WKM® DynaCentric®
High Performance Butterfly Valves
TABLE OF CONTENTS

WKM® DYNACENTRIC®
HIGH PERFORMANCE BUTTERFLY VALVES

Introduction ................................................................................................................. 3
Features and Benefits ................................................................................................. 4
Are Readily Automated .............................................................................................. 7
Special Service Valves ............................................................................................... 8

PRODUCT SPECIFICATIONS
Standard and Compliance ......................................................................................... 9
How to Order ............................................................................................................... 9
Standard Materials ..................................................................................................... 10
Seat / Seal Material Codes and Ratings ...................................................................... 12
Pressure / Temperature Ratings .................................................................................. 13
Valve Sizing Formulas ............................................................................................... 14
Flow Characteristics ................................................................................................... 15
Torque Values ............................................................................................................. 16
Dimensional Data ........................................................................................................ 18
Actuators ..................................................................................................................... 21
Material Selection Guide ............................................................................................ 22
Aftermarket Services .................................................................................................. 26
Trademark Information ............................................................................................... 27
Cameron’s Valves & Measurement (V&M) group is a leading provider of valves and measurement systems to the oil and gas industry. The group’s products are primarily used to control, direct and measure the flow of oil and gas as it is moved to refineries, petrochemical plants and industrial centers for processing.

The Distributed Valves division provides valves products that are sold through distributor networks worldwide, for use in both oil and gas and industrial applications and include such widely recognized brand names as WKM®, DEMCO®, NAVCO®, NUTRON®, TEXSTREAM™, THORNHILL CRAVER®, TECHNO® and WHEATLEY®.

The WKM brand is recognized throughout the world for durable, reliable and flexible valves built for many challenging situations. The WKM product line offers a broad line of valves including ANSI gate valves, DynaSeal ball valves and Dynacentric and Series E butterfly valves, all built to exacting standards for demanding applications.
WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES
FEATURES AND BENEFITS

Model MB-1 (Wafer)

Model MB-1 (Lug)
The DynaCentric High Performance Butterfly Valve brings low cost and light weight to high pressure water, oil, steam, gas and slurry applications. These valves satisfy a wide range of industrial applications and are available in carbon steel or stainless steel as well as lug and wafer body styles.

DynaCentric high performance butterfly valves offer the high performance of ball and gate valves with the low-cost, lightweight benefits of a butterfly valve design.

Engineered for heavy-duty, maintenance free performance, the DynaCentric high performance butterfly valve is most commonly selected for the following applications:

- Chemical and petrochemical processing
- Utilities
- Pulp and paper
- Oil and gas production
- Fuel handling systems
- Air conditioning and refrigeration
- Marine

FEATURES AND BENEFITS

Two Body Styles

Flangeless wafer and threaded lug styles are available.

Heavy Duty Disc

Designed to withstand the higher stresses associated with high pressure applications. Wide disc edge provides greater sealing area.

Thrust Bearing / Disc Spacer

A corrosion resistant, single component thrust bearing / disc spacer reduces body wear and assures positive centering of disc in the valve bore.

Internal Stop

Prevents disc over-travel and seat damage caused by disc over-travel. Assures proper disc alignment in closed position.

Deep stuffing box for extended life

Deep stuffing box design includes stainless steel fasteners as standard and is available with TFE Chevron or high temperature compression packing for long life and positive stem seal. Live loaded packing assemblies available upon special request.

Lower Stem Disc Spring

Lower stem disc springs allow for thermal expansion and provides constant grounding.

Disc Design Reduces Seat Wear

Precision machined from carbon or alloy steels, the rugged valve disc is designed for gradual engagement into seat to prevent pinching or cutting. Eccentric positioning of stem allows disc to swing free of seat in open position, reducing operating torque and wear. Special surface coatings such as Stellite overlay are available for critical or severe service conditions.
Positively Retained Stem
Prevents Blowouts

The tamper-proof design not only meets but exceeds the requirements of ASME B16.34. The disc, disc pins and stem design meet ASME requirements for maximum torsional and bending stress. Additional blowout prevention is provided by stem retainer pins inserted in the stem below the stuffing box.

Three Seat Designs

The standard TFM™ seat (S02) is bi-directional with an extended pressure responsive sealing lip. The S02 seat design is capable of drop tight sealing to 740 psi.

The patented fire tested, bi-directional metallic seats with TFM™ seat insert (F02) provide a metal-to-metal pressure responsive triple seal. DynaCentric high performance butterfly valves with the F02 seat design and high temperature seals have been fire tested and are qualified to meet the stringent requirements of API 607 4th edition. This unique design provides fire test capabilities regardless of flow direction. The F02 seat design is capable of drop tight sealing to 1480 psi.

