

# Keeping Oven Chains Protected, Even at Extreme Temperatures



- **Bakery ovens used in the production of tortillas, pita bread, pizza dough and other baked goods can expose conveyor chains to extreme temperatures upward of 650°C, which can significantly challenge typical food-grade lubricants.**
- **Klüberfood NH1 CH 6-120 SUPREME is a major development for bakeries looking to provide optimum protection for chains at extreme temperatures, while continuing on the path toward food safety.**

At high temperatures, common food-grade chain oils can evaporate and break down, leaving behind high levels of residue and/or requiring constant re-lubrication. A common alternative is to use a chain lubricant containing suspended industrial solids that will provide emergency lubrication even when the carrying fluid evaporates.

Although these formulations can provide high temperature lubrication, it is often accomplished at the sacrifice of the lubricant no longer being registered by the National Sanitation Foundation (NSF) as food grade H1.

New, Klüberfood NH1 CH 6-120 SUPREME utilizes a solid white lubricant to provide optimum protection of chains at extreme temperatures and is NSF H1 registered for incidental contact, providing a long-lasting solution to the challenge of using food-grade lubricants at extreme temperatures.

## Meeting the demands of extreme temperatures

In all industries, but particularly in the food industry it is important to understand the makeup of the lubricant being applied to any equipment operating at elevated temperatures.



Conveyor chains in bakery ovens are exposed to extreme temperatures upward of 600°C, which can significantly challenge typical food-grade lubricants such as synthetic esters, which can evaporate at temperatures above 300°C.

The various base oils used in lubricants are affected by extreme temperatures in different ways in terms of the levels of evaporation loss and in the formation of residues – both factors that influence chain life.

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Innovative tribological solutions are our passion. Through personal contact and consultation, we help our customers to be successful worldwide, in all industries and markets. With our ambitious technical concepts and experienced, competent staff we have been fulfilling increasingly demanding requirements by manufacturing efficient high-performance lubricants for more than 85 years.

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Each type of base oil has a different temperature limit—and even going slightly past this limit can have a dramatic effect. For instance, at temperatures above 260-315°C, even synthetic esters, which are excellent performers in many bread ovens, can evaporate. As a result, frequent re-lubrication is needed to keep the chain lubricated and protected. However, even with constant re-lubrication, the continuous break down of certain types of base oils can thin the lubrication barrier, which reduces component protection. Also, residue levels become higher, which impairs fresh lubricant from reaching the intended surface(s).

A common method used to lubricate chains operating at extreme temperatures is to use a solid lubricant. The solid lubricant is in suspension within a fluid carrier when the lubricant is applied and as the fluid carries the complete formulation into the components and begins to evaporate, the solid stays behind inside the friction points as a type of emergency protectant to decrease wear of the surfaces.

Understanding the importance of the types of carrier fluid and solid being used is critical, as with any formulation, they should be selected based on the complete tribological environment. Other important factors include how the lubricant will be stored, the method in which it will be applied to the chain and when it will be applied.

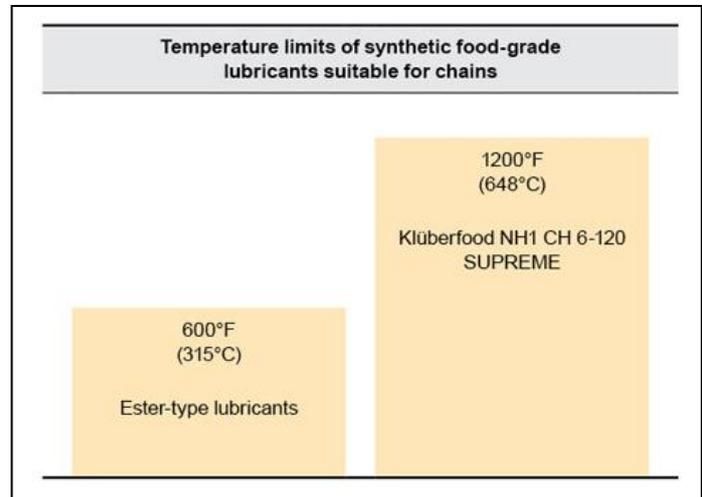
A lubricating formulation using solids held in suspension is likely to require mixing either when being stored or prior to application. Stirring can be done with various methods, such as using an agitator pump inside the lube reservoir. Agitation maintains the proper ratio of the fluid carrier and the solid lubricant(s) during application, which can then be done using an automatic lubrication system.

