



Eddy's Food Blog



Eddy's Food Blog – September 2011

Don't worry - Dine happy!

Dear Visitor,
Welcome to the monthly Food Blog.

The Blog will cover the most frequently asked questions we get from the food community and from customers.

For this issue I've found a guest author to talk about an issue we are pretty often faced with.

Guest Author for this issue is **Pieter van de Schepop**.





Pieter is member of the Food Division of Fuchs Lubritech and is our Global OEM and Key Account Manager.

We both hope that this blog will provide you with some ideas on how you may answer questions when you're asked about the discussed subject.

The topic of this issue is **"Lubrication of Can Seamers in the Food & Beverage Industry"**.



Angelus Can Seamer

	
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Point of Lubrication	Food Grade Lubricant
Oil Lubrication System	*FUCHS EM Gear Oil TLS 150 *FUCHS Cassida® GLE 150
Drive & Gear Case Oil	*FUCHS Cassida® GLE 220
Automatic Grease Lubricator	*FUCHS Cassida® RLS 1
Seaming Rolls	*FUCHS Cassida® RLS 0** 1
<small>*Machinery has been filled at the factory with this product. **To use with Automatic Lubrication Control System. Do not use grade 1 grease on automatic seaming roll lubrication system.</small>	
<small>For FUCHS Technical Assistance Global: FUCHS LUBRITECH GmbH FOOD DIVISION Phone: +49 (0) 6391 3206 0 USA: FUCHS Lubricants Co., LUBRITECH DIVISION Phone: +1 708.225.0920</small>	
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Tag on Angelus Seamer

Introduction

Operational efficiency, public safety and the bottom line are all factors that have to be balanced in can filling operations. As the demands of each of these areas increases it becomes more difficult to do. International regulations, local legislation and GMP (Good Manufacturing Process) require the use of food safe processes in the production of food products for consumption by the general public. Operations and Maintenance Managers must depend on high performance lubricants that do not compromise production performance. The Canning sector normally operates on thin unit

margins, and the issue is that compromising production performance and cost for food safe processes is not possible.

Over the past 40 years, aviation piston engine oils and or conventional gear and hydraulic oils have been widely used throughout the industry for lubricating can seamers. Most can seamers lose some oil during operation and some of this oil may end up inside the can. However, if a non-food grade lubricant enters a food or beverage can, before or while it is being seamed, the product is considered "adulterated" and is therefore unfit for consumption and sale.

After a decade of developments on food grade lubricants, companies no longer need to sacrifice lubricant and machine performance for food safety. However over the last years we have several times been confronted with machine failures due to the use of normal food grade gear oils been used for the lubrication of can seamers. **We strongly advice only to use approved dedicated food grade lubricants for the lubrication to ensure maximum food safety and production availability.**

FLT's range of food grade can seaming lubricants (FM GEAR OIL TLS 150; CASSIDA FLUID GLE 150 and GLE 220 and CASSIDA GREASE RLS 1) are designed specifically for use in can seamers and will help manage food safety risks at the can seamer. Incidental contact with NSF H1 registered food grade lubricants is considered acceptable at levels up to 10 parts per million (ppm) by the US Food and Drug Administration (FDA).

Globally there are more than 6.000 cans seamers in operation, which need to be lubricated. The can seamer is a critical piece of equipment in the production process, as it can close up to 3000 cans per minute (top model of Angelus: 180 S). You can imagine what would happen if it doesn't seam accordingly.

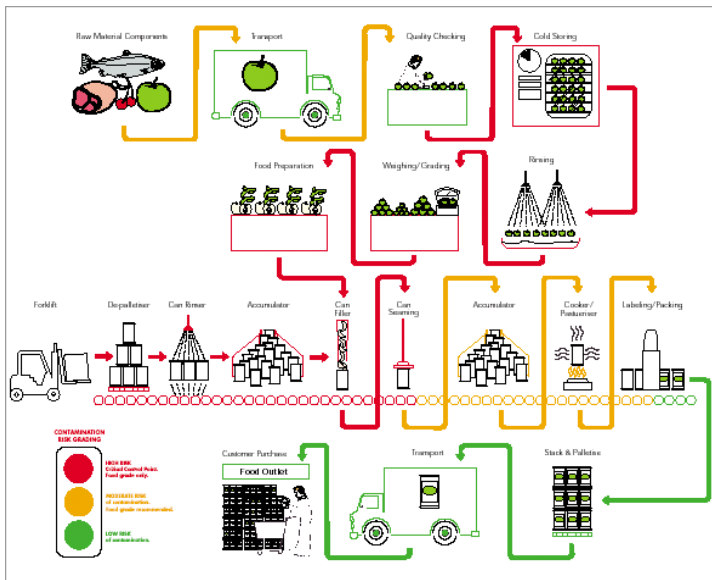
Most of them consume a significant amount of lubricants and are therefore important for the Food & Beverage Sector business.