DynaCentric high performance butterfly valves constructed of 316 stainless steel and assembled with the proper trims and Ni-Cr alloy (UNS 6625) seats (M03) are capable of handling temperatures to 1000° F (538° C). Metal seats of 316 SS (M01) and are suitable for temperatures to 750° F (399° C).
WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES
ARE READILY AUTOMATED

Specifications
See page 9 for technical specifications

Sizes
• 2 1/2 in. through 36 in. (65 mm through 900 mm)
• Working pressure ASME Class 150, 2 1/2 in. through 36 in. (65 mm through 900 mm)
• ASME class 300, 2 1/2 in. through 24 in. (65 mm through 600 mm)
• ASME class 600, 3 in. through 12 in. (80 mm through 300 mm)

Operating Temperatures
• Up to 1000°F (538°C)

Body Styles
• Flangeless Wafer, threaded lug

Standard Materials
• Body – Carbon steel, stainless steel
• Stem – 17-4 Stainless steel
• Disc – Stainless steel
• Seat – SO2 - TFM™
  • F02 - Fire tested
  • M01/ M03 - Metal seat

Optional Materials
• Seat / seal trims available for hundreds of different ladings. Additional materials listed on page 9.
WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES

SPECIAL SERVICE VALVES

High Temperature
DynaCentric high performance butterfly valves for high temperature service are equipped with a 316 stainless steel seat (M01), 316 stainless steel stem bearings and high temperature seals.

This seat / seal combination is rated up to 750° F (399° C) in carbon steel bodies. Ni-Cr alloy (UNS 6625) seats (M03) and stainless steel bodies can be utilized up to 1000° F (538° C). Leakage rates for metal seated valves can be provided within the service limits of ASME / FCI 70-2 class V on request.

Standard leakage rate of metal seated valves is less than .005 ml / psi / NPS.

Valves furnished with this seat perform well in steam, hot oil and heat transfer fluids.

Vacuum Service
The drop-tight sealing capabilities of these valves make them an excellent selection for vacuum service.

S01, S02, and F02 seat-seal codes are suitable for vacuum service to 20 microns absolute.

Inverted packing configuration is available on request.

Sour Oil and Gas Service
DynaCentric high performance butterfly valves with sour gas trims are available for H2S service in accordance with NACE MR0175, 2002.

Low Temperature Service
DynaCentric high performance butterfly valves for temperatures to -50° F (-46° C) are available in both 316 stainless steel construction and low temperature carbon steel.

Oxygen Service

DynaCentric high performance butterfly valves provide the positive shut-off and tight sealing necessary for gaseous oxygen service. Due to the risk of explosion and fire inherent in such service, positive grounding for the disc and stem with the belleville disc springs are standard.

Positive safeguards have been established in order to conform to the requirement that valves for oxygen service must be completely free of oil, grease, combustible material, slag, metal shavings, paint, rust or various fibers.

All parts are cleaned of contaminants with solvent and inspected under black light.

After assembly and testing with nitrogen, each valve is individually tagged and sealed in a polyethylene bag.

Valves for such service may be supplied in most materials, but 316 stainless steel or Ni-Cu alloy (UNS 5500) are recommended.

Steam Service
DynaCentric high performance butterfly valves are ideally suited for applications in steam service. Reinforced TFM™ seats (S02) with high temperature packing are the standard stem service seal materials.

For higher saturation pressures, 316 stainless steel seats with TFM™ inserts (F02) are available.

The combination of rotary operation, streamlined flow and positive shut-off can result in years of maintenance free service without the seizures on cool-down, flashing or stem leakage associated with conventional globe or gate valves.

Enhanced Fugitive Emission Control
The valve stuffing box can be modified for live loaded packing assemblies.
DynaCentric High Performance Butterfly valves comply with the following design and testing standards:

- ASME B16.5 (Steel pipe flanges and flange fittings)
- ASME B16.34 (Steel valves)
- ASME/FCI 70-2 (Control valve seat leakage)
- MSS-SP-6 (Standard finishes for pipe flanges)
- MSS-SP-25 (Standard marking system for valves)
- MSS-SP-55 (Quality standard for steel castings)
- MSS-SP-68
- United States Coast Guard category (A) acceptance

In addition, DynaCentric high performance butterfly valves can be supplied to comply with these standards:

- ASME B31.1 (Power piping)
- ASME B31.3 (Chemical plant and petroleum refinery piping)
- MSS-SP-61 (Pressure testing of steel valves)
- API 609, API 598 (Valve inspection and testing)
- API 607 4th Edition (Fire test specifications)
- CE PED (Pressure equipment directive) 97 / 23 / EC

DynaCentric high performance butterfly valves trimmed for sour gas service in accordance with NACE MR0175, 2002 are available in both carbon steel and alloy construction.

