Are your food facility chemicals safe? – Non-food Compound Product Registration 101

Ashlee Breitner, Business Unit Manager: Non-food Compounds, Consumer Products & Food Contact Regulatory Compliance, NSF International

Industry roundtable

Featuring ExxonMobil, Fuchs Lubritech, Klüber Lubrication and ROCOL
Who?
Whether you are a food processor, manufacturer or food service business, the handling, preparation, processing and packaging of food products of all types inevitably involves the use of equipment and machinery with lubricated moving parts that come into contact with foodstuffs. The use of other chemicals such as anti-rust products and cleaning agents are also required to maintain the equipment properly. Just think for a minute about all the chemical products used prior to processing, during and as you source chemicals to use in the production of food such as greases, cleaners, pesticides, surface coatings, etc., do you ever find yourself asking: ‘is this really appropriate for me to be using near food?’ or ‘is there risk associated with using this product around food?’ Do not worry, there is help for you! This guide will help you understand the basic elements of what to look for when sourcing these non-food products. We will help to explain what product registration is, the prominent categories and their end use applications, how product registration works and why it is an important component of a food safety programme.

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FOOD GRADE LUBRICANTS
SUPPLEMENT
after. Figure 1 shows only a minor selection of all of the products and locations that these substances could be used.

The potential for non-food materials to have incidental contact with a food product is a hazardous cross contamination risk and must be controlled as part of any facility’s overall Hazard Analysis & Critical Control Points (HACCP) approach. A pre-requisite approach to a risk reduction plan is the use of registered non-food compounds. ‘Non-food compound’ is an industry term used to describe lubricants, greases and other chemicals used in and around food processing areas. In addition, ‘proprietary substances’ are pre-processing compounds also used within these same facilities. With the potential for contamination of the foodstuff it is vital that these compounds and substances adhere to strict standards of safety and quality.

When?
In the United States, the US Department of Agriculture (USDA) formerly reviewed and authorised non-food compounds acceptable for use in food processing and handling facilities. In 1999, NSF International, a not for profit public health organisation took over the responsibility of evaluating food grade lubricants and other food processing substances. Working with the USDA, NSF captured all previous review requirements and launched a third party registration and listing program for these non-food compounds represented by category codes developed based on the particular intended end use of the product.

What?
Product registration category codes have been developed to ensure that all products intended for specific applications are reviewed equally against the necessary criteria for that product’s intended end use application. The criteria are often based on the regulations in place for a particular product, ingredient or material type and also take into consideration key aspects of the process used to manufacture the product. While being applied in a production process, something as simple as a letter grading may not seem extremely important, but the impact of using the incorrect product could lead to a significant risk potential and possible food contamination.

Let’s use lubricants as an example. In this industry for lubricants marketed for use on food machinery or processing equipment, there are three main end use product categories. These categories designate the different intended end use applications for a particular product. The most well known is the H1 lubricant category (as shown in Figure 2 on page 4). An H1 lubricant is intended for use in applications where there is only potential for incidental food contact, as in the case of...
anti-rust agents or as a release agent on gaskets or seals of tank closures. Although this category implies the possibility of incidental food contact, the use of the minimum amount of lubricant in order for it to be effective for its purpose is recommended. Overuse can make the transfer of the material on to food, or the build up of residual lubricant, a genuine risk.

The second category of lubricants is an H2 registered product. H2 commonly may get confused with an H1 product, though the two are very different. In fact, H2 categorised lubricants are not intended to be in contact with foodstuffs at any time, not even incidentally. As such they are not food grade products. H2 lubricants are intended to be used on equipment where there is no possibility of food contact or residual cross contamination and should not be applied in a production process at any point where there is a recognisable or incidental cross contamination control point.

As you can see in the example of H1 versus H2, these two product categories are approved for very different uses. Therefore, understanding product categories is critical in the sourcing and use of these products in your production facilities. There are currently over 90 product categories used to identify an end use in which a particular product is registered as safe. Table 1 features just a few of the more prominent categories, note the differences in the end use applications.

