Understanding “Food Grade” Lubricants

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A Suncor Energy business

Outline

- What are “food grade” lubricants?
- “Food grade” registration programs
- Kosher/Halal approvals for lubricants
- Applications for food grade lubricants
- Why use food grade lubricants?
- Components for food grade lubricants
- Allergens
- Performance impact of food grade lubricants

What are “food grade” lubricants?

- Usually, the term “food grade lubricant” applies to lubricants designed to be used on food processing equipment where incidental food contact can occur.
- There are different classifications of food grade lubricants, depending on where they are intended to be used and the possibility of food contact.
- Food grade lubricants must be formulated from a restricted slate of ingredients.
- Food grade lubricants are usually approved by an authority that requires and maintains appropriate standards.

"Food Grade" Registration Programs

- Historically (pre 1998), 2 United States government agencies were involved:
  - Food and Drug Administration (21 CFR 178.3570) – Approved raw materials for use in lubricant formulations
  - U. S. Department of Agriculture – Approved incidental food contact lubricants for use in meat and poultry facilities.

- In 1998 USDA terminated its approval program, shifting the responsibility to food manufacturers to ensure they use safe lubricants

"Food Grade" Registration Programs

- In 1999 NSF International stepped in and launched a program based on the USDA program:
  - Formulation reviewed to ensure ingredients are suitable
  - Labels reviewed for appropriate instructions
  - Verify the proper category code used
  - Issued a letter of acceptance
- In 2008, NSF added ISO 21469 certification
  - In addition to H1 registration, also includes:
    - Risk assessment
    - Production facility audits
    - Annual product testing

NSF Category Codes

USDA/NSF Lubricant Category Codes – Part of nonfood compound product registration

- H1 – Lubricants with Incidental Food Contact
- H2 – Lubricants with no food contact
- H3 – Soluble oils
- HX-1 – Ingredients for use in H1 lubricants
- 3H – Release agents

“Food Grade” Registration Program

- In Canada, a similar program is administered by CFIA – Canadian Food Inspection Agency

Lubricant Category Codes

- n – Lubricants with Incidental Food Contact
- n1 – General (no food contact)
- n2 – Hydraulic oil
- n3 – Protective oil
- u1 – Release agent

Kosher

- Kosher is Yiddish, meaning "sanctioned by Jewish law"; ritually fit for use; or selling or serving food ritually fit according to Jewish law.
- Kosher lubricants must not contain or at any point contact non-kosher animals or ingredients derived from them, including:
    - Pigs
    - Birds of prey
    - Shellfish
    - Reptiles
- Kosher for Passover – Must not contain or contact grains.
- To attain certification, audit of the manufacturing facility required, followed by annual renewal audits to maintain.

Halal

- Halal is Arabic for permissible. It means sanctioned by Islamic law, especially; ritually fit for use according to Islamic law.
- Halal lubricants must not contain:
  - pork, or any pig-based products
  - blood, carrion, or carnivorous animals
  - Any intoxicants, especially alcohol.
- For lubricants, Halal requirements are similar (but not identical) to Kosher
- Audit of the manufacturing facility required, followed by annual renewal audits to maintain certification.

