



# Grease 201

**The webinar will begin in less than 10 minutes.**

The man is looking at a large screen displaying a complex data table. The table has multiple columns and rows, with some cells containing text and others containing numbers or symbols. The table is organized into several sections, with headers like '24 Hrs. or Mobility', '48 Hrs. or Energy & Temp', '100 Hrs. or Accuracy', and '100 Hrs. or Energy & Temp'. The table is very dense with data, and the man is looking at it intently.







Available duty assignment chart

Month	Date	24 Hrs. or Ability			48 Hrs. or Less A Type				96 Hrs. or Annually			168 Hrs. or Every 7 Days				Continuous Duty			
		Continuous	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent	Intermittent
01	01/01/14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
02	02/01/14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
03	03/01/14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
04	04/01/14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
05	05/01/14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
06	06/01/14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
07	07/01/14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
08	08/01/14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
09	09/01/14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	10/01/14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	11/01/14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	12/01/14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

# Grease 201

The webinar will begin in less than 5 minutes





  
**Mystik**  
LUBRICANTS



**Grease 201**





# Amber Fessler – NLGI CLGS; STLE CLS & OMA-I



- CITGO Senior Technical Services Representative
- Materials Engineer
- 12 Years of Experience in Lubricants
- STLE Certified
  - Certified Lubrication Specialist
  - Oil Monitoring Analyst I
- NLGI Certified
  - Certified Lubricating Grease Specialist







# Doug Rice – NLGI CLGS; STLE CLS & OMA-I

- Sr. Product Specialist
  - Grease Technology
- B.S. Chemistry
- 30 Years of Experience in Lubricants including QC Laboratory Manager, Sr. Technical Service Representative and Sr. Account Manager







# Angela Kirby



- CITGO Sr. Account Manager
- 11 Years of Selling Experience in the Lubricants Industry







