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## Chain - Part 2: Types Of Chain

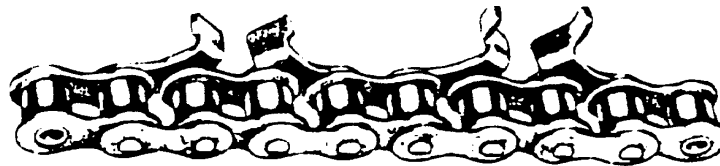
### PA NOTE

Of the various types of chain, the best candidates for Poly Chain® belt conversion are roller, corrosion resistant, silent, Hi-Vo, and O-Ring chain. Corrosion resistant and silent chain are good candidates based on a price comparison, while roller chain is a good candidate because of the possibility of improving life and eliminating lubrication problems. This Note will further discuss the types of chain and their characteristics in greater detail.

#### TYPES OF CHAIN

Roller chain is the most commonly used type of chain. Therefore, it is the most predominant candidate for Poly Chain® belt conversion. Roller chain horsepower ratings cover a large range of load requirements. As such, it is widely used on both power transmission and conveyor applications. Double pitch roller chain has essentially the same application characteristics as standard pitch roller chain, and is generally used on lighter duty applications such as conveyor drives. Roller chain has the advantage of having attachments easily adapted to it. This would present a problem with synchronous belts.

Figure 1



Corrosion resistant chain is standard series chain made of stainless steel for use on applications involving high temperature or corrosive conditions. Two types, 400 series stainless and 300 series stainless are available in single strands for most of the common sizes. The 400 series stainless is hardened for high wear resistance, while the 300 series stainless has maximum corrosion resistance. Corrosion resistant chain is approximately four to five times as expensive as roller chain. Corrosion resistant chain is typically used in the food and beverage handling markets as well as on drives operating in harsh chemical or high temperature environments. Corrosion resistant chain is also a good potential candidate for Poly Chain® belt replacement, however, proper care should be taken when investigating the possibility of Poly Chain® belt application on these types of drives. Extra caution should be given to obtaining all pertinent data relative to the environment.

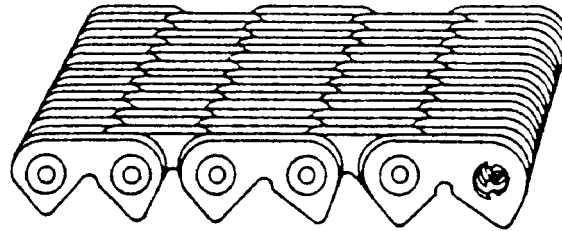
Silent chain is composed of inverted tooth steel links. It has a higher horsepower capacity in addition to being quieter than roller chain. Silent chain can operate at higher speeds than roller chain. Silent chain is also a good candidate for Poly Chain® belt replacement. Silent chain is generally recommended when four or more strands of roller chain are needed for an application. Silent chain typically costs four to five times as much as roller chain. It is predominantly used on automotive original equipment drives. It also requires the use of a housing due to the bath type lubrication necessary. While an ANSI standard exists for interchanges, the joint contours of silent chain vary so much with the manufacturer that different brands cannot be connected together or used interchangeably on different manufacturer sprockets. Center or side guide plates are used to prevent any



transverse movement. Silent Chain is identified with the prefix SC. As an example, consider the designation SC301:

- 3: pitch in 1/8" increments, (3/8" pitch in this case) with pitches available from 3/16" to 1".
- 1: width in 1/4" increments (1/4" wide in this case).

Figure 2



Hy-Vo chain is similar to silent chain but the tooth form is different, preventing interchanges with silent chain.

Manufacturers of Hy-Vo chain claim speed capability in excess of 7000 feet per minute. Hy-Vo chain is more efficient than silent chain, with manufacturers claiming efficiencies of around 99.7%. Cost is approximately the same as silent chain, being four to five times as expensive as roller chain. It also requires a housing due to bath type lubrication requirements. Where applicable, the economics of a Poly Chain® belt drive can be very dramatic as compared to silent or Hy-Vo chain.

Motorcycle chain is available in a variety of sizes. Two of the most popular are #520 and #530 chain. The most common motorcycle chain is #530, while #520 is usually used on off-road vehicles. In the chain designation, the 5 represents the pitch in 1/8" increments, while the 2 and 3 represent width in 1/8" increments. Two other sizes of motorcycle chain are available, #630 and #428.

The #630 chain is used on large motorcycles with engines of 1000cc or larger, while #428 is generally used only on very small motorcycles under 250cc. Harley Davidson was instrumental in the development of the Poly Chain® belt with the conversion of the primary and secondary drives on their motorcycles from chain to Poly Chain® belts. Kawasaki has since converted several of their models to use Poly Chain® belts instead of chain. An aftermarket also exists with several manufacturers of motorcycle chain-to-Poly chain belt conversion kits. Poly Chain® belts have been reported to exceed 50,000 miles on similar applications.

O-Ring chain is similar in appearance to roller chain except that it is wider. Drives currently using O-Ring chain provide a good opportunity for Poly Chain® belt replacement. An O-Ring acting as a seal fits between the roller and the pin link plates. Manufacturers claim a life of 5 to 7 times that of standard roller chain. However, lubrication is still necessary to prevent rusting and wear. Any contact with solvents or chemicals that may have an adverse affect on the elastomer seals should be avoided. Also, a normal pin extractor should not be used for disassembly because of possible damage to the O-Ring.

Having examined chain types which provide a good opportunity for Poly Chain® belt conversion, we will now discuss chain types which are less than ideal candidates.

Bead chain is composed of steel balls through which a steel cable is run. The balls range from 1/8" to 1" in diameter, while the cable can vary from .014" to 1/4" in diameter. Bead chain is extremely flexible, having the



ability to turn corners in all planes. It is probably not a good candidate for Poly Chain® belt conversion. Due to its all-steel construction and non-lubricated design, bead chain has an extremely wide operating temperature range. Bead chain is also relatively low in cost.

Leaf or lift chain, also called cable or balance chain, is commonly used on fork lift trucks and for chain wrench/pipe vise applications. Lift chain is not normally used for power transmission, but used instead for motion transfer. It is not a good candidate for Poly Chain® belt conversion. Due to the high liability only two manufacturers produce lift chain. It is typically 100% inspected. Lift chain is composed of heat-treated steel links similar to roller chain link plates and is designed with the prefix BL.

As an example, consider BL-534:

5: pitch in 1/8" increments, in this case 5/8",

34: the lace pattern of plates (in this case, alternating 3 and 4 link plates).

Welded link chain, resembling standard tow chain, is also used in lift applications. It is not a good candidate for Poly Chain® belt conversion. It can drive in different planes, and has been tested up to 3000 feet per minute. Manufacturers claim that welded link chain is self-cleaning and will not gall like roller chain.

The final type of chain is Vari-Chain or PIV (Link Belt) chain. These chains are used on automotive variable speed drives, running in variable pitch V-grooves. PIV chain is a competitor of Gates Power Trac high capacity variable speed belt, currently under development.

The third installment in this series will discuss chain design criteria.