NCH introduces the most innovative lubrication program to the food industry…

- Unique lubricants
- Complete product line
- Lubrication optimization tools

NCH: Water, Energy and Maintenance Solutions

- Founded in 1919 in Dallas, Texas
- NCH has a global presence including 25 European countries
- ISO 9001 & ISO 14001 European Manufacturing & NCH Distribution
- Focus on high performance lubricants

NCH Lubricants & Fuel

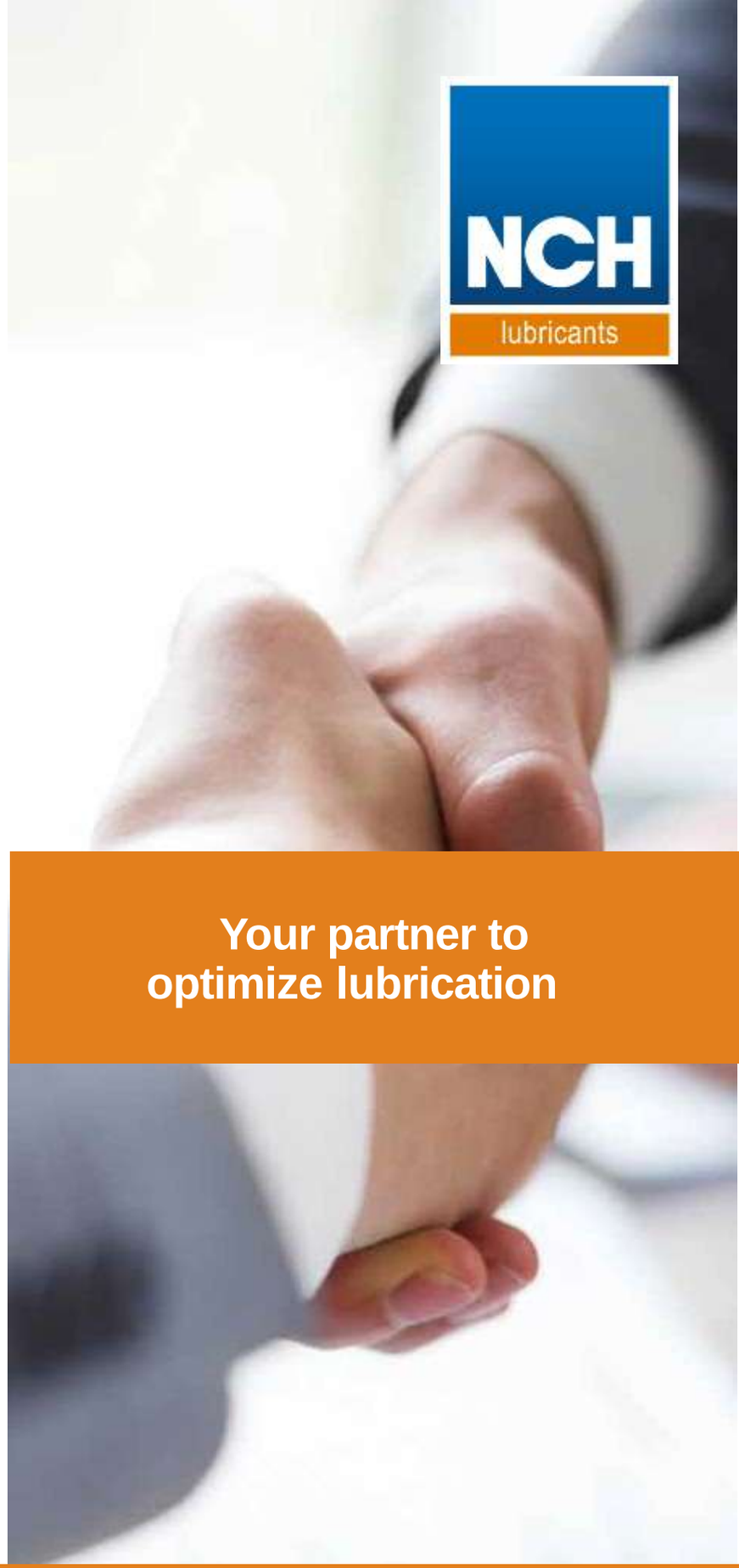
Protects fixed assets & boosts performance with powerful industrial solutions:

- High performance **greases**
- Premium **oils** (gear, hydraulic, motor, compressor)
- Diesel **fuel quality** management
- **Specialty products**
  - Chain & cable lubrication
  - Release agents
  - Metalworking fluids
  - Additives
- Lubrication **best practices** (seminars)
- Application **equipment**

Why trust NCH?

