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Dodge® elastomeric couplings: benefits of elastomeric couplings

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Many users consider the installation tasks of mounting and assembling a coupling quite simple. However, aligning the shafts to each other can be more difficult and take several hours, especially if the user doesn't have the correct tools. Excessive time spent on installation is costly and provides minimal value to the company's bottom line. Yet, how does a facility reduce maintenance and downtime costs related to couplings? The answer may be as simple as selecting or specifying the correct coupling for the application; an elastomeric coupling. Elastomeric couplings have a wide range of benefits for the user. Benefits that can all be tied to savings in operating, maintenance and replacement costs.

Elastomeric couplings are couplings that utilize an elastomer. This elastomer is usually some type of thermoset or thermoplastic material. Common elastomer materials utilized for couplings include natural rubber, polyurethane, neoprene, Hytrel and EPDM. All materials are selected based upon their natural mechanical characteristics toward the application demands. Material selection factors include chemical and wear resistance, temperature limits, thermal and electrical conductivity, toughness, strength, and durability.

One of the greatest features of elastomeric couplings is flexibility. This means that these couplings will operate properly under a misaligned condition. The bottom line is that less time is required to align two shafts and the equipment attached to them when you choose this style of coupling.

Accurate alignment is often time consuming and the tools to achieve this accuracy can be costly. This investment may not be practical. If the proper alignment tools are not available then alignment can take a considerable amount of time through a series of trial and error attempts. In addition, moving machinery around to properly align the shafts may take several hours. However, if the alignment tolerance window was much greater, as it is with elastomeric couplings, then the total time and effort required to align shafts properly is unnecessary. This installation cost is salvaged. It is important to note that some coupling designs and sizes will have more misalignment capability than others. In fact some elastomeric couplings can handle up to 4° angular misalignment combined with 1/8" offset misalignment. These tolerances are so large that they are easily noticed by a naked eye.

Elastomeric flexibility has other advantages beyond alignment. Flexibility will actually improve the overall life of the machine's system components. For example, imagine a coupling with no misalignment capability, a rigid coupling. If this coupling was exposed to misaligned shafts, the result would be component stress. The component stress is not only within the coupling but in the mating shaft and shaft components. Remember that for every action there is an equal and opposite reaction, therefore the result is an excessive preload on bearings and induced vibrations. This loading will decrease bearing life and lead to early component failure resulting in increased replacement and installation costs. Elastomeric couplings handle this misaligned condition efficiently and allow the bearings to operate properly as designed.

Elastomeric couplings also dampen shock loads and vibrations in applications. This relates to cost savings because it protects surrounding equipment from the damaging vibration and shock load affects. For example, if a driven piece of machinery is subjected to an aggressive shock load, the coupling would absorb a large part of this overload. If that heavy impact load reached an expensive piece of equipment, such as a gearbox, the mechanism might fail. Instead,

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the equipment is protected. Couplings absent of this dampening characteristic would transmit the load directly through the system, which often results in component failure.

Coupling failure can be beneficial in an overload situation. It is often easier to design the least expensive component in the system as the weakest design link. When a flexible elastomeric coupling is defined as the weakest link in a machine system then it can act as a type of mechanical fuse, failing upon damaging overloads or surges. After all, it is much easier to replace an inexpensive elastomeric coupling versus an expensive gearbox or motor.

Additionally, when an elastomeric coupling fails, it usually doesn't require the complete coupling to be replaced. Instead only replacing a low-cost elastomer tire, sleeve, or disc is all that is needed. Whereas most metallic couplings will require complete component replacement, making the repair costly. Further, the installation time of just the elastomeric insert is not time consuming, making them the ideal choice for critical applications.

Another major benefit of elastomeric couplings is that they require absolutely no maintenance. Install them and they will run until failure. Flexible couplings that do not rely on elastomer dampening will require lubrication. Lubricants such as grease and oil have short service lives therefore they require fresh grease on a periodic schedule. This means scheduled downtime is necessary for maintenance in order to achieve the intended product life. In addition, lubrication is messy and can drift off the coupling, making it less than ideal for certain applications such as food, beverage, and paper processing.

Both original equipment manufacturers and end users can benefit from the savings associated with elastomeric couplings. Less time is required for installation, alignment, and replacement. Mating component operating life is improved which decreases replacement costs or warranty charges. Maintenance costs are decreased due to the lack of maintenance required. Finally, improved uptime is often achieved due to the advantages with the ease of installation.

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