Lubrication performance and food safety

Lubricants and greases play a vital role in the smooth and efficient running of canning equipment. They are used to reduce metal-to-metal contact between equipment parts, can help to protect against expensive component wear and enable operators to maintain equipment uptime. However, as technology continues to advance, operating conditions become more exacting and place increasing demands on lubricant performance. Modern lubricants must be able to cope with long equipment running times, faster moving parts and high operating temperatures.

High quality, synthetic food grade lubricants, such as CASSIDA, offer distinct operational advantages, especially in the canning industry where Original Equipment Manufacturers (OEM's) such as Angelus have given their approval to the use of CASSIDA and FM lubricants in their can seamers. Due to our good relation, our Global presence with and the market need for a good food grade lubricant we have got the opportunity to develop these products together with the major OEM's like [Angelus](#), [FMC](#) and [Ferrum](#).

In applications where the lubricant circulates, such as gearboxes, pumps and compressors, leaks can occur over time due to worn seals or pipe joints. Even good, regular maintenance and operational practices cannot completely eradicate the threat of lubricant contamination and accidents can still happen. Leaks are not always obvious and more often than not, a contaminated product may leave the plant before the problem is detected, leaving the public at risk of consuming an adulterated food or beverage. Switching from non-food to synthetic food grade lubricants can significantly reduce the impact of this risk.



Canning Chart - - *Where can synthetic food grade lubricants work?*

Synthetic food grade lubricants can also out perform their mineral oil based non-food grade counterparts. In many cases, synthetic food grade lubricants and greases offer excellent anti-wear and strong resistance to oxidation. Even in extreme temperatures, synthetic food grade products can resist the formation of deposits and sludge, resulting in prolonged oil service and equipment life. Longer oil life and fewer stoppages for service and maintenance mean higher production rates and a better bottom line.

The Challenges the lubricant faces in a Can Seamer

A. Contamination Control and keeping the machine clean internally

Seamers can and do leak lubricant. The close proximity to the food product necessitates the use of a food grade lubricant. The ingress of cleaning water and contamination from beverages into the lubricant is a routine occurrence.



Angelus can seamer oil leakage found after using red dye

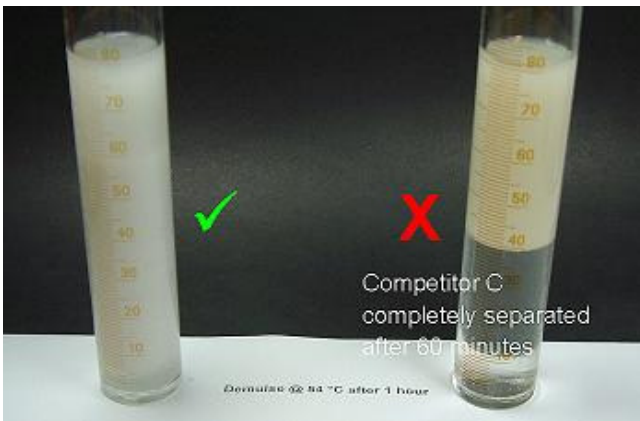
Sugar deposits from the food product can be very damaging to the machined surfaces. During down time, very hard deposits made of sugar and particulate matter form. These deposits could bridge the gap that is usually filled by the lubricant. This may result in in-sufficient lubrication that causes abrasive wear and will lead to premature failure.



One of the main roller bearings of an Angelus can seamer been contaminated with sugar deposits

The water handling capabilities of synthetic food grade lubricants such as CASSIDA FLUID GLE, can provide excellent equipment protection in the wet conditions found in beverage and canning plants. Formulated with the right additives, synthetic food grade lubricants are able to absorb free water and other contaminations, holding them in suspension, thus protecting the equipment's metal surfaces from rust, wear and corrosion and transporting it out of the machine.