NCH is the European leader in lubrication solutions for the food industry:

- 50 years of experience & **customer driven improvements**
- NCH is a **reliable manufacturer** (we sell what we produce)
- **10 years experience** in the food industry
- Lubricants specially **formulated for use in food machinery**
- Lubricants **tested & approved** by the food industry (NSF, Kosher, Halal)



What does broken equipment actually cost your company?

NCH lubricants

Replacement Parts

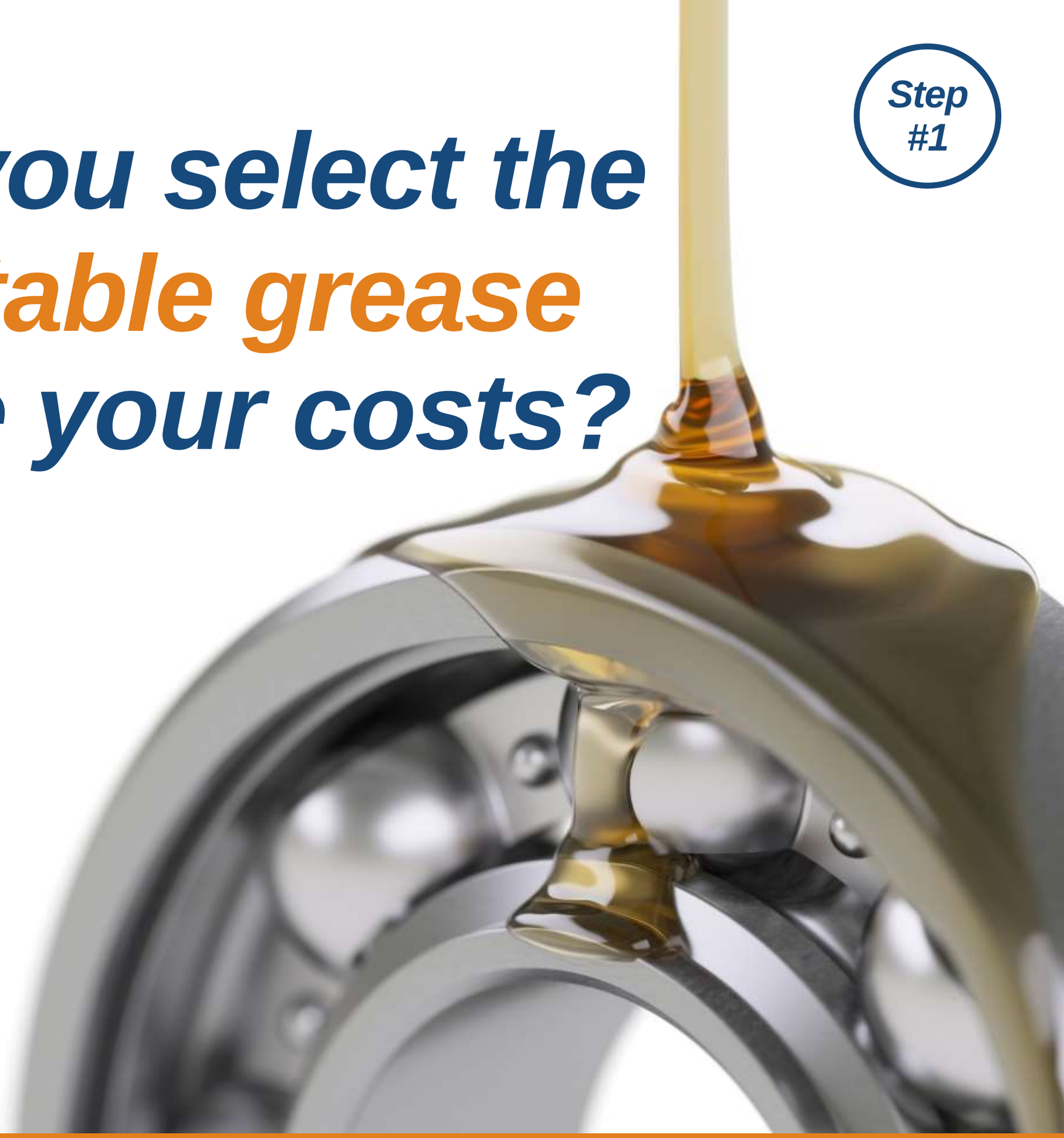
Downtime

Production Loss

Audit

Step #1

How do you select the most suitable grease to reduce your costs?



