Corrugated Paper Industry Lubrication Solution



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Wallimore, Lubrication Protection Under Harsh Conditions

Wallimore specialises in the production and development of speciality lubricants and greases. With more than 15 years of focus on grease lubrication and proven technology and commercial experience in the industrial market, we offer a wide range of lubrication products for special working conditions.

Whether in the extreme high temperature of 1400 $^{\circ}$ C, or in the harsh environment of -80 $^{\circ}$ C, we can guarantee the worry-free operation of the equipment; high-performance lubricants greatly enhance the environmental friendliness and equipment operability.

We aim to reduce production costs and provide scientific lubrication solutions for our customers with high quality products and perfect service system. We insist that service is a fundamental part of the product, and strive to ensure that the high performance of the product can be fully realised through a wealth of expertise and timely on-site service, and ultimately enhance the value in terms of safety, environmental protection, production increase, consumption reduction and sustainable development.



The production of corrugated board involves a complex manufacturing process: when subjected to heat, the paper is creased and bonded to a flat sheet. Single, two or three sheets can be combined to form a strong corrugated structure, thus providing an environmentally stable product for the primary production of packaging products.

The core equipment of a corrugated board production line is a high-performance corrugator with a maximum length of 150 metres, a weight of 500 tonnes and a production capacity of up to 50,000 square metres per hour. At the same time, they have to run perfectly and trouble-free, despite being subjected to, for example, high heat, high pressure and pollution, as well as water vapour. Failure to do so can lead to increased wear and corrosion, as well as costly unscheduled downtime; especially for corrugator rolls and pressure roll bearings, where maintenance requirements are even more stringent.

The service life of corrugator and pressure roller bearings depends on operating temperatures and production speeds, and these bearings are exposed to the following environments: - High temperatures

- High temperature and humidity
- Corrosive environments
- High pressure and friction conditions
- Dust
- Glue
- Paper deposits

The combination of these factors makes corrugated roll lubrication extremely complex, a process that can lead to early damage to the bearing structure, friction problems, malfunctions, and more. These adverse effects have a direct impact on machine productivity and maintenance costs.

The corrugated board industry has been growing steadily for many years. On the one hand, it must provide a high-quality product, and on the other hand, it must meet growing demand. Therefore, it is vital for every corrugated board manufacturer to use reliable lubricants to increase productivity, reduce maintenance costs and find the most cost-effective production process.



Cost Distribution

Early Bearing Failure Causes

Corrugated Machine Lubrication Conditions

Corrugated Line Lubrication Solutions

Common Problems

- Severe Carbon Build-up
- High temperature loss
- Grease is pushed out
- Bearing wear
- Bearing seized
- Running noise
- Frequent greasing
- High cost

The existence of the above problems hinders the performance of corrugated cardboard production equipment and reduces its service life.

Corrugated Roll Application Requirements

IIn corrugated cardboard production, saturated steam can reach up to 240 $^{\circ}$ C.

Plants are often equipped with rolling bearings that are designed for high loads and line contact between the rolling elements and the rails. In addition to the advantage of high load carrying capacity, these special bearings are subjected to high rolling and sliding friction during operation.

- Temperatures up to 240 $^{\circ}\,$ C
- Low to medium speeds (200 350 rpm)

• Lubrication intervals of approx. 4 weeks or more (depending on model and operating conditions)

- Erosion by water vapour
- Polluted working environment

High loads, high temperatures and high friction are the main challenges for bearing greases and require special lubricants.



Corrugated board production is a complex process. In addition to the lubrication of the core equipment, the corrugated rolls, we offer an ideal combination of other high-performance lubricants and automated lubrication systems for a wide range of applications on other equipment in the process.

We not only help you to find the right lubricant, but also support you in optimising your production process with detailed advice on, for example, lubrication areas, lubrication intervals and lubricant dosage.

Wallimore CMG 555 Perfluoropolyether Corrugator Grease

Perfluoropolyether greases offer excellent long-term high temperature performance, outstanding corrosion resistance and excellent wear resistance.

- Prevents wear and corrosion No hardening effect
- 3 times longer bearing life

- No oil separation
- Vibration and noise reduction No harmful components
- Low frictional torque
- Can be mixed with any PTFE/PFPE lubricant
- Energy and cost savings
- No special cleaning agents required