# Agenda



Grease Review

Market Overview

Grease Thickener Types

Compatibility & Conversion Issues

Grease Trends

What to Know About Lithium  
Complex Grease



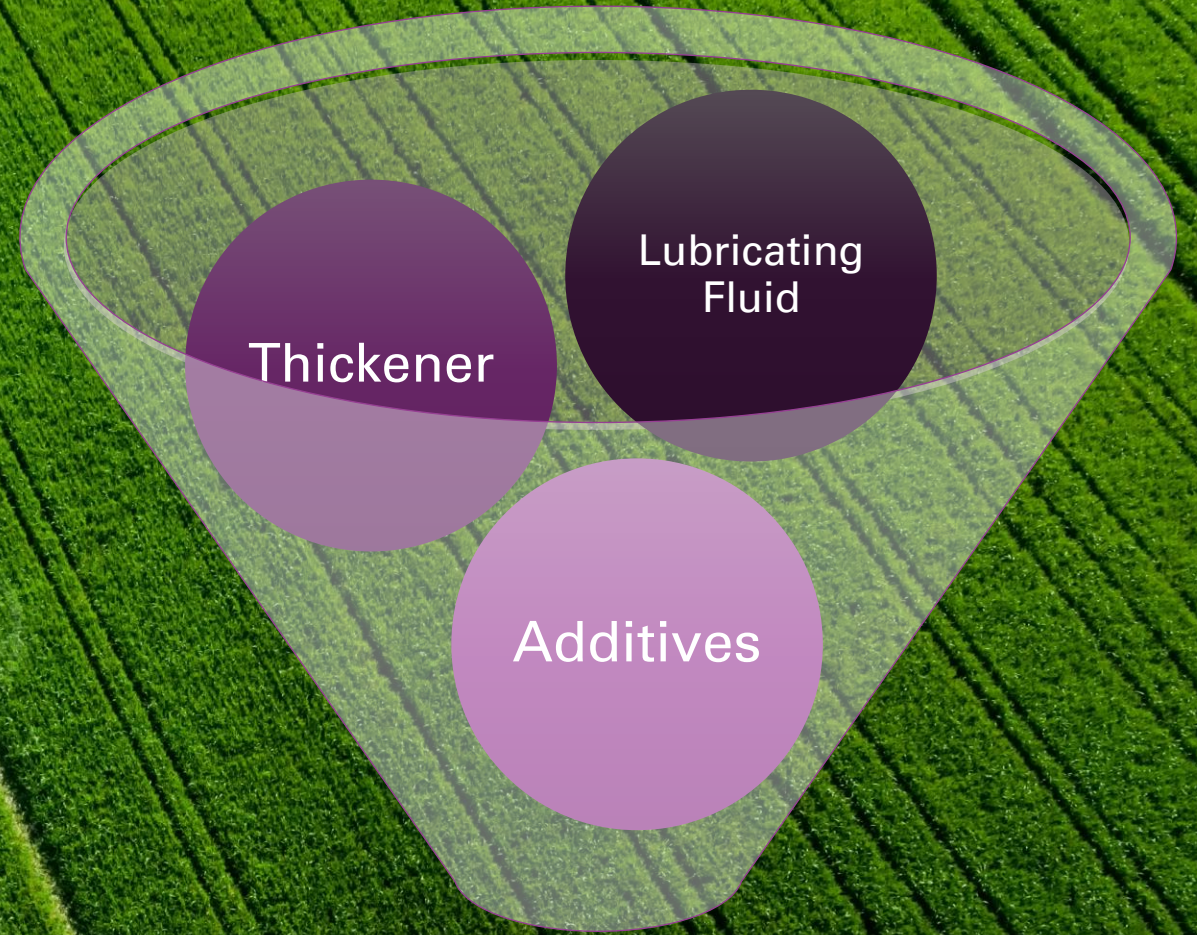


# Grease Review





# Grease Composition



# Grease



# Thickeners

## Simple Soap

Lithium

Calcium

Sodium

Barium

Aluminum

## Complex Soap

Lithium

Aluminum

Calcium

Barium

## Non-Soap

Polyurea

Calcium Sulfonate

Clay (Bentonite, Hectorite)