The ingress of products like beer juice, beverages and food in combination with the presence of water can cause severe corrosion on the finished metal surfaces. The lubricant must be able to arrest and remove the contamination.



Emulsifying capacity FLT Food grade products compared to our competitors

B. Lubrication - Wear Protection

In the general a can seamer is oil or grease lubricated. The fast running machines that are normally operated in the beverage (2 piece can, Aluminum) are in most cases oil lubricated. The slower operating units and very often also smaller machines that are been used in the food (3 piece can) are very often grease lubricated.

When a machine is oil lubricated (this has become more common practice nowadays) the OEM uses either a re-circulation system including filters (water and particles) or a total loss lubrication system (once trough). Even re-circulation machines need to be topped up on a weekly basis due to small leakages and some evaporation when running at higher operating temperatures.

As oil in total loss lubrication can seamers stays in the machine for only a relatively short period of time, the formulation for FM GEAR OIL TLS 150 is based on technical white oil. Using a similar additive technology to that used in synthetic CASSIDA FLUID GLE 150 for re- circulating can seamers, FM GEAR OIL TLS 150 is specially formulated to provide good lubrication even when

operating in conditions where contamination with water, juice, and food can occur.

Because these fluids are held in suspension, FM GEAR OIL TLS 150 protects metal surfaces from wear and corrosion.



A failed axially loaded bearing from Angelus 121L can seamer (running on competitor oil) - shows heavy pitting, formed by contact staining after water ingress

For the grease lubricated machines CASSIDA GREASE RLS 1 has received approvals from several can seamer manufactures like Angelus, FMC FoodTech after extensive field trials

Can Seamer Rolls

Every can seamer is equipped with seamer rolls, they actually seam the top of the can on the can body after filling.

These seamer rolls are fitted with a bearing that is either made from steel (very often used in food 3 piece cans, which are seamed at lower speed and by using a higher force, to be able to seam the seal due to the strength of the material) or from ceramics (mostly used in beverage where the speeds are higher and the forces to seem are lower).

As a result the CASSIDA greases need to deal with both different kinds of operations.

In **steel roller bearings** we have gained very good results using **CASSIDA GREASE RLS 1**. Here the selection of the grease is very important as on one hand the grease should generate a less friction as possible but should stay as long as possible in the bearing this to reduce re-grease interval. CASSIDA GREASE RLS 1 gives here the right balance.



Seamer roll been lubricated with a food grade grease

In **ceramic bearings** lubrication is less critical, here both **Cassida RLS**, and **EPS** (NLGI 1 and 2) are used successfully. Just to give you some guidance a steel seamer roller bearing needs to be

lubricated every 8 hours, a ceramic one only every 72 hours.

An exception regarding grease lubrication of the seamer roll bearings is the machine manufacturer **Ferrum from Switzerland**. They have engineered a very advanced oil lubrication system to lubricate these seamer roll bearings. Oil is transported via overpressure into the bearing. Due to special seals this machine does not suffer from contaminations like product or cleaning / disinfections agents. This complete machine can be operated with only 20 litres of synthetic food grade lubricant with a viscosity of 100 cSt at 40°C (ISO VG 100). Both **CASSIDA FLUID HF 100** and **CASSIDA FLUID CR 100** have been approved, however CASSIDA FLUID CR 100 is now used for factory fill after intensive trials at Ferrum.



Ferrum Can Seamer

Going back to the oil lubrication of the can seamers, the lubrication requirements are diametrically different for rolling element and gear applications.

The presence of both gears and rollers in seamers in general illustrates this tug of war between polar opposites. The higher speeds of rolling elements require lower viscosities. Gear applications require higher fluid film thickness for load carrying capacity and to lubricate the rolling and sliding contact of the meshing gears and hence higher viscosities.