HOW TO ORDER

<table>
<thead>
<tr>
<th>Size in. (mm)</th>
<th>Class</th>
<th>Material Style</th>
<th>Body Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 1/2 (65)</td>
<td>1 = 150</td>
<td>1 = CS</td>
<td></td>
</tr>
<tr>
<td>3 (80)</td>
<td>6 = 300</td>
<td>2 = SS</td>
<td></td>
</tr>
<tr>
<td>4 (100)</td>
<td>3 = 600</td>
<td>3 = CS2</td>
<td></td>
</tr>
<tr>
<td>5 (125)</td>
<td>4 = 600</td>
<td>4 = CS2</td>
<td></td>
</tr>
<tr>
<td>6 (150)</td>
<td>5 = 600</td>
<td>5 = LCC</td>
<td></td>
</tr>
<tr>
<td>8 (200)</td>
<td>6 = 600</td>
<td>6 = CS2</td>
<td></td>
</tr>
<tr>
<td>10 (250)</td>
<td>7 = 600</td>
<td>7 = LCC</td>
<td></td>
</tr>
<tr>
<td>12 (300)</td>
<td>8 = 600</td>
<td>8 = CS2</td>
<td></td>
</tr>
<tr>
<td>14 (350)</td>
<td>9 = 600</td>
<td>9 = LCC</td>
<td></td>
</tr>
<tr>
<td>16 (400)</td>
<td>10 = 600</td>
<td>10 = CS2</td>
<td></td>
</tr>
<tr>
<td>18 (450)</td>
<td>11 = 600</td>
<td>11 = LCC</td>
<td></td>
</tr>
<tr>
<td>20 (500)</td>
<td>12 = 600</td>
<td>12 = CS2</td>
<td></td>
</tr>
<tr>
<td>24 (600)</td>
<td>13 = 600</td>
<td>13 = LCC</td>
<td></td>
</tr>
<tr>
<td>30 (750)</td>
<td>14 = 600</td>
<td>14 = CS2</td>
<td></td>
</tr>
<tr>
<td>36 (900)</td>
<td>15 = 600</td>
<td>15 = LCC</td>
<td></td>
</tr>
</tbody>
</table>

* MODEL / SIZE AVAILABILITY:

Model B 2 1/2 in. and 5 in. (65 mm and 125 mm)

- class 150 and class 300 lug
- 4 in. and 6 in. (100 mm and 150 mm)
- through 24 in. (600 mm) class 150 and class 300 lug and wafer
- 3 in. (80 mm) class 150, class 300 and class 600 lug and wafer 36 in. (900 mm) class 150 lug

Model A 4 in. and 6 in. (100 mm and 150 mm) through 12 in. (300 mm) class 600 lug and wafer 30 in. (750 mm) class 150 lug

1. Controlled hardness carbon steel (H2S service).
2. Valves equipped with 316 SS stems may require derating depending on size and class. See page 13 for actual valve ratings.

Model Numbers

- MA-1 / MB-1 Standard HPBFV Assembly
- MA-2 / MB-2 Standard HPBFV Assembly with MTR’s
- MA-3 / MB-3 CE compliant HPBFV Assembly

NOTE: Other materials of construction and valve options are available on application.

** Wafer valves 2 1/2 in. - 12 in. (65 mm - 300 mm) come standard with an unbolted inset seat retainer, held firmly in place for shipping and handling by an interference fit O-ring retention design (see page 10). By design, the seat retainer is secured in place by the piping flange during normal installation procedure.
**WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES**