Fumed Silica



# Thickener Reaction

## Saponification



## Common Acids

- Stearic Acid
- 12-Hydroxystearic Acid
- Tallow
- Azelaic Acid
- Sebacic Acid

## Common Bases

- Lithium Hydroxide
- Calcium Hydroxide
- Sodium Hydroxide
- Barium Hydroxide





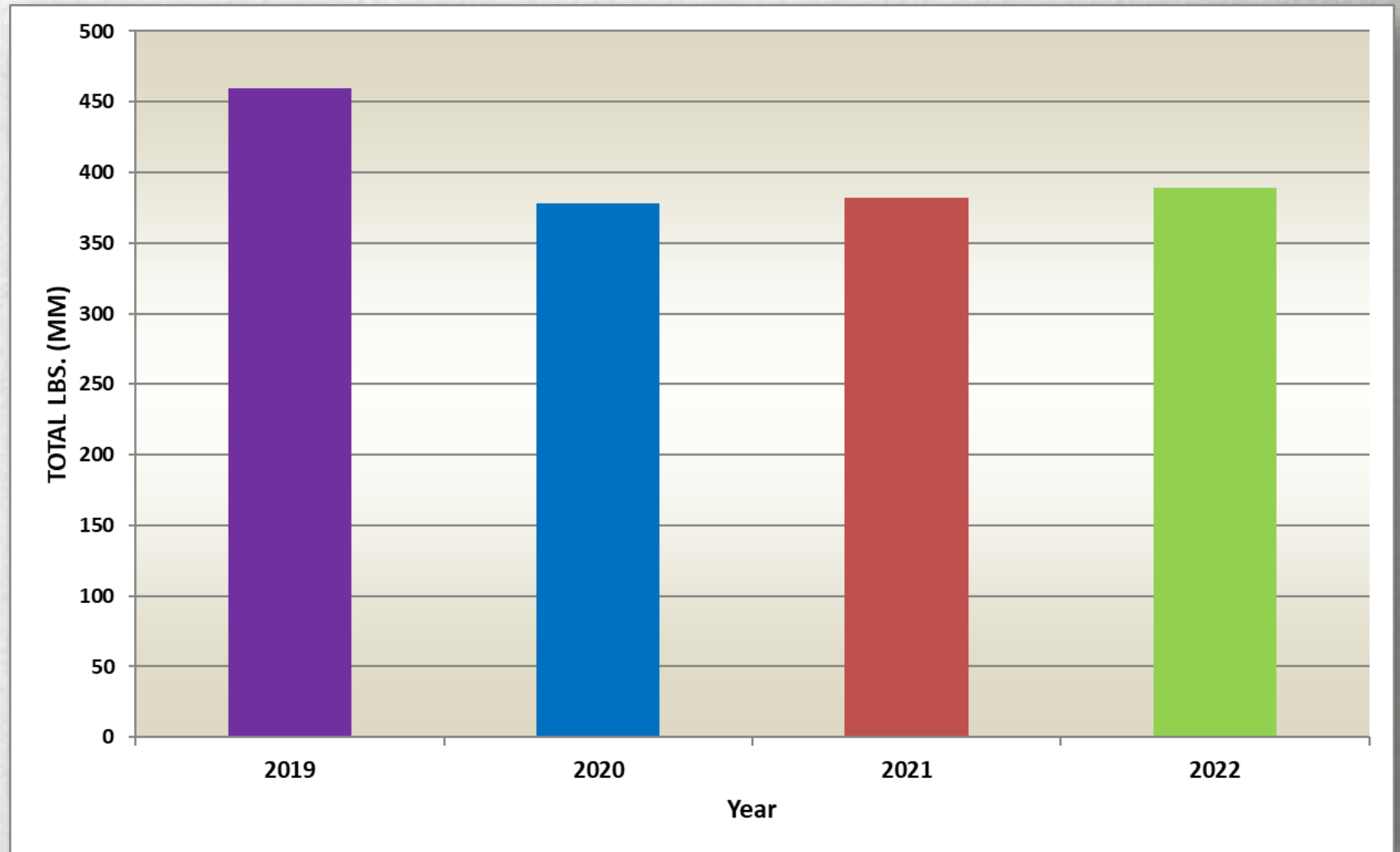


# Market Overview



# Annual Grease Production

North America  
2019-2022

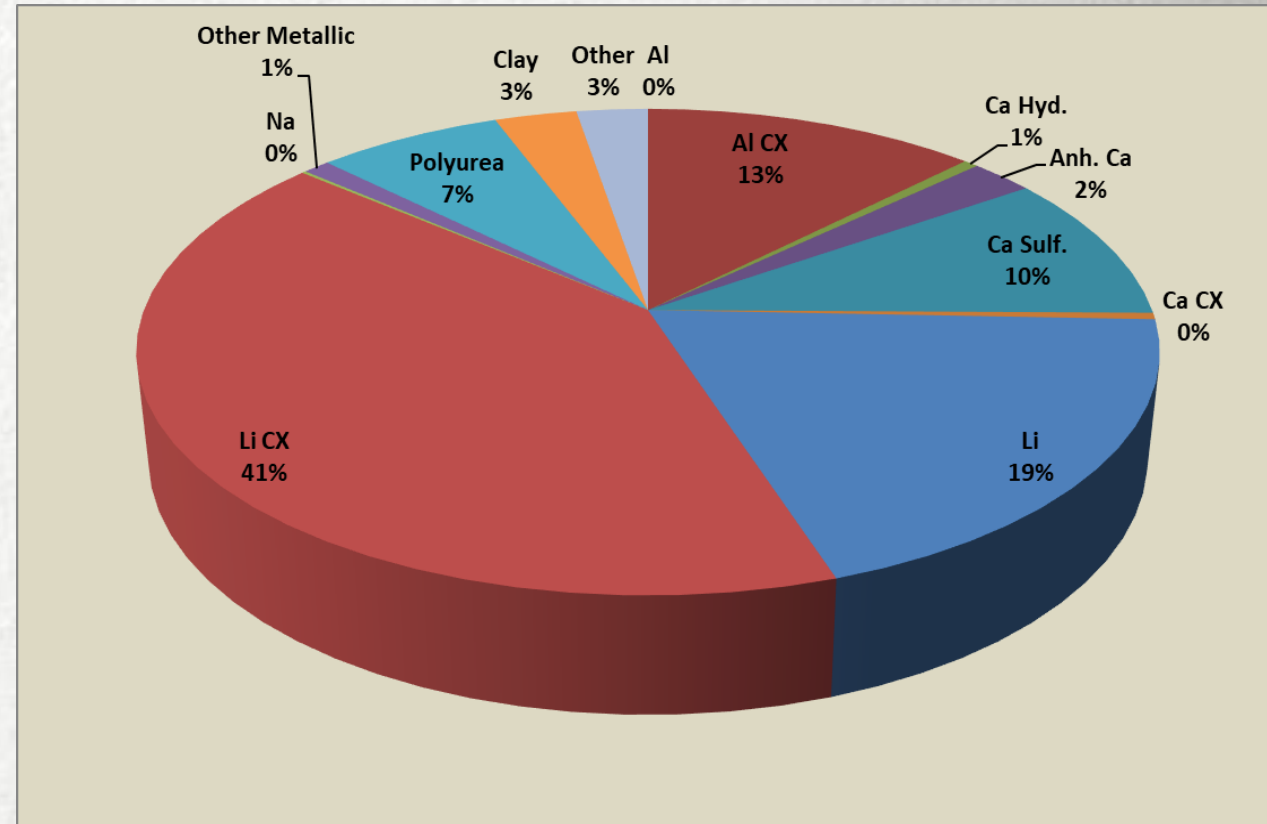
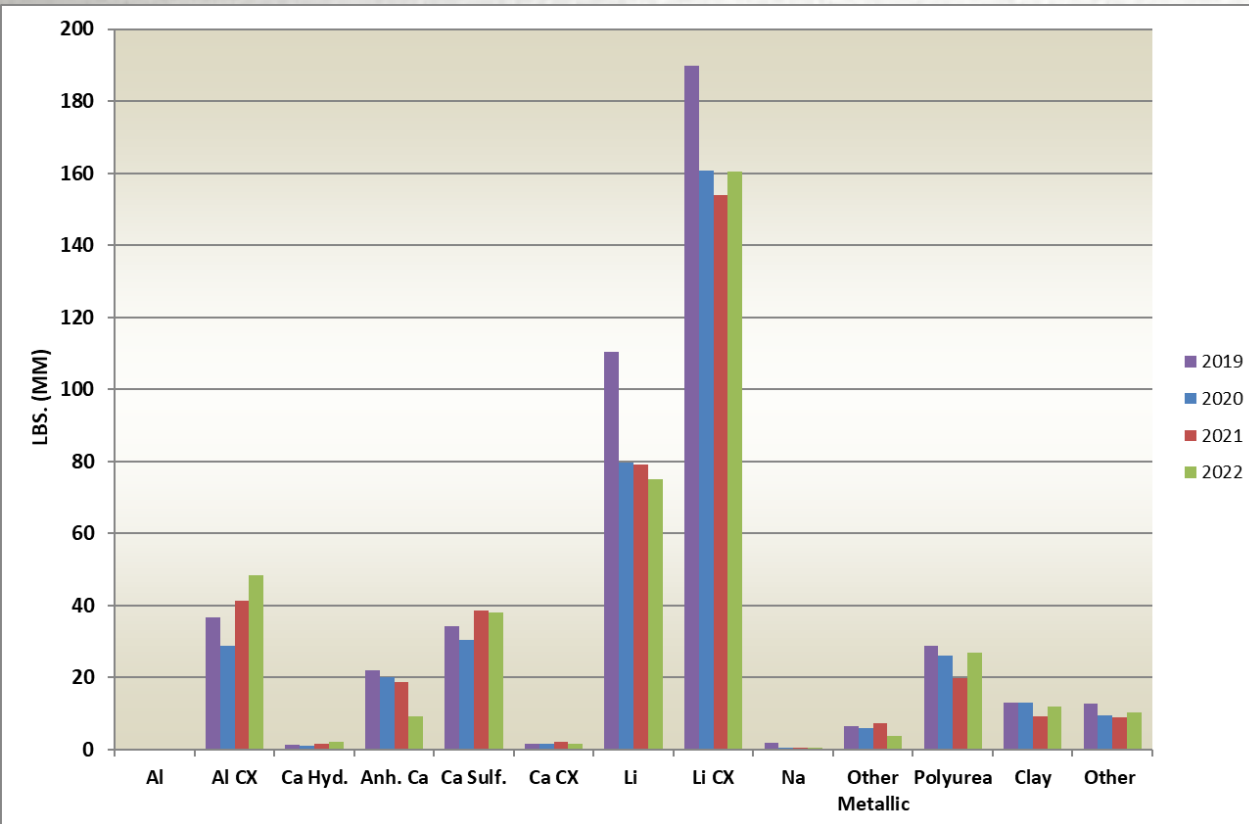


Source: NLGI Annual Survey 2023

# Grease Production by Thickener

## North America

### 2019-2022



Source: NLGI Annual Survey 2023







# Grease Thickener Types





# Aluminum Complex



Applications	Advantages	Disadvantages
High-Temperature Industrial – Steel Mills and Paper Mills	High Dropping Point	Poor Storage Stability
Incidental Food Contact	Can be NSF H-1	False Set
	Water Resistant	Oil Separation
	Reversible	Limited Compatibility





