oxide	2.00
Sodium Chloride		1.00
Preservative, perfume, dye		Q.S.

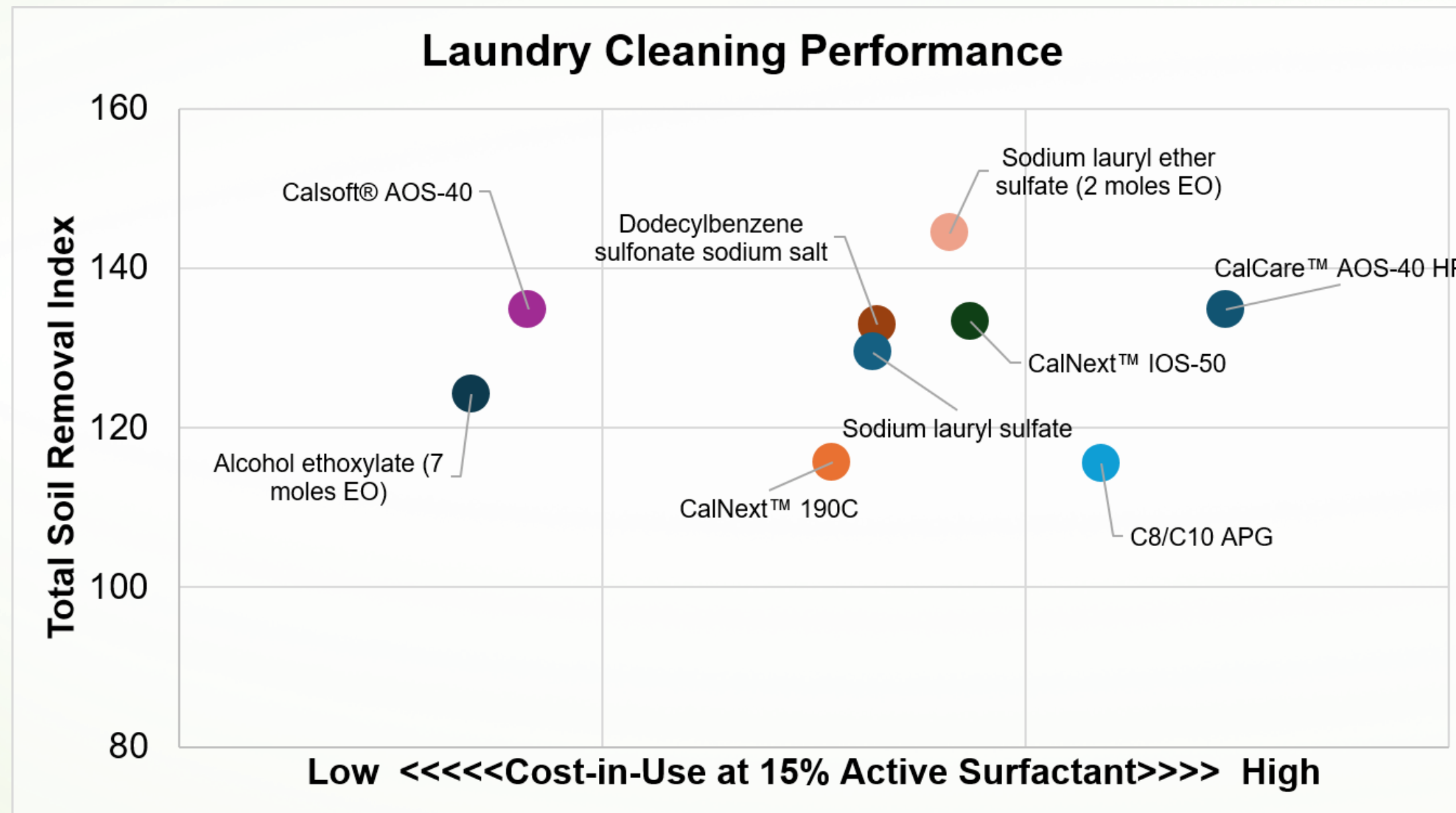
Calsoft® AOS-40 performs well across many stains



Liquid Laundry Formula	%Active
Surfactant	15
SXS-40	0.4
Baypure CX-100	0.68
Sodium citrate	2
Foam Ban 1820	0.2
Water	To 100%
pH	8.0-8.5