STEP #1
The Right Grease

NCH lubricants

NSF REGISTERED

Problem: Heavy loads

Heavy loaded applications are common to the food industry

- Heavy loads tend to **squeeze grease out** from between metal surfaces leaving parts unprotected

- Heavy loads create the potential for **excessive wear** resulting in **costly downtime** and **expensive parts replacement** (bearings, rollers)

Small bearings subject to heavy loads are multitude in the food industry

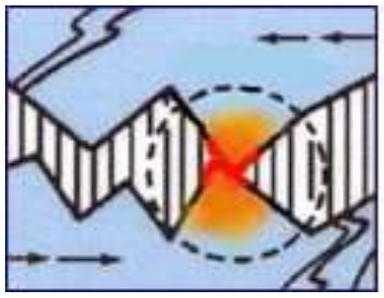
Problem: Heat & friction

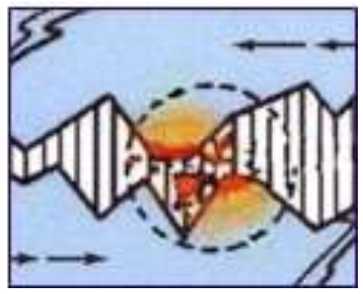
3 types of heat

- **Operating heat** from conveyor ovens, cooking applications and motors
- **Ambient heat** from production (no air conditioning)
- **Heat caused by friction** due to metal-to-metal contact

All surfaces have **asperities** (tiny peaks & valleys) that cause friction. Asperities lead to **melted** or **charred** grease. Equipment wear, parts replacement & costly downtime are the end result

Where these asperities collide, temperatures can reach 1,000° C





Operating heat can drastically reduce the life of lubricants

Problem: Contaminants

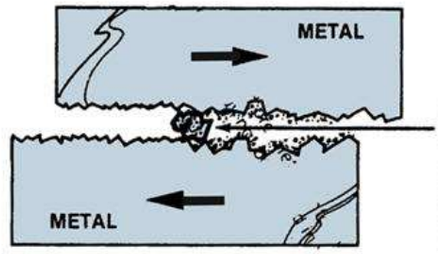
3 types of contaminants

- **Water & steam** wash away grease leaving metal surfaces unprotected (cleaning)

- **Acids and corrosive chemicals** used in production or during cleaning can break down grease causing non- lubricated surfaces and equipment wear.

- **Solid particles** such as cardboard fibers, metal particles get into grease and grind away at metal surfaces

This abrasive wear is the **most destructive** type of wear on industrial equipment



Loose abrasive particle
(sand, metal wear particles and other contaminants)

Regular cleanings reduce lubrication properties (1), water & humidity are common problems in the industry (2)

Problem: Over-lubrication

The majority of grease breakdowns are caused by grease over-lubrication

- If the grease volume dispensed is excessive (most cases), it leads to increased friction & excessive operating temperatures

- The final outcome is a significant increase in **bearing failures** resulting in costly downtime and parts replacement

Over lubricated grease nipple (1), grease on the floor can lead to accidents & mix with food (2)

Problem: Food safety

Food-safe H1 lubricants must be used when in contact with food

Typical Food Grade greases:

- Have **staining** properties

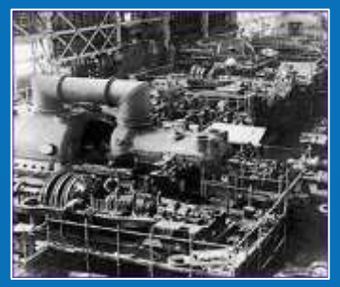
- **Compromise performance** to achieve NSF H1 safety standards

- Suffer **rapid breakdown** caused by micro-organisms growth (equipment wear)

Micro-organisms are dangerous food contaminants (grow in heat & moisture)

Inspections are conducted to ensure followed processes (1), E Coli can contaminate food via grease (2)

1900's
1st generation
<u>axle grease</u> that did not perform in:
- Extreme temps
- Heavy loads
- Contamination



1940's
2nd generation
<u>Calcium grease</u> that:
- Melted easily
- Washed out with water

