

## INDUSTRY STANDARDS REFERENCED

AGMA 9002-B04 - BORES AND KEYWAYS FOR FLEXIBLE COUPLINGS (INCH SERIES)  
 AGMA 9112-A04 - BORES AND KEYWAYS FOR FLEXIBLE COUPLINGS (METRIC SERIES)  
 AGMA 922-A96 - LOAD CLASSIFICATION AND SERVICE FACTORS FOR FLEXIBLE COUPLINGS  
 API610 / ISO 13709 - CENTRIFUGAL PUMPS FOR PETROLEUM, PETROCHEMICAL AND NATURAL GAS INDUSTRY, 11th Edition - Torsiflex-i meets the requirements of API610, 11th Edition when supplied with interference fit bores.  
 API671 / ISO 10441 - SPECIAL PURPOSE COUPLINGS FOR PETROLEUM, CHEMICAL AND GAS INDUSTRY SERVICES, 4th Edition  
 NEMA MG1 14.38, MG1 20.81 AND MG1 21.82 - All Form-Flex® & Torsiflex-i flexible disc couplings meet these standards without the addition of a limited end float device.

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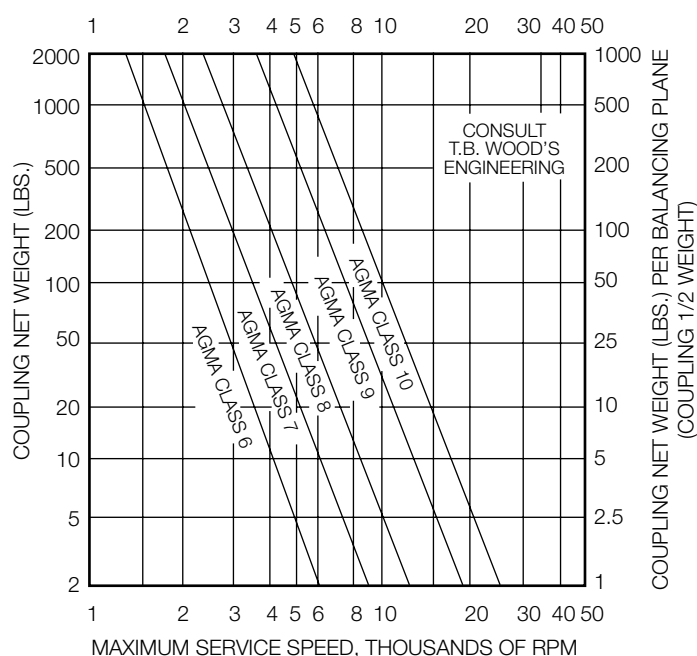
## DYNAMIC BALANCING RECOMMENDATIONS

Use this graph to determine the appropriate balance class based on coupling weight and operating speed. The balance classes listed on the graph are for equipment with average sensitivity to coupling unbalance. The user should determine how sensitive the equipment train is to coupling unbalance. Use one balance class higher if your system has higher than average sensitivity to unbalance. Use one balance class lower if your system has lower than average sensitivity to unbalance. Use this guide to check your coupling selection against the recommended balance class for your operating conditions.

The following factors should be considered when determining a machine's sensitivity to coupling unbalance.

- 1) Shaft End Deflection: Machines having flexible shaft extensions are relatively sensitive to coupling unbalance.
- 2) Bearing Load Due to Coupling Weight Relative to Total Bearing Load: Machines having lightly loaded bearings, bearings that are primarily loaded by the weight of the coupling or other overhung weight are relatively sensitive to coupling unbalance.
- 3) Bearing, Bearing Support and Foundation Flexibility: Machines or systems with flexible foundations for supports for the rotating elements are relatively sensitive to coupling unbalance.
- 4) System Natural Frequencies: Machines operating at or near natural frequencies are sensitive to coupling unbalance.
- 5) Machine Separation: System having widely separated machines are relatively sensitive to coupling unbalance.
- 6) Shaft Extension Relative to Bearing Span: Machines having a short bearing span relative to their shaft extensions are sensitive to static unbalance.

BALANCE CLASS SELECTION CHART



## HOW FLEXIBLE DISC COUPLINGS ACCOMMODATE MISALIGNMENT

Double flexing metal disc couplings may be used to accommodate angular, parallel and axial misalignment. Single flexing couplings may only be used to accommodate angular and axial misalignment. A metal disc type coupling uses a double hinge effect through two flexible discs and the spacer to compensate for parallel offset misalignment between shafts. Parallel misalignment imposes the same angular deflection (A) on each flex disc. Angular misalignment of either connected shaft, (B), creates additional angular deflections which are added to the angular offset due to parallel misalignment. The total misalignment angle, (C), at the flex disc is equal to the angular offset due to parallel misalignment (A) plus the angular offset due to angular misalignment (B). The maximum misalignment angle (C) should never exceed the rated misalignment capacity of the coupling type being used. Machinery equipment changes in actual operation and over the life of the equipment. We recommend that the machinery misalignment be set as close to zero as possible when a coupling is installed. We recommend keeping the measured misalignment below 25% of the rated misalignment capacity of the coupling type used when the machinery is installed and aligned. The remaining coupling misalignment capacity will then be available to accommodate additional misalignment caused by foundation shifts, vibrations, thermal growth or other causes.