Used ballasts in testing, cold tap water, city water hardness

Calsoft® AOS is a cost-effective anionic surfactant

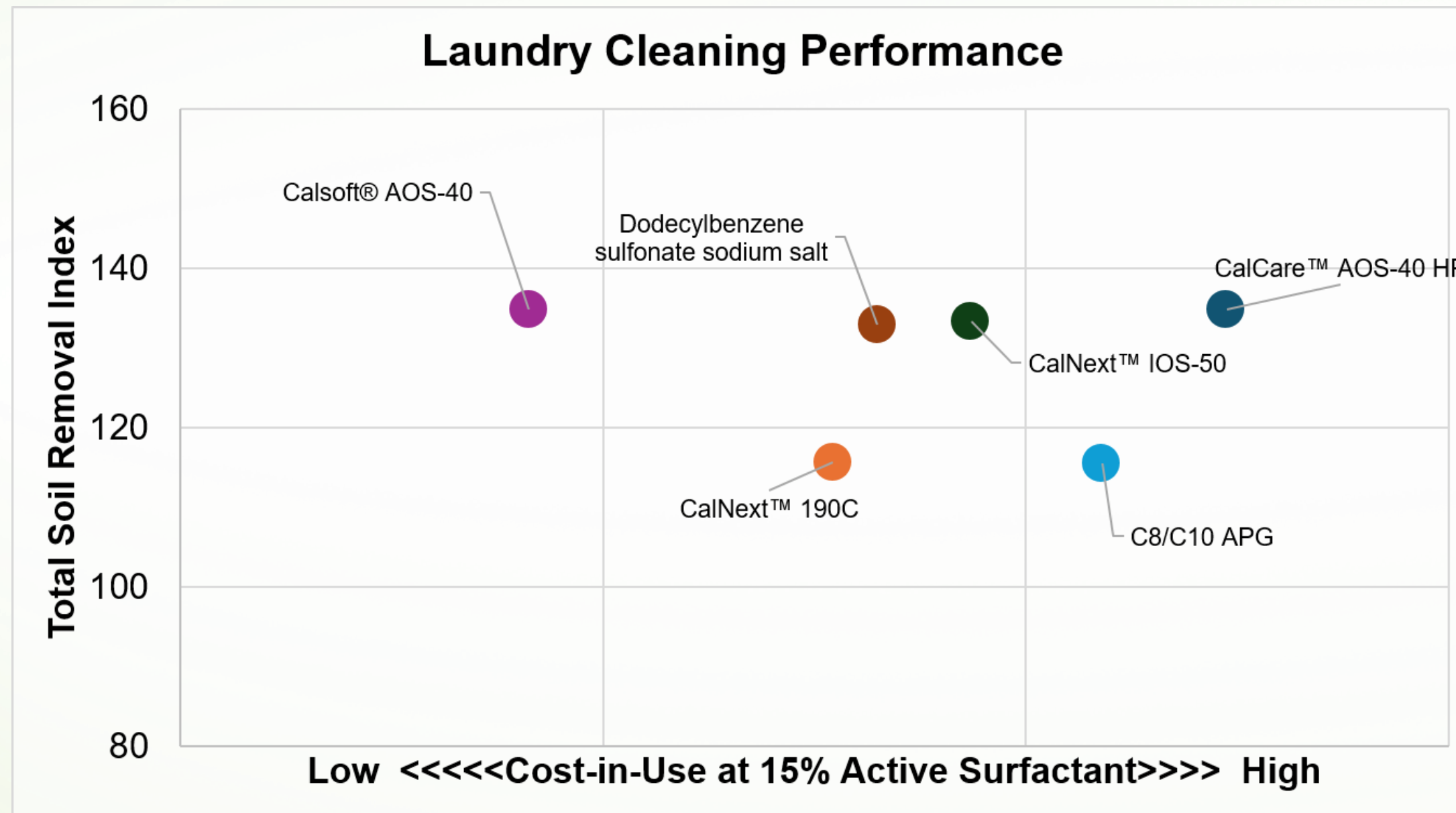


Liquid Laundry Formula	%Active
Surfactant	15
SXS-40	0.4
Baypure CX-100	0.68
Sodium citrate	2
Foam Ban 1820	0.2
Water	To 100%
pH	8.0-8.5