# Anhydrous Calcium



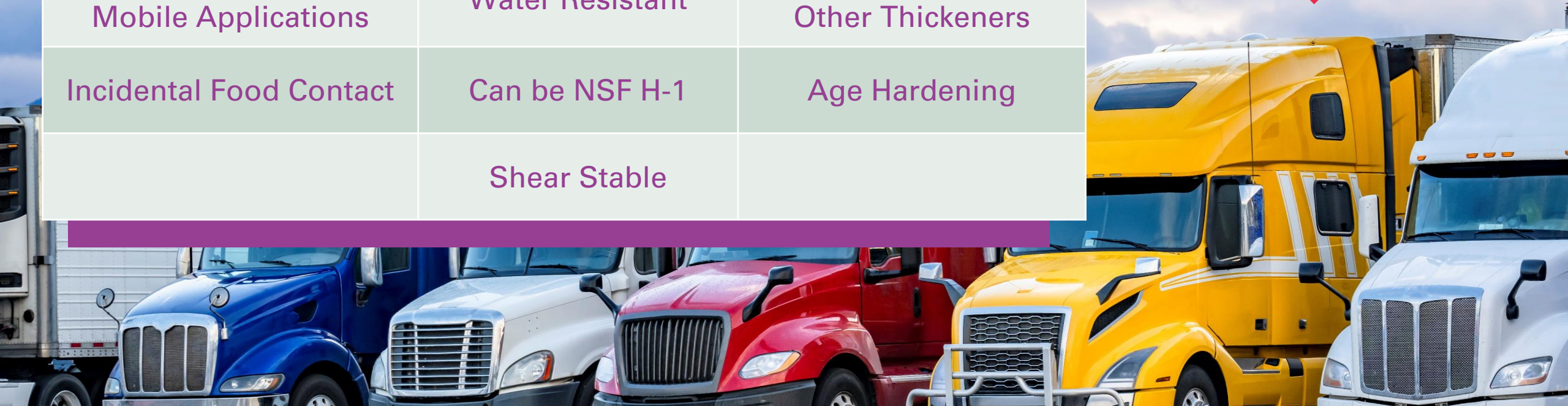
Applications	Advantages	Disadvantages
Low to Moderate-Temperature Industrial Applications	Water Resistant	Low Dropping Point
Low to Moderate-Temperature Agricultural Applications	Can be NSF H-1	Not for High-Temperature Applications
Incidental Food Contact	Good Pumpability	
	Shear Stable	



# Calcium Sulfonate



Applications	Advantages	Disadvantages
High-Temperature Industrial Applications	Corrosion Resistant	High-Density May Limit Pumpability
High-Temperature Mobile Applications	Water Resistant	Incompatibility With Other Thickeners
Incidental Food Contact	Can be NSF H-1	Age Hardening
	Shear Stable	







# Lithium



Applications	Advantages	Disadvantages
Moderate-Temperature Industrial Applications	Good Flow Properties	Not for High-Temperature Applications
Moderate-Temperature Mobile Applications	Water Resistant	
	Low Oil Separation	
	Shear Stable	
	Widely Compatible	





# Lithium Complex



Applications	Advantages	Disadvantages
High-Temperature Industrial Applications	High Dropping Point	Higher Cost
High-Temperature Mobile Applications	Good Flow Properties	
	Water Resistant	
	Low Oil Separation	
	Shear Stable	
	Widely Compatible	







# Polyurea



Applications	Advantages	Disadvantages
Electric Motor Bearings	High Dropping Point	Higher Cost
"Fill for Life" Applications	Good Flow Properties	Limited Compatibility
High-Temperature Industrial Applications	Oxidation Resistant	Manufacturing Process
High Temperature Mobile Applications		