How?
In order to register a product, the formulation, including ingredients and percentage composition must be submitted to the registration process by the manufacturer. Once this information has been submitted, it is reviewed by the NSF International Standards department to ensure that the product is appropriate for the intended end use. If the product passes the review, it is assigned a category code and a description of its acceptable end uses. This information is then published in the NSF category system, allowing users to easily determine which products are appropriate for their specific needs.

Table 1: Prominent Product Registration Categories

<table>
<thead>
<tr>
<th>Category Designation</th>
<th>Category Code</th>
<th>Acceptable End Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>H: Lubricants</td>
<td>H1</td>
<td>General – incidental food contact</td>
</tr>
<tr>
<td></td>
<td>H2</td>
<td>General – non-food contact</td>
</tr>
<tr>
<td>A: Cleaning Products</td>
<td>A1</td>
<td>General cleaners</td>
</tr>
<tr>
<td></td>
<td>A8</td>
<td>Degreasers/carbon removers</td>
</tr>
<tr>
<td>C: Non-processing Area Products</td>
<td>C1</td>
<td>General</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td>Toilet/dressing room</td>
</tr>
<tr>
<td>G: Water Treatment Products</td>
<td>G5</td>
<td>Cooling and retort water treatment products – all food processing areas</td>
</tr>
<tr>
<td></td>
<td>G6</td>
<td>Boiler treatment products – all food processing areas/food contact</td>
</tr>
<tr>
<td></td>
<td>G7</td>
<td>Boiler treatment products – all food processing areas/non-food contact</td>
</tr>
</tbody>
</table>

* Use of this product in food processing or handling facilities requires that all food products and packaging materials be removed or protected prior to product use. A potable water rinse of cleaned surfaces is required after use of this product. When used according to manufacturer’s instructions, the cleaner shall neither exhibit a noticeable odour nor leave a visible residue.
body. This formulation will then go through an independent review against the requirements of 21 CFR and/or other acceptable regulatory compliance processes.

In addition to the formulary requirements, the finished product label must also be submitted for review. The labelling must be accurate with no misleading claims and include appropriate end use instructions. Product labels must also be traceable to the registered company and bear the registration mark, including the category code and unique product registration number. For registered products, this label review should provide you, the end user, the added reassurance that the claims made on the label are accurate and the suggestions for end use application are appropriate.

Where?
Just about every area of a food processing facility somehow comes into contact with some of these chemicals. From products that should have no food contact such as cleaners and degreasers to anti-foaming agents that are intended for direct food contact, these chemicals are present in almost all parts of the production process.

Over the past 5-10 years product registrations for non-food compounds used in food processing facilities have grown consistently, as food safety and risk mitigation have become increasingly important in the food industry. Between 2008 and 2014, NSF has seen an increase of almost 3,000 additional registered H1 products, to total over 8,700 H registered products. The EU is the largest market outside the US for registered non-food compounds, generating over 2,900 registered products between the UK, France and Germany alone.

In addition to the food grade lubricants industry, Latin America and Mexico appears to be an emerging market for the production and supply of D (antimicrobial agents) and A (cleaning products) category products for use in food processing environments. These products are exported to food manufacturers around the world to mitigate the risk of residual cross contamination during production.

China is a fast growing market for the manufacture and purchase of registered release agents (3H). These products are used on food contact

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surfaces, such as grills and chopping boards, to prevent food from adhering during processing. They often take the form of de-foaming agents. Demand is being driven by the growing food safety awareness of the Chinese food industry, as well as the growing interest of Chinese lubricant manufacturers in export markets and benchmarking themselves against the leading Western manufacturers.

Why?
As today’s food manufacturers realise the importance of identifying contamination risks, the use of correctly registered products for different applications in facilities provides a reliable prerequisite approach to complement a HACCP plan. While HACCP plans tend to focus on the handling of the actual ingredients and products, manufacturers now also need to consider seemingly peripheral aspects such as the lubricant on a chain. What may seem to be a minor issue could have a massive impact on a product, a company’s reputation and public health.

