Baldor•Dodge Disc Couplings: Coupling Requirements in API Standard 610

C.O. Engineering - Bearings and PT Components
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The American Petroleum Institute (API) is a national trade association which represents the oil and natural gas industries of America. Members of API include producers, refiners, suppliers, service and supply companies, etc. API is a leader in developing petroleum and petrochemical equipment operating standards. Currently, API maintains over 500 standards with API 610 being one of them. The API 610 standard specifies the centrifugal pump requirements for the petroleum, petrochemical, and natural gas industries. Within API 610 are specifications for couplings used on this equipment. This paper will outline the API 610 specifications, and explain how the Baldor•Dodge Disc Coupling meets the requirements. Specific API 610 standards are called out with parenthesis at the end of each related description. This paper is intended for the use as a reference and does not claim to encompass the API 610 specifications completely.

Section 7.2 of the API 610 standard describes the specifications for couplings used in the petroleum and petrochemical field. The API 610 standard specifies that all flexible elements be of corrosion-resistant material, and that the hub assemblies be made of steel. The Baldor•Dodge Disc Coupling consists of two disc packs which function as the flexible element for the coupling and are manufactured from 301 Stainless Steel. Grade 301 Stainless Steel has good resistance to corrosion in applications which involve external exposure to mildly corrosive conditions at ambient temperatures (API 610 7.2.2.a). The hubs, spacer, bushings, and guard rings of the Baldor•Dodge Disc Coupling are all made from 1045 steel, which is a medium carbon steel with greater strength and hardness than low carbon or stainless steel (API 610 7.2.2.c).

The API 610 standard also requires that the coupling be designed to reduce the chance of ejection of the spacer assembly if the flexible elements should fail. The Baldor•Dodge Disc Coupling accomplishes this by positively retaining the spacer assembly with piloted hubs. The guard rings for the coupling are also piloted to retain the spacer center tube. Figure 1 shows the piloted hubs and how they interact with the spacer assembly.

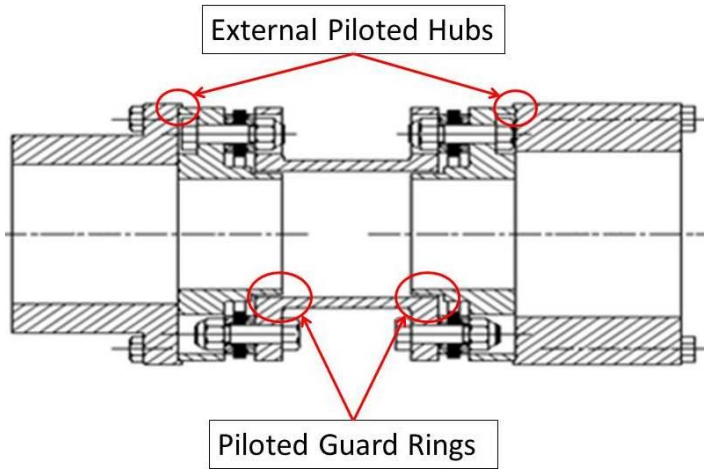

Figure 1: Piloted hubs and guard rings that provide anti-flail protection.

The combination of the piloted hubs and piloted guard rings creates a positive retention mechanism that will retain the spacer element if the disc should rupture and will prevent it being ejected from the assembly in the event of a failure (API 610 7.2.2.b).

Baldor•Dodge Disc Couplings are offered with spacer sizes which meet or exceed the 125mm (5in) minimum distance between shaft ends. This allows for the removal of the coupling, pump bearing housing, bearings, seal assembly, or other components without moving the driver or pump (API 610 7.2.2.d). Baldor•Dodge also offers spacer assembly sizes smaller than the 125mm requirement for equipment that has a smaller BSE and does not require an API spacer length.

If properly sized, the Baldor•Dodge Disc Coupling is capable of handling the nominal and peak torque loads of an application. The couplings can further be sized with service factors for the applications, and can act as a mechanical fuse for the system preventing any damage to the application if an overload torque should be applied (API 610 7.2.7). Each of the Baldor•Dodge Disc Coupling hubs are provided with a standard sized keyways in accordance with AGMA 9002 standards. These standards dictate the proper key size and scribe height according to the bore diameter size (API 610 7.2.6). Standard hubs are provided with either a clearance fit bore for easy removal or an interference fit bore for applications which require higher torque transmission and more stringent balance requirements. Either of these fits can be specified by the costumer. Baldor•Dodge also has the option to provide additional share attachment methods on a made to order (MTO) basis (API 610 7.2.11). Popular examples of these shrink discs and keyless locking assemblies.

All hubs for the Baldor•Dodge Disc Coupling, no matter the shaft attachment method, come with two tapped removal holes, or puller holes, to assist in removing the hubs from the shafts after installation. Figure 2 shows the placement of the removal holes on a standard hub size as well as the installation holes (API 610 7.2.9).

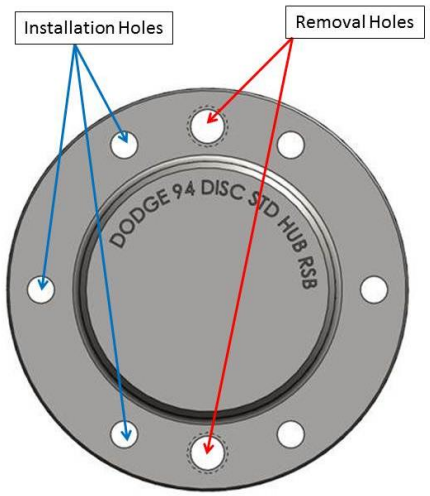

Figure 2: Removal Hole Locations for Baldor•Dodge Standard Disc Hub.

The API 610 standard requires that all couplings meet AGMA Class 9 balance specifications. Any coupling operating in excess of 3,800 RPM must meet API 671/ISO 10441 balance requirements. Baldor•Dodge Disc Couplings up to size 210 are capable of running at speeds in excess of 3,800 rpm without balancing. Sizes 236 and larger operating in excess of 3,800 RPM, must be balanced per API 671/ISO 10441.

All Baldor•Dodge disc couplings can be balanced and manufactured to meet API 610, API 671/ISO 10441 and ISO 1940-1 grade G6.3 standards if specified by the costumer (API 610 7.2.2.f, 7.2.3, 7.2.4). In addition to component balancing, Baldor•Dodge also has the capabilities to assembly balance the Baldor•Dodge Disc Coupling to AGMA 10 and AGMA 11 standards.