

WHITE PAPER

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FOOD GRADE LUBRICANTS

*Requirements registration and certification
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Kosher & Halal

What's your flavour ?



In recent years, there has been a clear upswing in interest for lubricating greases suitable for use in the foodstuffs industries. At the same time, there have also been considerable changes in the approval procedures to verify compliance.

Foodgrade greases must provide exactly the same technical performance as for any other lubricant. There is, however, an additional parameter to be considered, the possibility of incidental contact with the foodstuffs through leakage from the machine components and/or in connection with different maintenance activities. These greases must, therefore, also comply with food, health and safety regulations by being physiologically inert, tasteless, odourless and internationally approved. The greases, in turn, are also subject to contamination from the surrounding environment where substances such as steam, sugar juice and flour particles can be detrimental to lubricant performance.

Modern foodgrade greases provide excellent functionality without posing any known health risk to the consumer of the finished products. There are even additional requirements on the contents of foodgrade greases and the manufacturing processes used to produce such greases due to specific religious demands, especially in certain parts of the world.

KOSHER

Kosher means "suitable" in the context of foodstuffs prepared in accordance with the Jewish food laws. The main purpose of these laws is to differentiate us humans from the animals. A Jewish ecology, in defining our relationship to the World and the creatures inhabiting it, would build on the supposition that humans are quite different from other living creatures and that we have a special responsibility because of this. Humans can act in a disciplined way towards something as holy as food. This we cannot expect of the animals.

According to Kosher, certain animal species are allowed whereas others are forbidden. Cattle, sheep, poultry and fish are generally classed as "suitable" even though there may be some exceptions. Pigs and shellfish are, on the

other hand, not Kosher. In some cases, the forbidden animals have specific characteristics which should be repudiated; birds of prey are not Kosher, for instance, whereas other more peaceful species are allowed.

In addition, when an animal is slaughtered, the difficult compromise of having to kill to eat must be made as painless as possible. In the Torah, there is a law forbidding the killing of a calf in the presence of its mother. Traditional Kosher slaughter is however forbidden by many European laws and such meat has often to be imported.

Another characteristic of Kosher is that meat and dairy products may not be consumed during one and the same meal. This is for holy reasons rather than a health issue. Nature produces milk in the udder of the mother animal

FOOD GRADE LUBRICANTS : requirements, registration & certification

Food processing today

At present, food manufacturers are faced with a unique set of challenges in today's food processing environment. As savvy consumers demand a greater variety of specialized food and beverage products, the conventional mass food production model is changing. Increasingly, food manufacturers are using equipment capable of making rapid production line changes with minimal interruption of operation. Today's processors also generate more foodstuffs under shorter lead and production times, placing a greater demand on equipment and machinery. Additionally, the current attention on environmental sustainability and waste reduction is driving food manufacturers towards leaner, more efficient practices.

Of primary concern to today's food manufacturers is the threat of food contamination resulting in product recalls and consumer litigation. Food retailers and their branded suppliers most fear instances of food contamination resulting in public notices and food recalls. Even before causation is demonstrated in a court of law, negative publicity, increased regulatory

scrutiny and litigation fees can cost a manufacturer millions in lost revenue and destroy a product brand. One recent, highly-publicized case of foodborne illness outbreak at a US manufacturing plant is estimated to have cost the company over \$60 million in recall efforts alone. The plant at the source of the outbreak was shut down for 6 months.

Clearly, with the potential to impact public health and safety on a global scale and with enormous revenues at stake, food processors are continually seeking ways to effectively balance regulatory requirements, production risks and rising costs. Today's processors are reacting to changing food safety standards and the threat of costly recalls by searching for better ways to systematically reduce hazards in their plants. Food processors are investing in new technologies, safer materials and improved process design as the means of bringing these risks to acceptable levels.

Food processing compounds

A multitude of compounds or agents may be used at food processing plants to facilitate the safe and

to provide nutrition to the newly born creature. Killing a young animal for meat is already a concession to human greediness. To eat the meat together with the milk produced by the mother will only serve to aggravate this cruelty. Strict law-abiding Jews have even different sets of china and cutlery for meat and dairy products.

In the lubricants industry, the "suitability" of our products and the manufacturing processes are subjected to a technical and religious certification process which investigates the possibility of animal contaminants. A producer interested in a Kosher certification should apply to the local Jewish community or Consistory in writing on paper with their company letterhead. There will then be a request made to list the ingredients

used in the product(s) for which the application is being made.