# Impacts of Change







# Compatibility & Conversion



# Compatibility

General Guide -  
Exceptions Are Possible

	Aluminum Complex	Calcium Stearate	Calcium 12-Hydroxy†	Calcium Complex	Calcium Sulfonate	Clay	Lithium Stearate	Lithium 12-Hydroxy	Lithium Complex	Polyurea	Sodium Soap
Aluminum Complex	C	I	B	I	I	I	I	I	I*	I	
Calcium Stearate	I	C	C	I	B	I	C	B	C	I*	I
Calcium 12-Hydroxy†	B	C	C	B	C	I	C	C	C	I*	I
Calcium Complex	I	I	B	C	I	I	I	I	B	C	I
Calcium Sulfonate	I	B	C	I	C	I	I	B	B	I	I
Clay	I	I	I	I	I	C	I	I	I	I	I
Lithium Stearate	I	C	C	I	I	I	C	C	C	I*	I
Lithium 12-Hydroxy	I	B	C	I	B	I	C	C	C	I*	I
Lithium Complex	I	C	C	B	B	I	C	C	C	I*	I
Polyurea	I*	I*	I*	C	I	I	I*	I*	I*	C	I
Sodium Soap	I	I	I	I	I	I	I	I	I	I	C
C - Compatible											
B - Borderline											
I - Incompatible											
I* - Dependent Upon Type											
† - Anhydrous Calcium											







## Incompatibility Can Occur

- Thickener Types
- Additives
- Base Oil Types



## Potential Results of Incompatibility

- Softening
- Hardening
- Lower Dropping Point
- Decreased
  - Wear Protection
  - Extreme Pressure Protection
  - Corrosion Protection

**Converting  
Greases  
in an  
Application**





# Grease Trends



North American volume  
is down from its peak in  
2018



Calcium Sulfonates and  
Aluminum Complex  
increased slightly at the  
expense of other  
thickeners



Lithium Complex and  
Lithium greases  
expected to continue to  
be market leaders