Properly administered HACCP plans that include the use of registered non-food compounds in food processing, provide a path toward compliance with Global Food Safety Initiative (GFSI) standards. The use of NSF registered non-food compounds as part of a strong HACCP plan that looks at both the chemical and physical risks associated with food processing is an important and critical step towards completing certification to GFSI standards. In addition, the use of registered products is important, not just at the food manufacturer but even before that, at the manufacturer’s ingredient suppliers. Using registered products and ingredients is a critical link in the supply chain and one that can influence the success of achieving certification to a GFSI benchmarked standard.

The market for registered products is growing fast, both because of the proliferation of new product developments and, more importantly, because of the rapidly increasing demand for third party registered products by food processors today. Understanding what product categories are, and the value of sourcing and appropriately applying registered products is a critical element of any production facility’s quality plan and should be considered very closely by those responsible.

Resources
Visit http://info.nsf.org/USDA/Listings.asp to search for all NSF registered products – totalling close to 16,000 – and learn more about what end use category codes represent.

About the Author
Ashlee Breitner is Business Unit Manager of the NSF Non-food Compounds Registration program. Ashlee has worked at NSF International for five years serving in several positions including Group Leader for the NSF Consumer Products program. Her expertise in the NSF certification process enriches the Non-food Compounds Registration program and continues NSF’s mission to deliver a program that provides product manufacturers, food producers and regulatory/inspector groups with a proven method to determine product acceptability.

Ashlee oversees all aspects of NSF’s Non-food Compounds Registration program. She leads the Non-food Compounds team in developing new service offerings, improving existing processes, enhancing their customer service skills and representing NSF International at industry events and conferences.

Ashlee also works closely with NSF Registered companies and regulators, assuring that the NSF Non-food Compounds Registration program continues to utilise the most up to date regulatory requirements and industry best practices.
1. What are the major challenges for lubricant producers and marketers in the food industry? Where should development be focused?

**Buffin:** Producers are faced with the ever evolving requirements of audit body regulations at an end user level. Audits vary widely throughout food and beverage manufacturing sites, highlighting inconsistency in the process. ROCOL ensures the very highest levels of audit compliance are met through manufacture, product performance and comprehensive management systems to guarantee total compliance. Future development needs to be ‘customer back’ led. As the industry evolves and demands further development of lubricants, the need will be observed and ultimately fulfilled.

**Lange:** There is a technical challenge from equipment manufacturers which is non-specific to the food industry. A gearbox is a gearbox, whether it’s working in a food manufacturer or a machine shop. For lubricants, the technical requirements are rust and corrosion protection, anti-foaming, air release etc. These are challenging especially as they often need to operate at different temperatures. On top of this, you have the food related requirements. That means not only technical performance but also meeting the NSF H1 standard and kosher/halal requirements. Lubricants don’t just protect equipment – they are part of the construction with the potential for both increasing productivity while meeting these requirements.

**Oliveira:** A major challenge is customer knowledge and understanding of the performance benefits a high quality food grade lubricant (FGL) gives. In many cases these products outperform ‘traditional’ or industrial lubricants, being more economical in use, so creating this understanding with customers and potential customers is the greatest challenge. The next challenge is to find a way to increase the scope of FGLs within a manufacturing plant. We are at the forefront of driving the changes, working closely with customers and various organisations. Our aim is to offer more than food safety with our value added service program.
Stempfel: Basically it’s the lack of legislative pressure around the globe to use FGLs everywhere, where there is a risk of incidental contact with the processed food and beverage. Although awareness has improved over the last two decades there are still quite a lot of food producers which do not accept they need to pay more money for safer lubricants. This might not significantly change until local authorities regulate the use of FGLs by law.

2. How do you expect European legislation to develop regarding FGLs? Will there be new limitations? Do you expect a global playing field?