**MB-1 DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES**

2 1/2 in. through 24 in. (65 mm through 600 mm) ASME CLASSES 150 & 300

3 in. (80 mm) ASME CLASS 600, 36 in. (900 mm) ASME CLASS 150

### Material List

<table>
<thead>
<tr>
<th>No.</th>
<th>PART</th>
<th>CARBON STEEL</th>
<th>STAINLESS STEEL</th>
<th>CARBON STEEL (H2S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>A216 Gr. WCC</td>
<td>A351 Gr. CF8M</td>
<td>A216 Gr. WCC RC-22</td>
</tr>
<tr>
<td>2</td>
<td>Seat Retainer</td>
<td>A516 Gr. 70</td>
<td>A276 Type 316</td>
<td>A516 Gr. 70 RC-22</td>
</tr>
<tr>
<td>3</td>
<td>Seat Retainer O-Ring</td>
<td>Nitrile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3a</td>
<td>Seat Retainer Screw</td>
<td>A193 Gr. B7</td>
<td>18-8 SS</td>
<td>18-8 SS</td>
</tr>
<tr>
<td>4</td>
<td>Stem/Disc Spring</td>
<td>TFE/Steel</td>
<td>Teflon/316 SS</td>
<td>Teflon/316 SS</td>
</tr>
<tr>
<td>5</td>
<td>Nameplate</td>
<td>18-8 SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Gland Retainer</td>
<td>Carbon Steel</td>
<td>Stainless Steel</td>
<td>Carbon Steel</td>
</tr>
<tr>
<td>7</td>
<td>Gland Retainer Stud</td>
<td>18-8 SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Gland Retainer Nut</td>
<td>18-8 SS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Bottom Cover</td>
<td>Carbon Steel</td>
<td>Stainless Steel</td>
<td>Carbon Steel RC-22</td>
</tr>
<tr>
<td>10</td>
<td>Bottom Cover Gasket</td>
<td>Composite Fiber</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Bottom Cover Screw</td>
<td>A193 Gr. B7</td>
<td>18-8 SS</td>
<td>A193 Gr. B7</td>
</tr>
</tbody>
</table>

**Body Group Trim Number**

**Internal Group Trim Number**

**Seal Group Trim Code (Note Pressure Classes)**

<table>
<thead>
<tr>
<th></th>
<th>BODY</th>
<th>INTERNAL</th>
<th>SEAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Seat</td>
<td>See Note (1)</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Packing Set</td>
<td>TFE VEE, High Temperature, Graphitized or Grafoil</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE (1) Seat assemblies consist of the following:**

- **TYPE S** - Class 150 - Virgin TFE (available in class 150 only) Standard class 150 and 300 - TFM™
- **TYPE F** - Metal, fire tested, class 150, 300 and 600 - Stainless steel with TFM™ Insert - STD Seat for all class 600 valves
- **TYPE M** - Metal, high temperature, class 150, 300 and 600 - 316 Stainless steel with 316 Stainless steel insert

*Hard chrome plated on F02, M01 and M03*

One-piece stem 2 1/2 in. (65 mm) through 12 in. (300 mm) class 300

- Two-piece stem 12 in. (300 mm) class 600 through 36 in. (900 mm) class 150
- 10 in. (250 mm) class 300, 12 in. (300 mm) class 150 and 300, 14 in. (350 mm) - 36 in. (900 mm) class 150

**TYPICAL VALVE CONSTRUCTION SHOWN - SOME SIZES MAY VARY**
WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES

MA-1 DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES

4 in., 6 in., 8 in., 10 in., 12 in. (100 mm, 150 mm, 200 mm, 250 mm, 300 mm) ASME CLASS 600
30 in. (750 mm) ASME CLASS 150

Material List

<table>
<thead>
<tr>
<th>No.</th>
<th>PART</th>
<th>CARBON STEEL</th>
<th>STAINLESS STEEL</th>
<th>CARBON STEEL (H2S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>A216 Gr. WCC</td>
<td>A351 Gr. CF8M</td>
<td>A216 Gr. WCC RC-22</td>
</tr>
<tr>
<td>2</td>
<td>Seat Retainer</td>
<td>A516 Gr. 70</td>
<td>A276 Type 316</td>
<td>A516 Gr. 70 RC-22</td>
</tr>
<tr>
<td>3</td>
<td>Seat Retainer Screw</td>
<td>A193 Gr. B7</td>
<td>18-8 SS</td>
<td>18-8 SS</td>
</tr>
<tr>
<td>4</td>
<td>Stem/Disc Spring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Stop Pin (4 in. (100 mm) through 10 in. (250 mm) only)</td>
<td>Carbon Steel</td>
<td>316 SS</td>
<td>316 SS</td>
</tr>
<tr>
<td>6</td>
<td>Stop Pin Plug (4 in. (100 mm) through 10 in. (250 mm) only)</td>
<td>TFE/Steel</td>
<td>Teflon/316 SS</td>
<td>Teflon/316 SS</td>
</tr>
<tr>
<td>7</td>
<td>Stem Bearing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Nameplate</td>
<td>Carbon Steel</td>
<td>Stainless Steel</td>
<td>Carbon Steel</td>
</tr>
<tr>
<td>9</td>
<td>Gland Retainer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Gland Retainer Stud</td>
<td>Carbon Steel</td>
<td>18-8 SS</td>
<td>18-8 SS</td>
</tr>
<tr>
<td>11</td>
<td>Gland Retainer Nut</td>
<td>Stainless Steel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Body Gasket</td>
<td>See Note (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Bottom Cover Plate</td>
<td>Carbon Steel</td>
<td>Stainless Steel</td>
<td>Carbon Steel RC-22</td>
</tr>
<tr>
<td>14</td>
<td>Bottom Cover Gasket</td>
<td>Composite Fiber</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Stem Bearing</td>
<td>A193 Gr. B7</td>
<td>18-8 SS</td>
<td>A193 Gr. B7</td>
</tr>
</tbody>
</table>