1st generation of food grade greases

1960's
3rd generation
<u>HT bentonite grease</u>
- Chars & becomes abrasive under high temps

Today
4th generation
<u>Aluminum grease</u>
- Combines the characteristics of lithium & bentonite without the performance problems of either one

Today, NCH has designed a unique grease specifically targeted at the food industry…

HEAVY LOADS

Solution: K Plex White

NEW
& IMPROVED

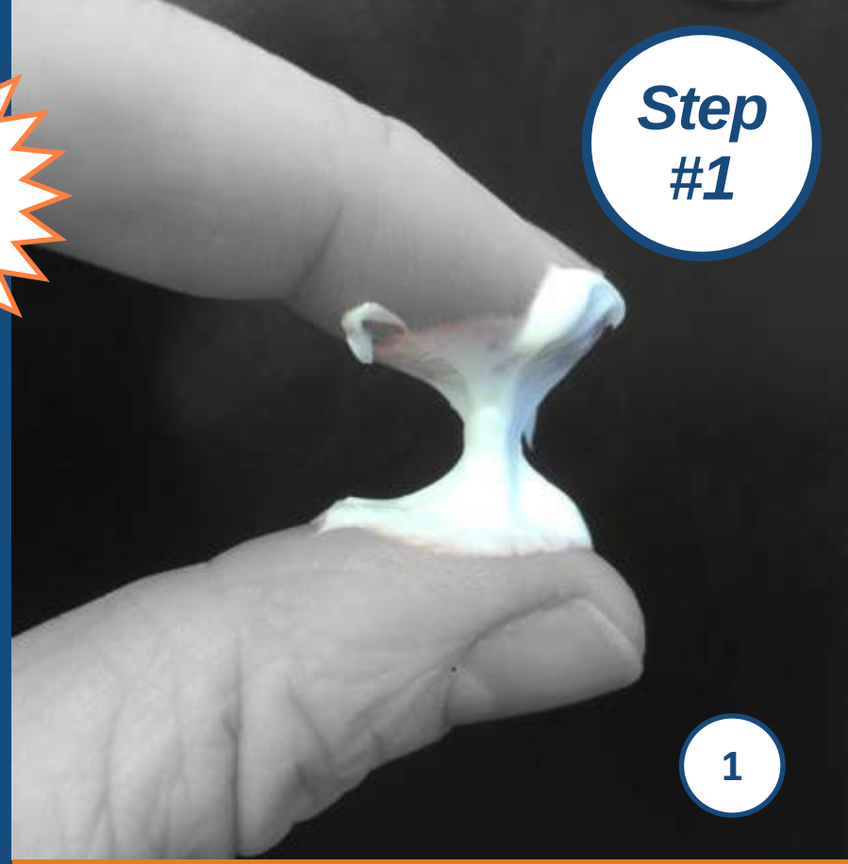
Designed specifically for the food industry, K Plex White withstands the heavy loaded conditions of the industry

- **ADHESIVE COHESIVE POLYMERS-** Keep K Plex White in place under heavy loaded applications

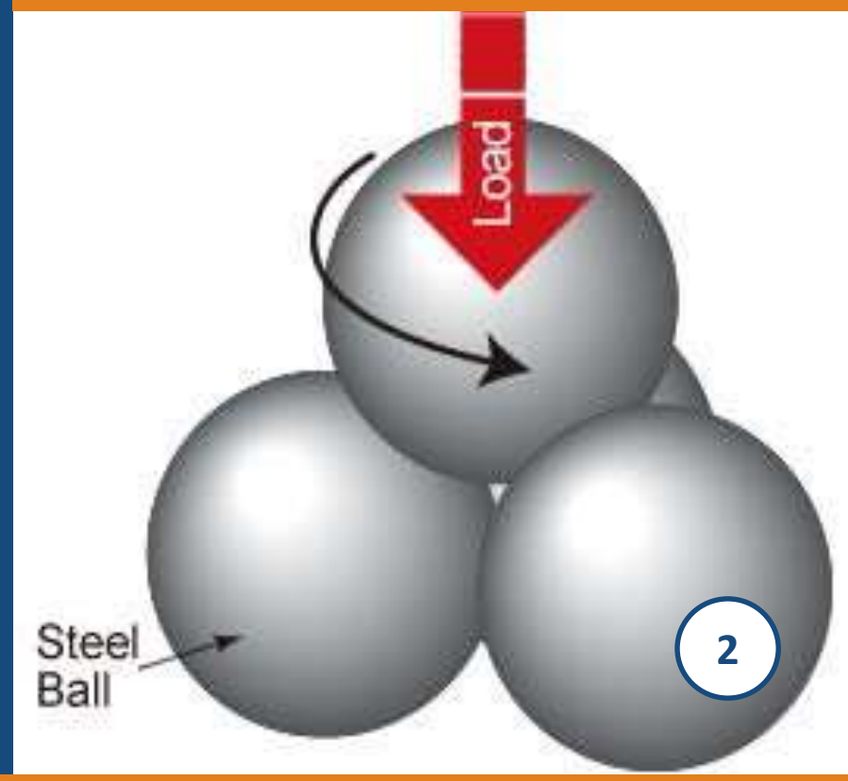
- **4 BALL WELD (ASTM D-2596)-** Determines the load carrying properties of lubricating greases by identifying the weld point (K Plex White > 400 Kg)