Parallel to the technical study of the raw materials, a technical and religious investigation will be made at the manufacturing site. Here, the auditor will check that all the ingredients are, in fact, Kosher and that there is no possibility of cross-contamination by non-Kosher ingredients used in the same production equipment. After certification, renewal audits must be conducted on a yearly basis.

efficient preparation of meat, poultry and other food products. Examples of these types of compounds include: denaturants, cleaners, sanitizers, boiler treatment compounds, lubricants for incidental food contact and others. Historically, in the United States, the Food Safety and Inspection Services (FSIS), a branch of the US Department of Agriculture (USDA), required facilities to use approved compounds and products for food processing. These products fell into two specific categories: 1) proprietary substances, or products used in the pre-processing treatment of food, and 2) nonfood compounds, or products used in and around food processing areas. These products required approval under a USDA operated authorization program. The USDA evaluations were based upon product formulation and label review and generally did not include testing. Product formulations were reviewed against the U.S. Code of Federal Regulations Title 21 (21 CFR), Food and Drugs, and other regulatory requirements. Upon a determination of compliance, the USDA would issue a letter of authorization and the product would be listed in the next edition of the List of Proprietary Substances and Nonfood Compounds, widely recognized as the USDA Whitebook. The USDA authorization ensured that FSIS inspectors would approve a product's use within meat and poultry operations.

HACCP based approach

Hazard Analysis and Critical Control Points (HACCP) analysis is a systematic, science based process control system for identifying food safety hazards and establishing ways to control them. An effective HACCP system focuses on prevention, resulting in the elimination or reduction of potential biological, chemical and physical hazards that can adversely impact food safety. Under HACCP, food processors must identify and manage critical control points (CCPs), or points at which controls can be put into place to prevent, eliminate or reduce hazards. For proprietary substances and nonfood compounds, facility operators must select the appropriate product to meet their operational needs and their HACCP requirements. Food regulators in various countries throughout the world have adopted HACCP principles into their facility inspection requirements.

With the regulatory acceptance of the HACCP approach to food safety monitoring in the US, the FSIS moved away from prescriptive regulations to performance-based reviews. In 1998, in conjunction with adopting HACCP, the US FSIS eliminated the USDA authorization program for proprietary substances and nonfood compounds.

HALAL

Halal is an Arabic expression meaning "permissible". In the English language, it is often used to describe food which is deemed suitable according to the Islamic laws. In Arabic, however, it refers to anything permissible under Islam; in contrast to "Haraam", that which is forbidden. This includes behaviour, speech, dress, conduct, manner and dietary laws. Some aspects of Halal are similar to the Hebrew term "Kosher" but these terms are not interchangeable.

The strictest definition of Halal adheres to the philosophy that in order for food to be considered "permissible", it must not contain a forbidden substance and any meat must have been slaughtered according to the traditional guidelines known as "Dhabiha".

Muslims vary on the exact requirements for food to be considered "Halal". A variety of substances are considered forbidden (haraam) according to different verses in the Quran. These include pork, or any pig-based products, blood, animals slaughtered in the name of anyone but God, carrion, "fanged beasts of prey" (usually simplified as all carnivorous animals, with the exception of most fish and sea animals) and all intoxicants, especially alcohol.

Dhabiha, the conventional method of slaughtering all animals, excluding fish, involves the severing of the major arteries in the neck of the animal, the oesophagus and the trachea, with one swipe of a non-serrated blade. This is difficult to adhere to in

NSF's Registration program

NSF International is a not-for-profit, non-governmental organization that provides standards development, product certification, education, and risk-management services for the benefit of public health and safety. Recognizing the void left by the discontinued USDA authorization program and responding to concerns voiced by industry and public health experts, NSF International launched its Proprietary Substances and Nonfood Compounds Registration and Listing Program in 1999. Working with the USDA, NSF captured all previous review requirements and packaged them into NSF guidelines, against which all products are now evaluated.

Food grade lubricants

The machinery and equipment used for food and beverage processing requires lubrication to protect against wear and corrosion, to dissipate heat caused by friction and to provide sealing effects. These lubricants are essential components of food handling equipment, but may potentially cause serious public health hazards if they come into contact with food. One method of mitigating such risks is to incorporate sanitary equipment design into facility



AS CLEAN AS CLEAN CAN BE !

planning. In many instances of food or beverage processing, the potential for contact of the lubricant with the product cannot be entirely negated. The use of properly evaluated nonfood compounds, therefore, plays a critical role in effectively controlling chemical hazards in food and beverage processing plants.

In order to achieve Registration status with NSF,

a non-Muslim country since national laws will often forbid such methods.