Applications of “food grade” lubricants

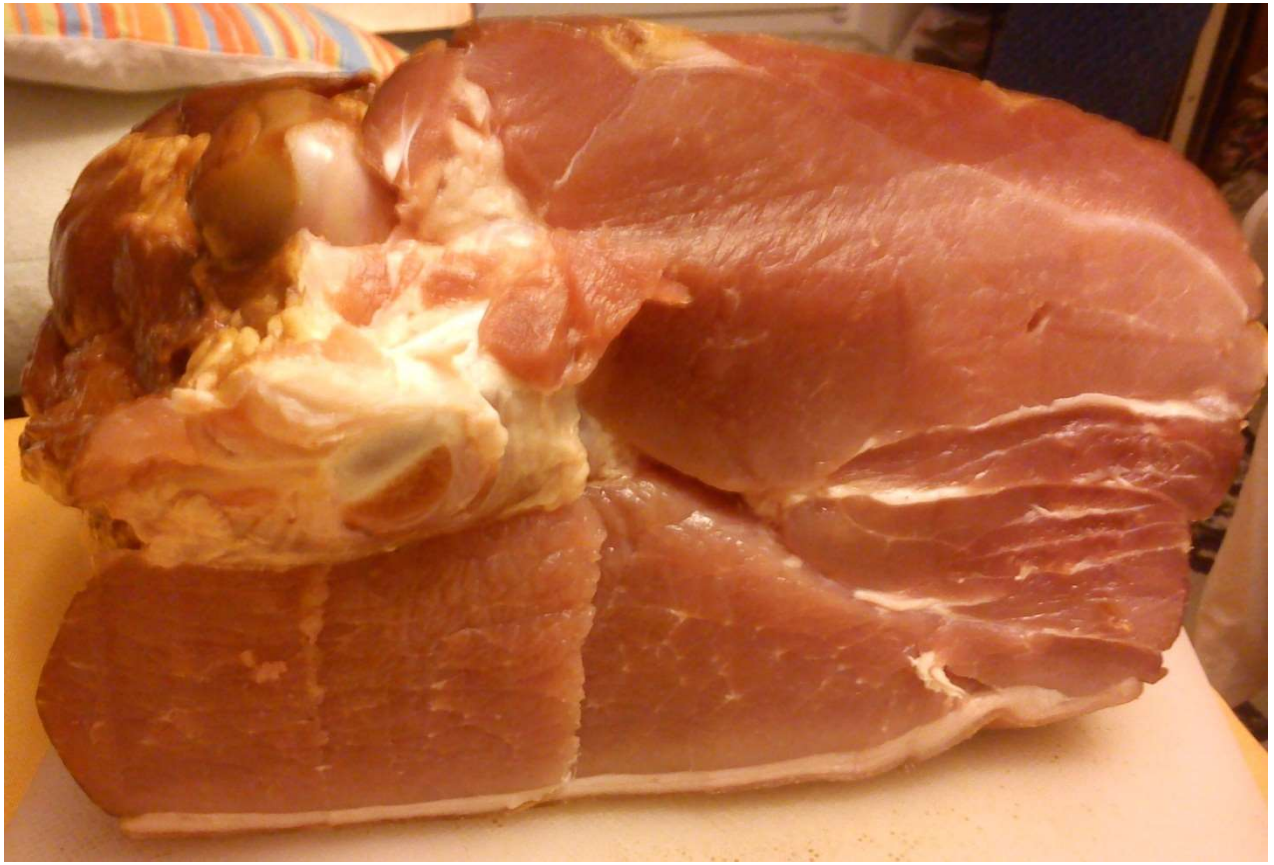
- Food grade lubricants should be employed anywhere there is potential contact between lubricant and food or potable water.
- Conventional lubricant applications: hydraulic fluids, compressor fluids, gear fluids, chain fluids, greases.
- Specifically food grade applications, such as seamer oils, trolley fluids, divider oils, etc.
- Can be used in non food contact areas of food plants, to eliminate the possibility of mis-application and simplify logistics.
- Are used in fire hydrants, water plant machinery, water distribution valves, where lubricant contacts potable water.

Why do we need “food grade” lubricants?

- The equipment in a food processing plant has many of the same lubrication requirements as those in non-food plants.
- In the event of contact with food, the lubricant must not pose a risk to food safety.
- Food recalls are becoming a very common news story
- Food industry is increasingly global