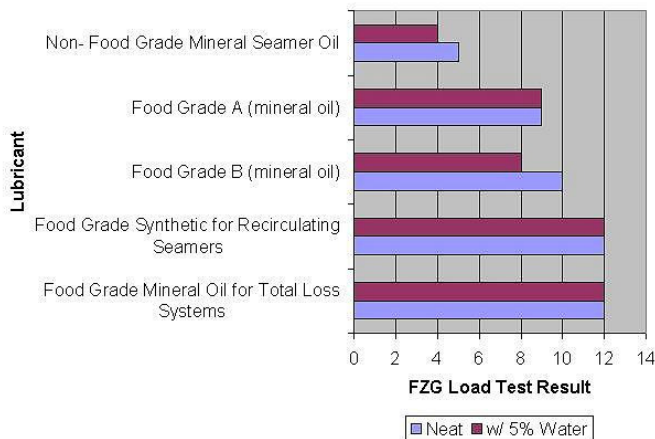
The chosen lubricant must be able to balance the requirements of both of these applications in order to meet reliability goals in this demanding application.

Some of the new food grade products can exceed the required OEM specifications and out perform the long- established non-food grade products that have been in use for over 40 years (aircraft engine oils). One important characteristic of gear oils is its load carrying capacity. This ability is measured in the FZG load test. Several different products were tested in comparison to the non-food grade standard (see the chart).

The lubricant industry standard test for load carrying capacity is the FZG test. An FZG rating of 12 is a very good result for any gear oil (food grade or non-food grade). The graphic illustrates the carrying capacity of the lubricant product when placed into the seamer. The testing is repeated after the product is contaminated with water (the addition of water mimics contamination that will occur in the application).

The results translate directly to performance in the application and longevity of highly valuable assets in the plant operation. Equipment life extension helps to drive profitability.

FZG Load Carrying Capacity Results for Various Seamer Lubricants



FZG Test Results

C. Corrosion protection

The ingress of contaminations like tomato juice, beer and carbonated beverages and other products being canned (in the presence of water) can cause severe corrosion on the finished metal surfaces in and at the outside of the can seam. The lubricant must be able to arrest and remove the contamination internally and thereby nullifying their potential effects. The anti corrosion package of the lubricant must be very effective too.

	Type A Dist Water	Type B Salt Water		
FAIL	Cassida GLE FM Gear Oil TLS Comp A AeroShell W 100	Cassida GLE FM Gear Oil TLS	None	
			Light	
			Moderate	
		Comp A, C & E AeroShell W 100	Severe	

Corrosion protection of FLT Food grade products compared to our competitors (ISO 7120)

D. Heat Transfer

Although it is not the primary function of the lubricant, heat transfer is essential in the successful operation of seamers. In addition to lubrication of the machine surfaces, the lubricant acts as a heat sink to remove heat from the moving elements of the machinery.

The absorption of this heat can be detrimental to the life of the lubricant and shorten oil drain intervals if care is not taken to minimize excess heat through the selection of the correct ISO viscosity grade for the dual rolling element and gear applications.

Field experience has showed that the faster the machine runs i.e. closer to maximum output, the higher the machine temperature will be. An Angelus can seamer model (121L), which runs at the maximum output of 1.700 cans a minutes reaches an oil temperature of around 100°C.

It is essential that the machine is been lubricated as recommended by the OEM

How to change over systems

In order to ensure maximum reliability of the can seamer when start using food grade lubricants it is very important to inform the customer about the procedure how to change over from a conventional lubricant to a food grade lubricant. You can find these procedures, which have been written in co-operation with the OEMs, in the download section of this blog.

Summary

Lubrication is essential for an efficient, reliable and food safe operating can seamer. Together with the major OEMs we have put a lot of effort in the development of the right food grade lubricants and with success. Our customers can select an FLT Food Grade lubricant for almost every made of can seamers globally.

We have a leading edge and reputation in the Canning sector due to our work with the Canning OEMs and the outstanding proven performance of our CASSIDA FLUID GLE, CASSIDA GREASES and FM GEAR OIL TLS 150 products in these demanding applications.

It is important to inform our customers in a professional way and always advice confirm the recommendations of the OEM.

	CASSIDA GLE	FM TLS 150	CASSIDA CR 100	CASSIDA HF 100	CASSIDA RLS 1
Angelus	✓	✓			✓
Ferrum			✓	✓	
FMC Food Tech	✓				

OEMs where we have Approvals

I'd like to thank Pieter very much for this contribution. I'm sure that it will shed some light on the mysteries of Can Seamers.

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Will talk to you again in October.
Eddy

Contact: [Eddy Stempfel](#)
