

Roller Chain Lubrication

Roller chain drives suffer more harm from faulty lubrication than from years of normal service!!!

A roller chain consists of a series of connected journal bearings which must be properly lubricated to obtain the maximum service life. Although many slow speed drives operate successfully with little or no lubrication beyond that initially applied at the time of manufacture, continued proper lubrication will greatly extend the useful life of every chain drive.

Chain drives require lubrication for six primary purposes:

1. Resist wear of the pin-bushing joint.
2. Cushion impact loads.
3. Dissipate heat.
4. Flush away foreign materials.
5. Lubricate chain-sprocket contact surfaces.
6. Prevent rust or corrosion.

In selecting a lubricant, a good grade of clean petroleum oil without additives is most commonly recommended. Certain additives in oil can leave a varnish or gum buildup which will prevent additional lubricant from entering chain joints.

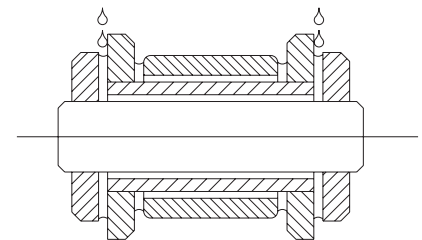
The viscosity of the lubricant greatly affects its ability to flow into the internal areas; therefore, the highest viscosity oil which will flow between the chain link plates and fill the pin-bushing areas will provide the greatest film thickness and best wear life.

Greases, applied to the exterior of the chain, serve no purpose with the exception of protecting the external surfaces from rust or corrosion and should not be relied upon to provide any internal lubricating benefits.

The following table provides a guideline for selecting the proper lubricant viscosity at various ambient temperatures:

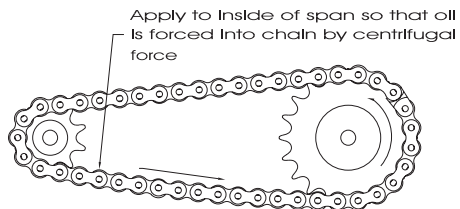
Ambient Temperature Degrees F	Recommended Lubricants				
	SUS Viscosity 100 F	SAE Engine Oil	SAE Gear Oil	ISO	AGMA
20-40	200-400	20	80W	46 or 68	1 or 2
40-100	400-650	30	85W	100	3
100-120	650-950	40	90	150	4
120-140	950-1450	50	90	220	5

The elongation of roller chain is the result of wear caused by friction between the pins and bushings and regardless of the size or type of chain, in order for any lubricant to reach the critical pin/bushing area it should be applied to the upper edges of link plates in the slack span. Lubricant applied only to the chain's rollers will not provide an adequate supply to the internal wearing surfaces. However, the chain's rollers will receive adequate lubrication due to spillage over the link plate edges when lubricant is properly applied.



LUBRICANT FLOW INTO THE CHAIN JOINT

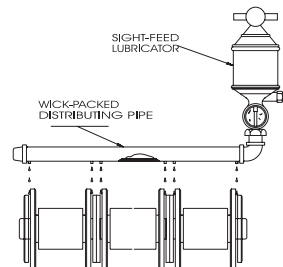
Note: When applying lubricant to multiple strand chain, it is important that lubricant be directed to each row of chain link plates, not just the outermost rows; and, in conveying applications, oil should be directed between the rollers and bushings as well as between the chain link plates, as significant wear can result from external loading.



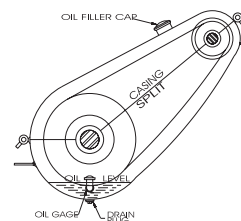
APPLICATION OF LUBRICANT TO CHAIN

There are three basic methods of lubrication for roller chain drives. Close adherence to these recommended types of lubrication is essential in obtaining the maximum service life of a chain drive. These recommended types of lubrication, as shown in the horsepower rating tables, are determined by the chain speed and the amount of power transmitted.