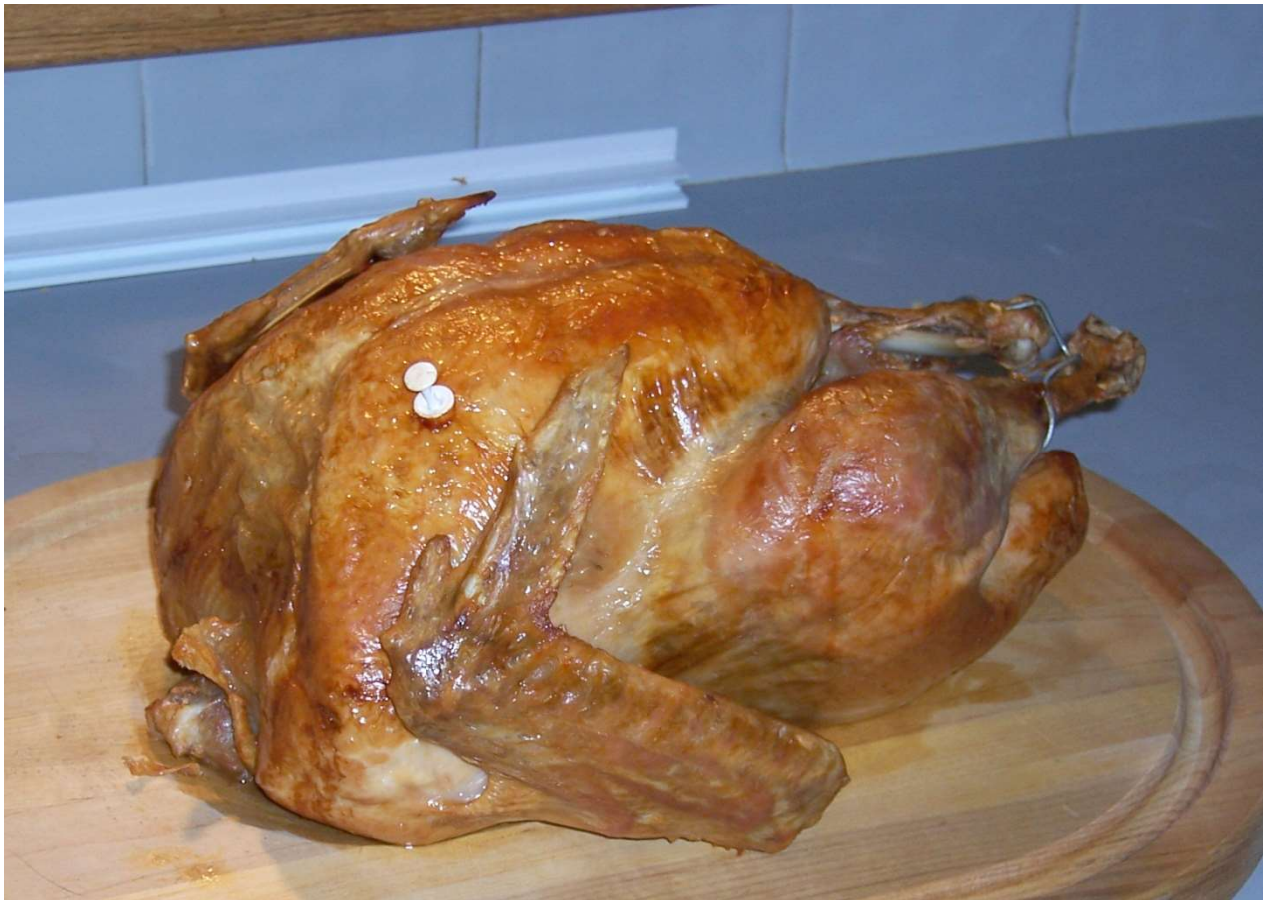
Why do we need “food grade” lubricants?

- April 1998 – Smithfield Packing of Kinston, North Carolina recalled 490,877 pounds of smoked boneless ham after contamination with gear lubricant.



Why do we need “food grade” lubricants?

- June 2000 – Farmland Foods of Kansas City, Missouri recalled 86,000 pounds of smoked turkey exposed to non food grade lubricant.



Why do we need “food grade” lubricants?

- July 2002 – Arinco, a Danish manufacturer of milk powder recalled 1,100 tons of infant formula after contamination with lubricating oil containing iron particles.

Why do we need “food grade” lubricants?

- November 2002 – Consignment of five flavours of “Big Thirst” soft drink recalled in Victoria, Australia due to lubricant contamination

Components for “food grade” lubricants

- Food grade lubricants must be formulated using “safe” ingredients listed under
  - FDA 21 CFR 178.3570 Lubricants with incidental food contact – Lists acceptable lubricant components and concentrations
  - FDA 21 CFR 182 and 184 Substances listed as GRAS (Generally Recognized as Safe) or
  - Substances which have been evaluated through a risk assessment process (NSF HX-1)

Approved FG Base Fluid materials

- White mineral oil (Technical or USP grade)
- Polyalphaolefins (PAOs)
- Polyisobutenes (PIBs)
- Dimethylpolysiloxanes (> 300 cSt @ 40 °C)
- Polyalkylene glycols
- Esters
- PFPE (Perfluorpolyethers)
- Vegetable oils

Approved FG grease thickeners

- Aluminum complex
- Clay
- Calcium sulphonate
- Calcium-12-HOSA
- Calcium complex
- Polyurea
- Fumed silica
- PTFE

Allergens

Contamination from food allergens:

- Peanuts
- Tree nuts
- Sesame seeds
- Milk
- Mustard
- Eggs
- Fish and shellfish
- Soy
- Wheat and gluten

“Food Grade” Lubricant Performance

- There is a common misconception is that “food grade” lubricant performance is inferior to industrial grade lubricants
- In the past resistance to using “food grade” lubricants was due to shorter fluid life and poorer anti wear performance.
- This is no longer true - Advances in lubricant and additive technology allow “food grade” lubricants to deliver the same or better performance than conventional lubricants.