In order to obtain certification for lubricants, the procedure is similar to the Kosher system. Contact should be made with the local Islamic community. The raw materials used will be screened on whether or not they are "permissible" and the production of the products should take place in a clean and approved processing system. The products are then considered Halal as long as an official HFFIA certificate is attached to the consignment and/or an HFFIA halal logo is printed on the packaging (HFFIA = Halal Feed and Food Inspection Authority).



lubricants are reviewed against the requirements of the U.S. Code of Federal Regulations Title 21 (21 CFR), Food and Drugs, which establishes the requirements for food grade or incidental food contact lubricants. These products are categorized as H1 lubricants and must be formulated using ingredients listed under 21 CFR Section 178.3570, which also references Generally Recognized As Safe (GRAS) substances listed under parts 182 and 184. In addition to being specifically listed in 21 CFR, a substance can be acceptable for use in an H1 lubricant if there is a food contact notification (FCN), threshold of regulation (TOR) exemption or GRAS notification where the indicated use is as an ingredient in a lubricant with incidental food contact. Further, a substance might be acceptable if there is a letter of opinion from the FDA or a qualified legal firm. Again, the use indicated in the opinion letters must be as an ingredient in lubricants with incidental food contact. In addition to the formulary requirements, product labeling must be true and accurate, make no inappropriate claims and bear appropriate end-use instructions. Product labels must also be traceable to the registered company and bear the NSF Registration Mark, including the H1 category code and unique product Registration number. Currently, over 450 H1 lubricant

manufacturers worldwide, with over 4,700 products are registered and publicly listed in the NSF White Book for identification by end-users and regulatory inspectors. In addition to H1, an ingredient category, designated as H1-X exists for lubricant components meeting the formulary requirements of 21 CFR Section 178.3570.

Food Grade Lubricant Certification

In recognizing the greater need for international standardization of the requirements for food grade lubricants, the International Organization for Standardization (ISO) developed and published a new ISO standard for lubricants in 2006. This document, ISO 21469: 2006(E) – Safety of machinery – Lubricants with Incidental Product Contact, was drafted by the Technical Committee ISO/TC 199, Safety of Machinery, and specifies the hygiene requirements for the formulation, manufacture and use of lubricants which may come into contact with products during manufacturing or processing. This international standard applies to lubricants intended for use in the food, cosmetic, pharmaceutical and animal feeding stuff industries.

NSF is currently developing an ISO 21469 Certification Program that will provide lubricant

DEDICATED MANUFACTURING EQUIPMENT

In line with the proposed requirements on separated and dedicated equipment for the production of foodgrade lubricants, and especially lubricating greases where kettles and ancillary installations are more difficult to clean, the AXEL Group is continually investing in increased capacity and state-of-the art technology.

In mid 2006, AXEL acquired the shares of Christol Grease SAS in Niort, France. In addition to the already existing modern production equipment, extra finishing kettles have been added to keep specific types of greases apart and, in so doing, ensure the stringent requirements on eliminating all possible contaminants. The plant has been subjected to a trial audit by NSF and has recently been evaluated as both Kosher and Halal compliant.

The cookers and finishing vessels are all made of stainless steel and located in a dedicated building completely separate from the rest of the industrial grease plant. There are now three cooling and mixing vessels for aluminium complex, calcium complex and biodegradable products as well as a number of smaller vessels for speciality products (inorganic thickened greases, silicone oil etc). Connected to these vessels are colloid mills, a high pressure homogeniser and filling machines, two specifically for cartridges. In yet another separate room are stainless steel reactors and mixers for fluid lubricants.

manufacturers with the option for a unique and comprehensive product assessment. This new Certification option will be offered to manufacturers of food grade lubricants seeking independent, 3rd party verification to the hygiene requirements of ISO 21469. The NSF Certification scheme will include product formulation and label review, site audits, risk assessment and product testing. Certified products will be uniquely distinguished by the NSF Certification Mark. The requirements for NSF Certification are currently under development and the Certification program will be launched later in 2007.

Challenged as never before, the food industry must proactively identify and control food safety hazards in order to prevent catastrophic public health incidents. The use of approved materials, incorporated into an effective food safety and quality plan, allows manufacturers to mitigate these risks.

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Footnote:

At the ELGI/NLGI working group meeting on food grade lubricants held in connection with the 2007 ELGI Annual Meeting in Limassol, Cyprus, a presentation (in principle identical to the lead article in this White Paper, including a time frame for the phasing out of the present system) was made by Koen Bontinck of NSF International. In the ensuing and vehement discussion, the majority of participants were, in fact, not in favour of conversion to ISO 21469 including testing and new registration, mainly due to financial implications, but preferred to retain the present “H1/H2” type system.

Some however, including Hervé Grignou, Managing Director of AXEL’s Christol grease plant, were predominantly positive, albeit reluctant to the financial impact of increased costs for registration, and recognised the need for the proposed requirements on dedicated production equipment with certified quality and safety management systems.



PRODUCTION PLATFORM FOR FOOD GRADE GREASES, CHRISTOL GREASE, NIORT, FRANCE

In the next issue of the White papers, we will highlight a new and patented lubricant concept based on polymer technology. Originally developed and patented by SKF in response to specific problems in roller bearing applications, this has now been further refined into a whole range of new products with properties vastly exceeding the performance levels of more traditional soap based greases. Our guest writer will be the well-known Tribology Gold Medalist, Professor Bo Jacobson, one of the original inventors of this novel polymer concept.

We encourage reader contribution, feedback and proposals for topics in future editions of the White Papers.

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