Because the carrier will eventually evaporate, the application should be performed at a temperature allowing the carrier to first deliver the additives into the friction points, if applied while the oven is at full or too high a temperature, heavy smoking and flashing off of the oil will occur when it contacts the chain. Therefore it is best to apply the lubricant at a lower temperature within the operating range of the carrier to allow penetration of the solid additives.

## Advanced protection for oven chains at extreme temperatures

Klüberfood NH1 CH 6-120 SUPREME uses carefully selected synthetic base oil as a carrier with a white solid lubricant held in suspension. The base oil evaporates off cleanly with very little residue, which provides the best protection possible from the solid lubricant. This formulation has excellent wetting and penetration properties on application, and can be used at operating temperatures even up to 650°C.

Klüberfood NH1 CH 6-120 SUPREME provides excellent long-term performance and is registered as food grade H1 by the NSF thus maintaining high industry standards for food safety.



In addition to high-temperature performance and NSF H1 registration, Klüberfood NH1 CH 6-120 SUPREME is ISO 21469 certified, therefore verifying that the lubricant has been produced and packaged following hygiene requirements established by the standard.

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## Save time and money while supporting food safety

Along with performance and food safety advantages, Klüberfood NH1 CH 6-120 SUPREME protects components to extend chain life and reduce maintenance issues, re-lubrication periods are extended—upward of one or two weeks—as the solid lubricants become impregnated into the metal surfaces, and the synthetic oil provides good corrosion protection thus enhancing chain life.

To ensure optimum lubrication and performance, Klüberfood NH1 CH 6-120 SUPREME must be properly applied, if a solid lubricant solution has already been used, the same application procedure can be followed.

Typically, a solid lubricant in fluid suspension is applied at lower temperatures to reduce smoking and to ensure that the carrier penetrates into the chain components. Application at chain temperatures below 150°C is recommended during planned maintenance or periodic downtimes. If automated lubrication is used then the

## Comparing Klüberfood NH1 CH 6-120 SUPREME synthetic oil with an ester lubricant when used above 600°F

Klüberfood NH1 CH 6-120 SUPREME	High-Temperature Ester Lubricant
1200°F (650°C) upper operational limit	600°F (315°C) upper operational limit
Example: 1- to 2-week application intervals in established practice	Requires continuous and costly reapplication
Cleaner burn off with low residue	Burn off leaves higher levels of residue

reservoir holding the lubricant should employ an agitation or stirring method. Agitation ensures that the solid lubricant stays in suspension. Application frequency should be reviewed with the lubricant manufacturer, particularly when switching from alternatives or working with a newer chain.



The solid white lubricant formulation (left) of Klüberfood NH1 CH 6-120 SUPREME is NSF H1 registered for incidental contact, providing a food-grade solution for chain lubrication as extreme temperatures without the residue of typical lubricants (right).

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## Extreme temperature performance and food-grade certification.

In the past, operators and manufacturers in the food and beverage industries faced a likely dilemma: either provide the best protection possible for the equipment without using a food-grade lubricant, or switch to an NSF H1 lubricant with the extra expenses of higher lubricant consumption and shorter equipment life. The good news for maintenance managers today however is that the newest lubricants designed for use in food and beverage facilities are capable of doing all the things that a conventional industrial lubricant does.

Technical advances in the industry show that H1 lubricants can deliver the same or better performance than conventional industrial products and can be used safely on machinery components such as pumps, mixers, gearboxes, chain drives and conveyor belts. Even at higher temperatures or loads and in wash-down environments, the appropriate NSF H1 lubricant will still reduce friction and wear, protect against corrosion, dissipate heat and have a sealing effect.

For bakeries Klüberfood NH1 CH 6-120 SUPREME provides a single solution and has been proven in baking applications.

To find out more about please contact Klüber Lubrication GB on the number below, or email [info@uk.klueber.com](mailto:info@uk.klueber.com)

## About the company

Klüber Lubrication is a manufacturer of specialty lubricants. For more information about food-grade lubricants and best practices, visit [www.klueber.com](http://www.klueber.com)

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## Reduce costs of relubrication & maintenance

- Example: 1- to 2-week lubrication intervals in established practice
- Cleaner burn-off, reducing residue which can impede proper relubrication
- Extended chain life
- Carefully selected base stock