Buffin: From personal experience I see the UK as the standard setter for the rest of the globe. Working in Europe and South East Asia I have witnessed UK practices being adopted on an outward expansion. The global market will always show inconsistencies as local legislation develops from source. As the world becomes increasingly cosmopolitan certain requirements will need to be adopted to accommodate changes in culture.

Lange: I think regulations will become more stringent and expansive, and the pressure will increase not only in FGLs but throughout the whole food industry, especially when we look to Europe. To address this, we expect to be working ‘farm to fork’ in future, from the very beginning of food production until the end of the chain.

Oliveira: The ELGI Working Group on FGLs is taking a leading position on information flow and contributing to EU Legislation discussions. We expect that consumer demand for clean healthy food will be the key driver and that the industry will follow these demands and continue to enhance food safety.

3. What can or should the industry do as reaction to the changes or limitations expected?

Buffin: Understanding local needs will arm the industry for the potential changes ahead. The process adopted by ROCOL is that of a proactive, consultative approach. Being a manufacturer, ROCOL is able to adapt is offering based on the information gained through this strategy.

Lange: People will not eat food they do not trust. Even one bad experience can upset a person’s taste for certain kinds of food and this can damage trust forever. So it is very necessary that all parties related to the food industry can be trusted and take responsibility for products, clients and customers. We always want to be at the forefront of delivering the most credible product to our market, our customer and the end consumer.

Oliveira: If it was a legal requirement, the industry and lubricant manufacturers as well as food producers would need to fulfil it anyway. Of course it would be important to understand what these limitations would look like exactly. Lubricant manufacturers seek for differentiation within FGLs. We foresee tendencies for food safety standards and legislation to be mis-interpreted or grey areas used to make deals against food safety ethics.

Stempfel: As already mentioned the lubricants industry does not expect important changes in the foreseeable future. If there would be any the lubricant manufacturers are probably well prepared and flexible to adapt their products.

4. What are the implications of classification, labelling and packaging (CLP) regulations for FGL producers and will there be a noticeable cost involved for lubricant users (e.g. registration of labels etc.)?

Buffin: All safety data information has to be reviewed and updated. A limited number of products may now need to carry CLP hazardous labelling which will require COSHH reassessment for the end user. This will have significant cost and operational implications for both the supplier and user.

Oliveira: As a major formulator and producer, we welcome all moves to create clarity and consistency with products. There have been a number of changes over the years and CLP is another expectation placed on all producers. We are prepared and will, of course, meet our obligations to both our current and future customers.

Stempfel: CLP will certainly have an administrative impact on lubricant producers and in a few cases it might result in reformulation of products.
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The administrative impact is mainly focused on MSDS and label changes/adjustments. Every label change will result in a review by lubricant registration bodies (e.g. NSF, InS) and a fee will be requested. Usually lubricant manufacturers assign such activities to normal product stewardship activities and do not pass on such (additional but one off) costs to their customers.

5. Should there be more events and opportunities for the lubricant industry to meet food and pharmaceutical producers, and in what format?

Buffin: Currently exhibitions and events do not seem to be focused on this important area. Attendees to such events either have a focused agenda (food manufacturing machinery) or a general maintenance (MRO) spread. This dilutes the lubrication impact of any said event dramatically. Typically lubricant companies in attendance at either of the aforementioned would number no more than two or three.

Lange: We would like to have some more contact with customers and manufacturers as we want to give good examples of how lubricants can support the efforts of the whole industry in areas such as food safety and energy management. When you look at the total cost of ownership opportunities we can give a lot of support with our lubricants, so a conference or symposium would be beneficial. FGLs in particular have a very small maintenance value, around 0.5% of total maintenance costs, but this can have a big impact on productivity, and we would like to be able to discuss this subject with all parties.

Oliveira: Certainly, we would welcome such an initiative. We feel it is necessary to bring awareness about the need for using FGLs in general and how the FGL industry can contribute to the overall food safety initiatives of the customer. Due to our close working with food and pharmaceutical manufacturers, we understand the need for bringing more stakeholders together to support the aims of the food industry. We already have the ELGI working group, which can be further reinforced to take the lead to support this activity. Klüber Lubrication as a market leader would be glad to support this initiative.