Expect cost increases for  
Lithium/Lithium  
Complex greases





# What to Know About Lithium Complex Grease





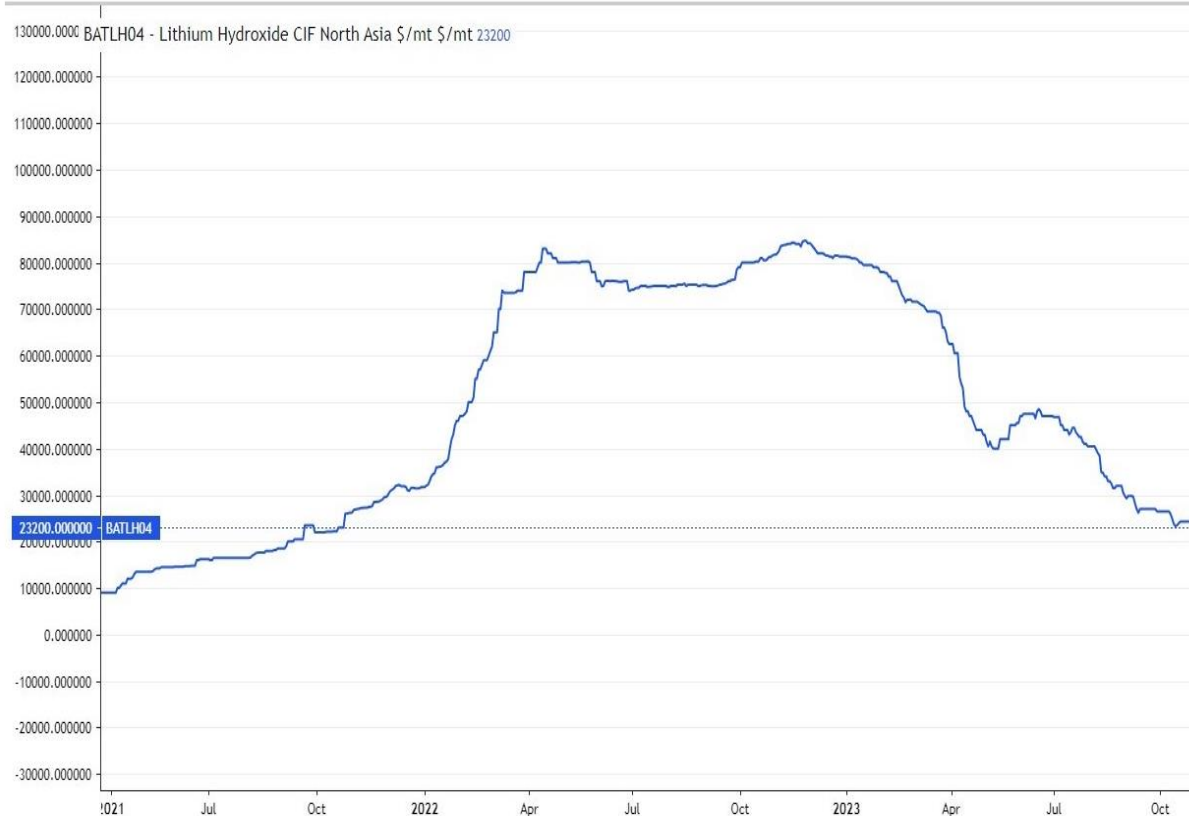




# Like Everything in 2022 Lithium Prices Rose



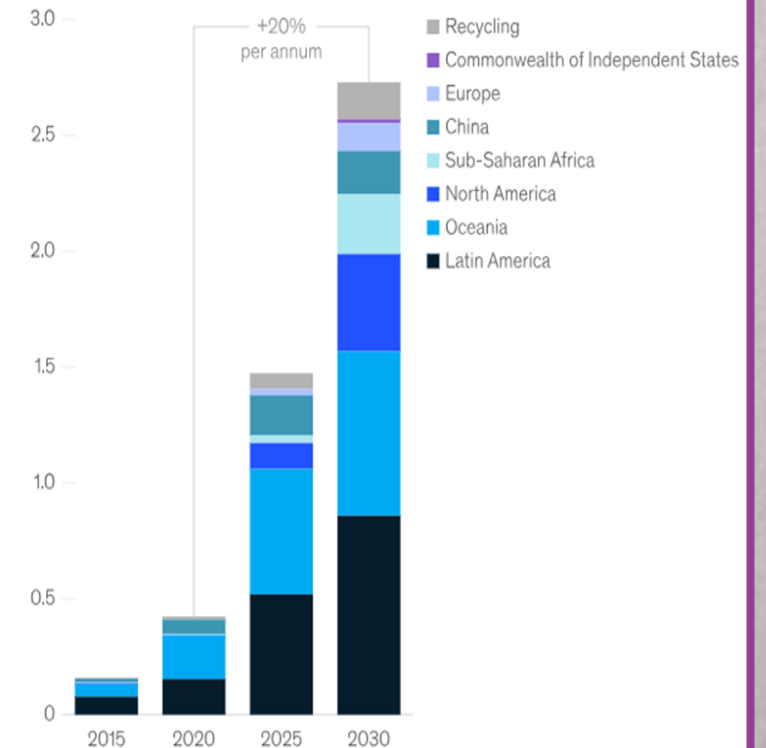
## BATLH04 - Lithium Hydroxide CIF North Asia \$/mt



Source: S&P Platt  
Source: McKinsey Research

## Lithium production is expected to expand by 20 percent a year.

Global lithium production by source,<sup>1</sup> million metric tons lithium carbonate equivalent



<sup>1</sup>2015 and 2020 estimated actual supply; 2025 and 2030 supply calculated at 93% utilization of capacity; includes all project categories.  
Source: MineSpans

# The Best Cure for High Prices is High Prices





# Contemplating Switching?

Check **Application, Application, Application!**

## Total Cost of Change

- Technical resources to evaluate options
- Labor
- Risk of equipment degradation
- Production downtime
- Cost of being an early adaptor to alternatives



Compatibility of Thickeners/Need to Flush Equipment

There is nothing available that has stood the test of time like lithium complex!



# Optimize Grease Consumption

Make Sure Your Grease Suppliers Have Secure Sources Of Lithium

Use A Superior Quality Grease

Avoid Over Greasing

Have Patience

Check Application Frequency

Training

Tips For Weathering Lithium Volatility







# Questions?



Please post your  
questions using the  
Q&A function.





# Contact Us

Lubes Answer Line  
800-248-4684

8:00 AM - 12:00 PM  
1:00 PM - 5:00 PM CT  
Monday - Thursday

8:00 AM - 12:00 PM  
1:00 PM - 4:30 PM CT  
Friday

[lubeshelp@citgo.com](mailto:lubeshelp@citgo.com)







# Future Webinars

**February 23, 2024:**  
Hydraulic Systems & Plastic  
Injection Molding

**March 22, 2024:**  
CITGARD On Road







**Mark Your  
Calendars**

# 2024 Spring Lubes School

**April 1 - 5, 2024**

**The Westin Houston, Memorial City**

**Registration details  
coming in early February**







# Thank You!

See you next time