Used ballasts in testing, cold tap water, city water hardness

Stains	
BMI	Vegetable fat and food dye
Used frying grease	Lipstick
Spaghetti and beef sauce	Fluid Makeup
Olive oil and chlorophyll	

Calsoft® AOS is a cost-effective anionic surfactant that addresses 1,4-dioxane & sulfate concerns

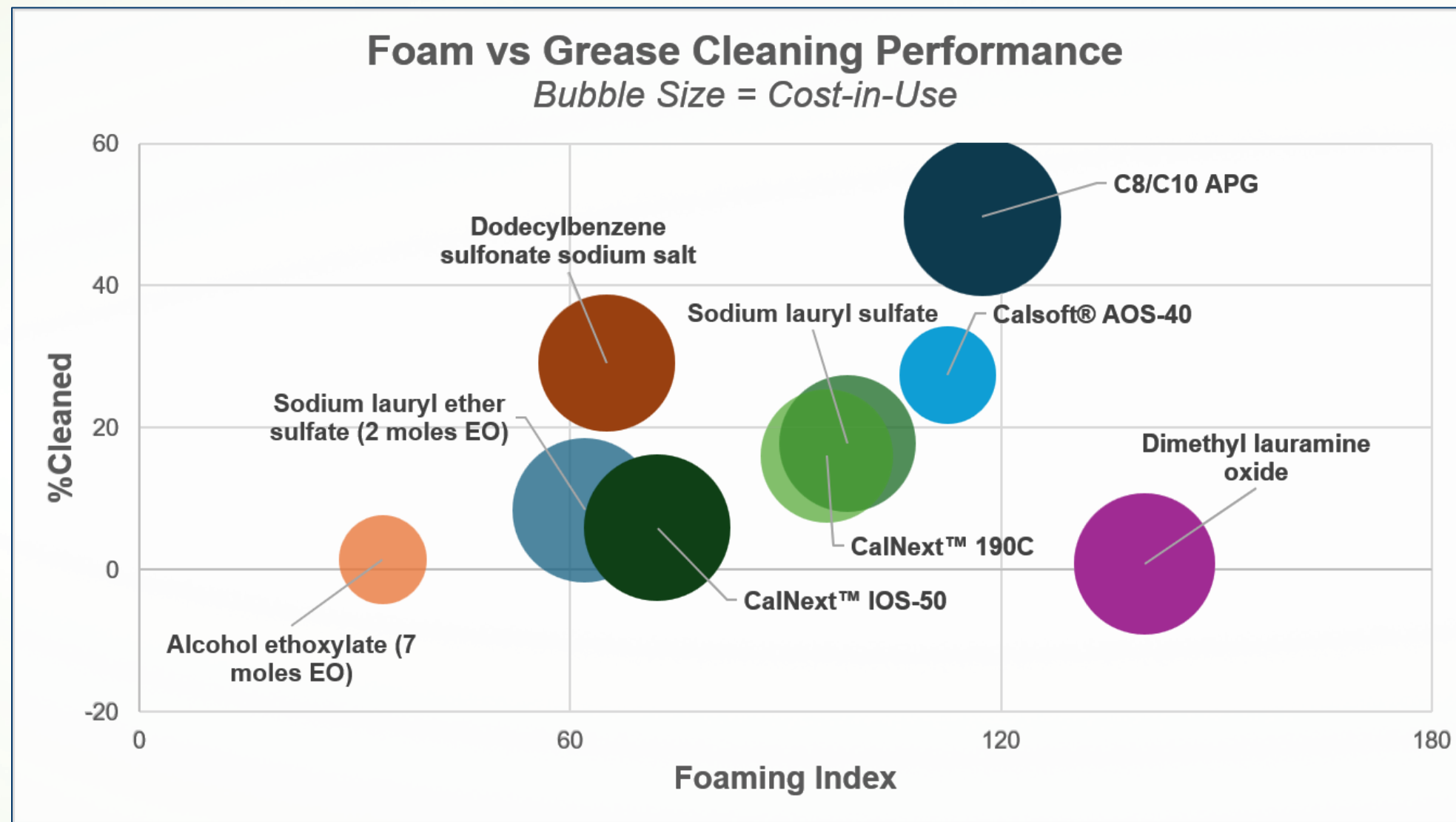


Liquid Laundry Formula	%Active
Surfactant	15
SXS-40	0.4
Baypure CX-100	0.68
Sodium citrate	2
Foam Ban 1820	0.2
Water	To 100%
pH	8.0-8.5