Stempfel: Definitely yes. However this is not an easy task. In the past, workshops, seminars and conferences organised by lubricant manufacturers or industry associations about FGLs and lubrication have mainly attracted competitors but unfortunately not enough food manufacturers, OEM’s or even legislators/governmental bodies. It might be helpful if food manufacturer associations would invite lubricant suppliers to their events as well to speak about lubrication and food safety issues from their perspective.

6. Do you foresee any new technologies in food and pharmaceutical production that will impact the lubricant and chemistries currently available?

Buffin: Potentially there are new technologies being developed, but lubricant manufacturers tend to not be made aware of these until they near commercialisation by the food and beverage manufacturers. One of the latest trends that we have been involved in is microbiologically resistant lubricants.

Lange: In food and pharmaceutical production, as in other industries, machines have become faster and can handle bigger loads while becoming more compact. This requires an increasing lubricant quality in addition to those requirements mentioned previously. These requirements will be defined by the food industry and equipment builders. We have been in working with equipment manufacturers for over 100 years to ensure we are at the forefront in terms of machine development and lubricants, and that is leading us forward.

Oliveira: The advancement of technologies leads to the need for higher performance lubricants. The output of machines is increasing with time. An example: today beverage filling machines are running at 1,200BPM, where previously 600-800BPM was already considered high. We also see the need for lubricants to support customers’ programs to minimize the use of natural resources. Klüber Lubrication is anticipating the changing needs of the industry due to our close working relationships with end customers. As we work closely with machine manufacturers, we are also able to collaborate with them and take steps accordingly to meet these needs.

Stempfel: Although technology is changing and developing pretty fast these days, lubrication as such might not change in the same manner. Besides this there is an ongoing activity by food manufacturers to apply similar safety precautions to their suppliers, especially packaging and food additives. This will certainly extend the use of FGLs but without drastic impact to the lubricant technology/formulation of existing product portfolios.

About the Participants
Matthew Buffin has over 20 years’ experience of working with the food and beverage manufacturing industry. Initially working in bearings, power transmission products and conveyor systems, he joined ROCOL in 2001. Specialising in food grade lubrication, his role as Key Account Manager has enabled him to understand the diversity of pressures and challenges facing the industry across UK, European and global manufacturers.

Rainer Lange is a Mobil SHC Brand Advisor for ExxonMobil Lubricants & Specialities across EAME, specialising in driving awareness for Mobil branded lubricants. Rainer joined ExxonMobil over 22 years ago as a PCI Key Account Manager in Germany. After three years he took on the position of Key Account Manager for Pan-European Accounts. In the role of Field Marketing Coordinator from 2005 to 2011, Rainer was responsible for managing Industrial Marketing in Central Europe. He was then promoted to his current position as a Zone Industrial Marketing Advisor, in parallel to his role as a Brand Advisor for Mobil SHC, specialising in offshore wind energy and food processing industry applications.

Aldemir Oliveira has several years of experience in the food industry in different areas as a sales, marketing and project manager. He is Global Business Development Manager for the food industry at KlüberLubrication München.

Eduard Stempfel, a Chemical Engineer has worked in the lubricants industry (Shell Aced Ag and Shell Lubricants Switzerland) for more than 40 years in R&D greases, synthetic fluids and industrial lubricants. In that time he became Manager of R&D and Technical Support and was a member of the company management. In 2005 he joined Shell Global Solutions as a Product Application Specialist for Food Grade and Biodegradable Lubricants and in 2008 became Global Product Manager for Shell Food Grade Lubricants. He joined Fuchs Lubritech GmbH, Division Food in 2010 as Global Product Manager and Application Specialist. He has been an ELGi Board Director since 1998.

Although awareness has improved over the last two decades there are still quite a lot of food producers which do not accept they need to pay more money for safer lubricants

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