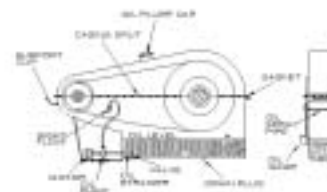
Manual or Drip Lubrication (Type A): Lubricant applied manually with an oil can or brush is acceptable for slow speed drives, generally not over 600 feet per minute. When lubrication must be accomplished with a minimum amount of oil, it is advisable to equip the system with either felt pads or brushes which are fed by lubricant from a reservoir and carefully positioned to direct oil into the clearances between each row of link plates in the slack span of chain.



Bath Lubrication (Type B): Lubricant is applied to the chain by allowing the oil level within an enclosed casing to cover the chain at approximately the pitch line at its lowest point of operation. This is by far the most desirable method for chains operating at up to approximately 1500 feet per minute.



Forced or Circulating Lubrication (Type C): This is similar to bath lubrication with the exception that the lubricant is pumped onto the chain under pressure. The oil should be delivered to the upper edges of each row of link plates across the lower span of chain just prior to the chain's entry into one of the sprockets.

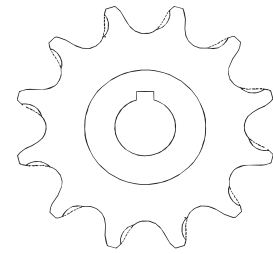


The following table can be used as a guide for determining the type of lubricating system based upon the speed of the chain in feet per minute. The final selection should, however, be based upon the type of lubrication system recommended in the horsepower rating tables for the specific chain, sprocket, speed and horsepower transmitted.

		Chain Speed in Feet/Minute								
Chain No.	35	40	50	60	80	100	120	140	160	200
Type A	350	300	250	215	165	145	125	110	100	80
Type B	2650	2200	1900	1750	1475	1250	1170	1050	1000	865
Type C	Use for speeds higher than Type B limits									

4. Check Sprocket Tooth Wear

Check for roughness or binding when the chain engages or disengages from the sprocket. Inspect the sprocket teeth for reduced tooth section and “hooked” tooth tips. If these conditions are present, the sprocket teeth are excessively worn and the sprocket should be replaced. Do not run new chain on worn sprockets as it will cause the new chain to wear rapidly. Conversely, do not run a worn chain on new sprockets as it will cause the new sprockets to wear rapidly. As a *general* rule, replace the sprockets with every third chain replacement.



**TOOTH FORM ALTERED
DUE TO WEAR**

5. Check Sprocket Alignment

If there is noticeable wear on the inside surfaces of the chain roller link plates, the sprockets may be misaligned. Realign the sprockets as outlined in the Installation section to prevent further abnormal chain and sprocket wear.

6. Check for Drive Interference

Check for interference between the drive and other parts of the equipment. If there is any, correct it immediately. Interference can cause abnormal and potentially destructive wear on the chain or the interfering part. If the edges of the chain link plates impact against a rigid part, link plate fatigue and chain failure can result.

Check for and eliminate any buildup of debris or foreign material between the chain and sprockets. A relatively small amount of debris in the sprocket roll seat can cause tensile loads great enough to break the chain if forced through the drive.

7. Check for Failure

Inspect the chain for cracked, broken, or deformed parts. If any of these conditions are found, **replace the entire chain**. Even though portions of the chain may appear to be in good condition, in all likelihood, the entire chain has been damaged.

Warning: Roller chains that have been damaged under excessive loading due to an accident, or otherwise, should be completely replaced because the chain, as well as the damaged component, has been loaded to a degree that has impaired its ability to transmit normal loading.

8. Evidence of Lubrication

One of the first indications that a roller chain is not receiving adequate lubrication is that the external areas around the joints will most likely have a reddish/brown (rusty) color. The inadequate lubrication can be confirmed by removing a link (most commonly the connecting link) and examining the surface of the pins. The color of the pins will generally be dark brown, even blue, if the chain has been running with inadequate lubrication. Additionally, the surface of poorly lubricated pins will be rough, grooved, or even show evidence of galling.

Properly lubricated chains will not exhibit the rusty color at the joints, and the pins of the connecting links, when removed, will be generally smooth, shiny and have an obvious coating of lubricant on the surface.