Used ballasts in testing, cold tap water, city water hardness

Stains	
BMI	Vegetable fat and food dye
Used frying grease	Lipstick
Spaghetti and beef sauce	Fluid Makeup
Olive oil and chlorophyll	

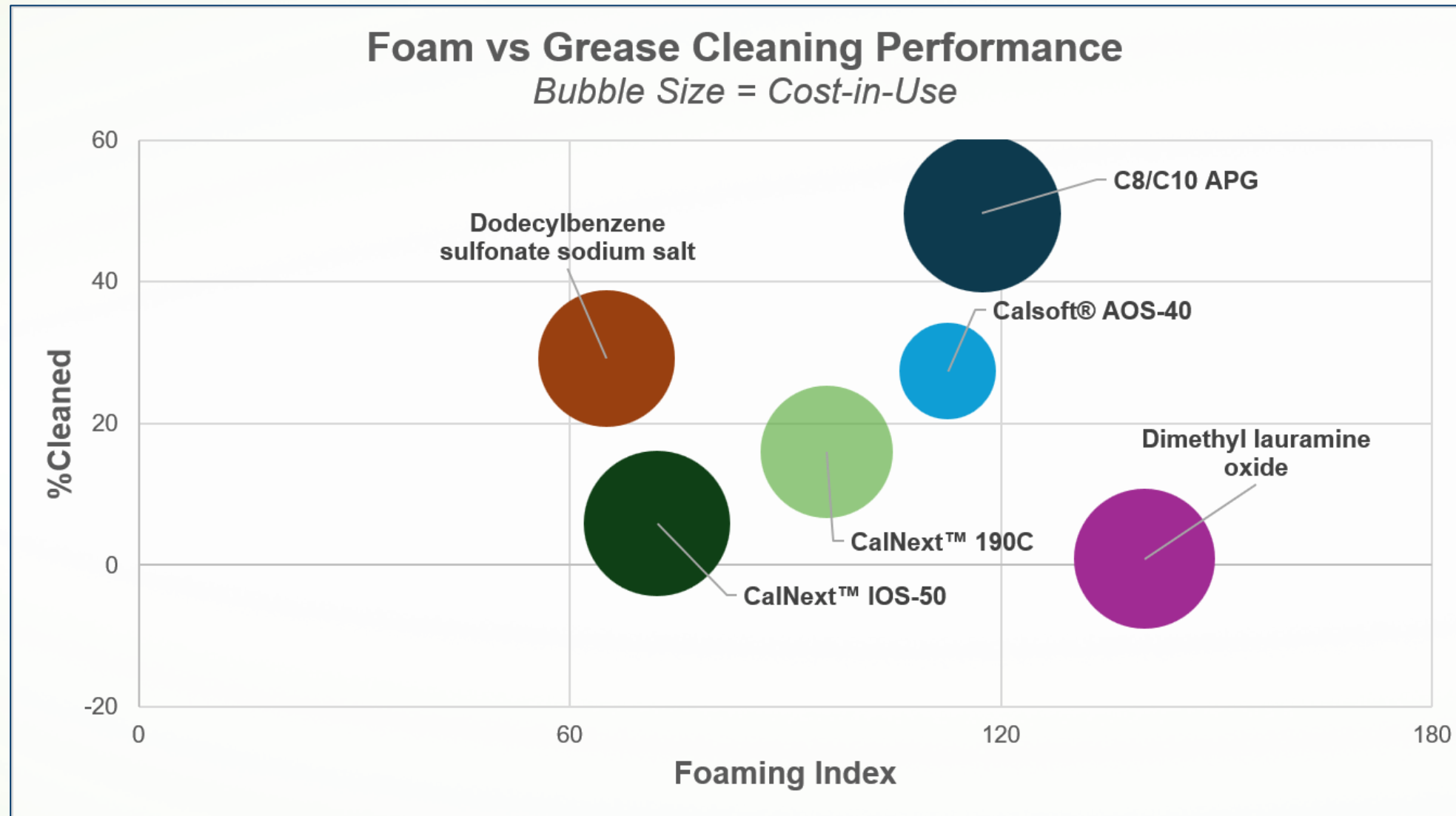
Calsoft® AOS has a good balance of cost-in-use, cleaning & foaming in dish & hard surface cleaners