Application Recommendations

Product	Wallimore CMG 555 Perfluoropolyether grease	Wallimore CMG 648 Synthetic grease	Wallimore CMG 645 Synthetic grease
Overview	PTFE and PFPE	Synthetic hydrocarbons and polyurea	Synthetic hydrocarbons and polyurea
Alternative Products	BHS PERFLU V 250 krytox GLP 226/226FG/227 Kluber AR 555 LUBCON LP 2502 NYECorr 140	Kluber HB 74-401/GH 461/GH 462 High-temperature grease 1# for J.S.Machine Tile Line	Mobil SHC 100/SHC 460 Brugarolas KOMPLEX HT-2/G
Grease chan cycle	^{ge} 5000 hours or 12 months	1000 hours or 1 month	300 hours or 1 month
Greasing cy	cle 3 months	1 months	15 days
Application Equipment	BHS, AGNATI, SIMON MITSUBISHI, ISOWAUCM UCM, LANGSTON, FOSBER	J.S.Machine, MarquipWardUnited, HSIEH HSU, WANLIAN, Shandong Mingwei, YUELI Machinety, TAIWAN XIEYANG, HANKUK PACKAGE	Various low-speed production lines



Other Application

Customer Case

Equipment and process situation

Production line equipment: involving BHS, J.S.Machine, WANLIAN, etc

Corrugated flute type: A, C, B, E, etc. Corrugated roll/pressure roll bearing type: double-row roller bearinas Bearing brand: SKF, NSK, etc.

Production working condition: 180°C ~ 220°C, water vapour environment, medium load.

Customer troubles

The main problems are as follows:

- Grease precipitation, commonly known as "running oil".
- Grease carbonisation, commonly known as "coking".
- Insufficient grease lubrication capacity, resulting in equipment wear or even damage.



Grease is not shear resistant



Grease coking

Cause Analysis

• Grease Separation - Running out of grease

Specific performance: The arease becomes thinner in consistency and flows out from the bearing. Reason: The grease can not withstand high temperature and shear environment for a long time, the structure of soap base in the grease is destroyed, the oil and soap are separated, so it is softened and lost.

Grease carbonisation - coking

Specific performance: bearing wear is serious or directly hold dead, similar to dry friction. After opening the bearing, it is found that the grease is no longer in semi-fluid state, instead of black charcoal.

Reason: The hydrocarbons in the grease, which play a role in lubrication, undergo a chemical reaction such as oxidation at high temperatures and eventually turn into carbides.

Insufficient lubrication - Wear and seizing

Specific symptom: During regular maintenance, there is semi-fluid grease on the bearing, but the bearing is severely worn.

Reason: Insufficient lubrication capacity of the grease prevents the formation of boundary lubrication or extreme pressure lubrication between the friction parts. This means that the grease has no or limited lubricating effect and the bearings are still in direct contact with each other.

Solution

Corrugated rolls are exposed to high temperatures, high loads and water vapour for a long period of time. To ensure long-lasting operation and reduce downtime, Wallimore CMG 555 corrugator grease is recommended:

- High Temperature Resistance: meets the requirements of at least $200 \,\text{C}$ for long term operation without loss. • Antioxidant: good oxidation stability, the lubricant will not be oxidised to produce oxides when it comes into
- contact with air in a high temperature environment, avoiding the production of carbides.
- Resistance to water vapour: the grease will not be emulsified or hydrolysed when it meets water.
- Anti-shear: grease in mechanical work, long-term shear effect, soap fibre will be separated and produce flow, grease structure is not stable resulting in a decrease in consistency. Ideal grease has a long service life because its consistency does not change much after long-term shear.

Effect of use

- Significantly increases uptime of corrugated roll bearings
- Reduces grease consumption by two-thirds
- Three times longer bearing life, saving repair costs.



Short component life, equipment failure and other problems

Corrugators are often operated with excessive lubrication in order to better lubricate the bearings; they may also be operated with insufficient greasing or with grease containing unsuitable base oils to lubricate the bearinas. Overuse or incorrect use of the wrong type of grease will result in purchasing more than needed each vear.

Solution



We will collect field data to determine the make and model of the equipment in question, bearing part numbers, operating parameters and current lubrication methods. Based on the loads, temperatures, speeds and environment of each piece of equipment, our technical service team will recommend the most favourable lubricant, lubrication intervals, quantities and application methods.

We will also provide a cost analysis to determine if a lubricant change makes financial sense.

Lubricant Loss

Bearing failure is a common but avoidable problem during corrugated roll operation, and different lubricants can make a huge difference. The lubricated area receives heat and air, which oxidises the base oils and thickeners; at the same time, the lubricant receives constant shear, which eventually destroys the soap base structure and softens the lubricant.

Solution



Wallimore High Temperature Lubricants are suitable for use in bearings operating in the vicinity of heat generating equipment or heat sources, where high temperatures will not cause the grease to melt and run out.

Regular additions are made to replenish the lubricant as it is consumed in service. It has been used successfully in numerous corrugators and has proven itself in extending relubrication intervals and reducing grease consumption.



Abrasive Wear

Have you been concerned about the life of your corrugated roll bearings and are they wearing out prematurely? Failure in continuous production will result in a significant loss of time and output. Generated and uncleaned contaminants can also lead to breakdowns and unplanned downtime.

Solution







Problems and Solutions

Stop equipment operation, check the source of contaminants and take protective measures, fully