- **SHOCK LOAD REDUCERS & EP ADDITIVES-** Cushion impact to minimize the stress, vibration and chatter that can occur under heavy loads

DEMO 1



Adhesive= stick to a surface, cohesive= sticks to itself (1), ASTM D-2596 test (2)



HEAT & FRICTION

Solution: K Plex White

NEW
& IMPROVED

Stays in place in high temperatures: positive or negative

- **EXTREME WORKING TEMPERATURES-** Effective lubrication from -20°C to +140°C (continuous), 200°C (intermittent), drop point >260°C

- **PTFE-** Dry lubricant provides extra lubricating performance over extremes of temperatures further reducing wear (-250°C to +250°C)

- **ALUMINIUM COMPLEX BASE-** Heat reversion properties allow effective lubrication even in variable temperature environments (- or +)

DEMO 2

NCH greases lubricate effectively both in cold & warm environments ice cream mfg.(1), sugar plant (2)

CONTAMINANTS

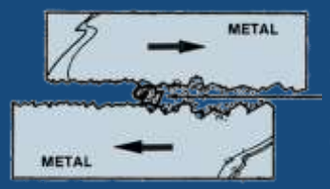
NEW
& IMPROVED

Solution: K Plex White

K Plex White is 10 times more resistant to water washout than standard greases

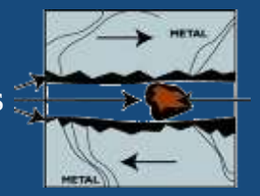
- **ANTI-EMULSIFICATION AGENTS-** Minimize grease wash out. The water wash out test (ASTM D-1264) measures a grease resistance to wash out (K Plex White = 0.2%, standard FG grease = 2%)

- **EXTREME PRESSURE AGENTS (EP)-** Coat metal surfaces to offer maximum lubrication



Loose abrasive particle *(sand, metal wear particles and other contaminants.)*

Abrasive wear



E.P. AGENTS

Abrasive particle

K Plex White protection

- **CORROSION INHIBITORS-** Form a protective barrier to block out the corrosive effects of acid

DEMO 3

Water washout test (1), non protected metal surface attacked by corrosion (2)

OVER LUBRICATION

Solution: NCH expertise

NCH specialists can help identify points of improvements to ensure:

- **USE OF THE RIGHT LUBRICANT -** The audit enables to understand your needs to select the best lubrication solution for the operating conditions

- **THE RIGHT QUANTITY -** Experience combined with the latest application software defines the right grease amount and re-lubrication intervals hence minimizing over lubrication

Results can be e-mailed

Over lubrication shortens bearing life (1), NCH experts calculate optimum lubrication amount (2)

FOOD SAFETY

*Solution: K Plex White**

NEW
& IMPROVED

Step #1

An internationally approved NSH H1 grease that out performs most non food grade greases

- **FOOD SAFE LUBRICATION -** K Plex White is a non-staining, food safe grease, which is NSF H1 certified. It can be used in and around food processing areas where incidental contact with food may occur

- **OMNISTAL™ -** A preservative which helps prevent microbial breakdown of K Plex white. Extends grease life which is especially beneficial where heat and moisture are present

** Also available as a clear version rather than white (K Plex Clear)*

NSF REGISTERED

1

NCH lubricants are NSF certified (1), USP 51 Bacteria Growth Effectiveness Test (2)

2