PSC Tech Topics

Understanding Coupling Balance

Why Choose PSC Disc Couplings?

- Longer equipment life with industry leading high torque density and low restoring forces
- Quick and easy installation with self piloting, fully assembled, and collapsible disc pack cartridges
- Better balance with precisely manufactured components and piloting features

PSC Couplings

www.psccouplings.com

What does balancing a coupling mean?

Balancing a coupling is putting the center of mass closer to the center of rotation. There are two main options manufacturer have to accomplish this:

- Option #1 - Manufacture use tight tolerances, tight fits, and proper geometric controls.
- Option #2 – Correct the imbalance after manufacturing by drilling holes in the coupling face. This weight removal process is similar to how car tire assemblies are balanced. However, instead of adding wheel weights, holes are drilled to remove weight.

Types of Imbalance

There are two main types of balance:

1. Potential Imbalance

The standard generally governing this is ANSI-AGMA 9000. This balancing protocol is more of a manufacturing standard. It involves the maximum potential misalignment of the axis of rotation to the center mass of rotation measured in micro-inches. With this standard, no matter what size the coupling is or speed the coupling operates the potential imbalance in micro inches is the same for each class balance. Also, the increased weight can increase the vibratory loads on connected equipment and decrease bearing and seal life.

2. Residual Imbalance

The standard generally governing this is ISO 1940. This balancing protocol is the actual balance of the coupling that is being shipped. This standard is a velocity measurement based on the distance between the axis of rotation and the center mass of rotation. This standard is predicated on the speed of the coupling in operation. So, if two identical couplings were rotating at different speeds in operation but were balanced to the same ISO 1940 G2.5, the faster coupling would have a tighter balance in order to meet the ISO standard.

Key Differences between Residual Balancing (ISO) and Potential Balancing (AGMA)

Any coupling can be residually balanced. Because of this, most manufacturers just residually balance everything. This allows them to make loose tolerance low, cost parts then just correct the imbalance. The big problem with this is the lack of part interchangeability. Once you drive down the residual imbalance of a coupling assembly, it is now a unit that cannot be switched and swapped with other spare parts. This can make proper coupling maintenance a real headache as well as costly. A true AGMA coupling has completely interchangeable components. This means all parts are manufactured with tight geometric tolerances to insure the center of mass is as close to the center of rotation as possible.

Specifying a Coupling Balance

Prior to ordering an AGMA Class coupling, make sure to ask for the balancing calculations. This is a simple root mean square analysis of the manufacturing tolerances. This analysis determines whether or not the coupling is actually AGMA Class compliant.

As an example, a great step to insure a true AGMA Class 9 rated coupling is being supplied is to ask for a barrel to bore run out of 0.002” or outer flange to Bore run-out of 0.002”. This simple request will instantly tell if you are really receiving a true AGMA Class 9 coupling.