Grease Cutting Formula	%Active
Surfactant	0.5
Sodium citrate	2
Water	To 100%
pH	8.0-8.5

Crisco Removal – Dunk Test Method: 0.11g Crisco; 0.5 wt.% surfactant.
Dunk tile for 2.5 minutes then two water dunks; let air dry.

Calsoft® AOS has a good balance of cost-in-use, cleaning & foaming in dish & hard surface cleaners

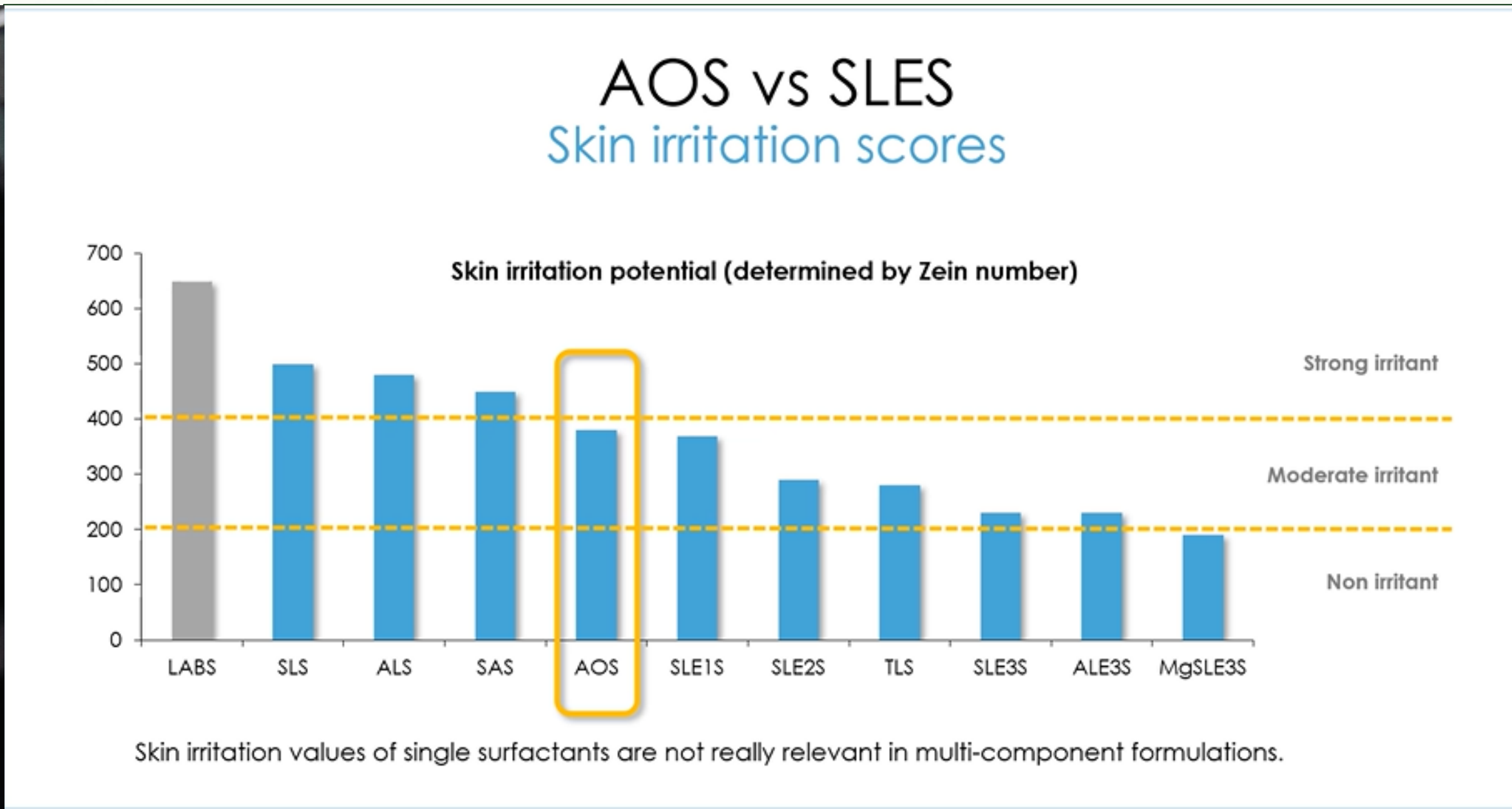


Grease Cutting Formula	%Active
Surfactant	0.5
Sodium citrate	2
Water	To 100%
pH	8.0-8.5

Good anionic surfactant to address 1,4-dioxane & sulfate concerns

Crisco Removal – Dunk Test Method: 0.11g Crisco; 0.5 wt.% surfactant.
Dunk tile for 2.5 minutes then two water dunks; let air dry.

AOS has similar skin mildness as SLES



Source: Innospec webinar on AOS - [Webinar: Formulating 1,4-Dioxane Free by Innospec Performance Chemicals](#)

Conclusion: Calsoft® AOS delivers superior value without compromising performance



Performance:

- strong detergency, excellent foam, hard-water tolerance, and favorable viscosity response
- across laundry, dish, hard surface, degreaser, vehicle wash, and institutional cleaning applications.



Formulation flexibility:

- compatible with a broad range of surfactants, builders, and chelating agents.



Regulatory readiness:

- helps formulators address sulfate and 1,4-dioxane concerns while maintaining consumer-acceptable performance.



Cost-in-use advantage:

- balances cleaning performance and formulation economics to deliver superior value.

**A versatile anionic surfactant platform for today's
HI&I cleaning challenges**

Where would you try AOS first?

- A. Laundry (liquids, pods, sheets, concentrates)
- B. Manual dish detergent
- C. Hard surface care
- D. Personal care
- E. Not currently considering AOS

Audience Poll 4 of 5 — point us to your priority format

Which surfactant(s) are you likely to displace with AOS?

- A. SLES / laureth sulfates
- B. SLS
- C. Linear alkylbenzene sulfonate (LAS)
- D. A blend or something else
- E. Not currently considering AOS

Audience Poll 5 of 5 — point us to your priority candidate



Committed to AOS



- Pilot Chemical Company is investing in AOS capacity expansion to support the current & emerging needs of the household, industrial and institutional (I&I), and personal care markets.
- We are developing new Olefin Sulfonate chemistries with improved sustainability & performance profiles

Pilot Chemical Company Announces Plans to Significantly Expand Anionic Surfactant Production Capacity

by Admin | Jan 24, 2025 | News, Press Release, Uncategorized

CINCINNATI (Jan. 23, 2025) – Pilot Chemical Company announced today its plan to significantly expand its North American production of high-quality anionic surfactants at its Middletown, Ohio manufacturing site. The expansion will enable the company to more than double...

Pilot Chemical Company Announces Exclusive Partnership with Kao Corporation to Bring Bio IOS® Surfactant Technology to the North American Market

by Admin | Jan 27, 2025 | News, Press Release

CINCINNATI (Jan. 27, 2025) – Pilot Chemical Company today announced an exclusive partnership with Kao Corporation to bring a new sustainable surfactant technology, Bio IOS® biobased internal olefin sulfonates, to the North American market. Bio IOS® technology will...

Pilot Chemical Company Announces Exclusive Partnership with Novvi LLC to Bring Biobased Alpha Olefin Sulfonate Surfactant Technology to the North American Market

by Admin | May 5, 2025 | Press Release

CINCINNATI (May 5, 2025) – Pilot Chemical Company today announced an exclusive partnership with Novvi LLC to bring a new sustainable surfactant technology, biobased alpha olefin sulfonates, to the North American market. In partnership with Novvi, Pilot will supply...

Regulatory pressure and new format growth are driving renewed adoption of AOS as a scalable, cost-effective surfactant platform in home care



To learn more about **Pilot Chemical** and the products we offer, visit our website
www.pilotchemical.com