Internal Group Trim Number

<table>
<thead>
<tr>
<th>No.</th>
<th>PART</th>
<th>CARBON STEEL</th>
<th>STAINLESS STEEL</th>
<th>CARBON STEEL (H2S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Upper Stem</td>
<td>A564 Type 630, H1150 + H1150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Disc</td>
<td>A216 Gr. WCC**</td>
<td>A351 Gr. CF8M*</td>
<td>A351 Gr. CF8M*</td>
</tr>
<tr>
<td>15</td>
<td>Lower Stem</td>
<td>A564 Type 630, H1150 + H1150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Stem Pins</td>
<td>A564 Type 630, H1150 + H1150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Disc Spacer</td>
<td></td>
<td>316 SS</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Stem Key (6 in. (150 mm) and larger)</td>
<td></td>
<td>Carbon Steel</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Stem Retainer Pins</td>
<td></td>
<td>316 SS</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Packing Spacer</td>
<td></td>
<td>316 SS</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Gland Ring</td>
<td></td>
<td>316 SS</td>
<td></td>
</tr>
</tbody>
</table>

Seal Group Trim Code (Note Pressure Classes)

<table>
<thead>
<tr>
<th>No.</th>
<th>PART</th>
<th>Trim code</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Seat</td>
<td>See Note (1)</td>
</tr>
<tr>
<td>23</td>
<td>Packing Set</td>
<td>TFE VEE, High Temperature, Graphitized or Grafoil</td>
</tr>
</tbody>
</table>

NOTE (1) Seat assemblies consist of the following:

**TYPE S** - Class 150 only - Virgin TFE, class 150 and 300 - TFM™
**TYPE F** - Metal, fire tested, class 150, 300 and 600 - Stainless steel with TFM™ Insert - STD seat for all class 600 valves
**TYPE M** - Metal, high temperature, class 150, 300 and 600 - 316 Stainless steel with 316 Stainless steel insert

NOTE (2) Standard valves do not require body gaskets. F02 fire tested, fire safe and high temperature, M01/M03 valves are equipped with composite fiber body gaskets.

* Hard chrome plated on F02, M01 and M03
** Electroless Nickel plated 14 in. through 30 in. (350 mm through 750 mm)
▲ One-piece stem 2 1/2 in. (65 mm) through 12 in. (300 mm) class 300. Two-piece stem 12 in. (300 mm) class 600 through 36 in. (900 mm) class 150
▲ 8 in. (200 mm), 10 in. (250 mm), 12 in. (300 mm) class 600, 30 in. (750 mm) class 150

TYPICAL VALVE CONSTRUCTION SHOWN - SOME SIZES MAY VARY
WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES
SEAT SEAL MATERIAL CODES AND RATINGS

Material Codes
This chart is an abbreviated guide to the chemical resistance and pressure temperature limitations of seat seal materials used in DynaCentric high performance butterfly valves.

<table>
<thead>
<tr>
<th>SEAL CODE</th>
<th>SEAT MATERIAL</th>
<th>ASME/FCI 70-2 SHUTOFF CLASS</th>
<th>SERVICE APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>S01</td>
<td>TFE</td>
<td>6 (VI)</td>
<td>Seats are virgin TFE. Use where lading contamination from glass or other fillers is not desirable, such as in food service. Available in class 150 valves only. Temperature range is -50°F to 400°F (-46°C to 204°C). Drop tight.</td>
</tr>
<tr>
<td>S02</td>
<td>TFM™</td>
<td>6 (VI)</td>
<td>Seat material is TFM™ with inert materials for use at elevated temperatures and pressures. Same chemical resistance as Virgin TFE except slightly affected by hot alkaline solutions. Suitable for saturated steam to 200 psig.** Temperature range is -50°F to 500°F (-46°C to 260°C). Drop tight.</td>
</tr>
<tr>
<td>F02</td>
<td>SS / TFM™</td>
<td>6 (VI)</td>
<td>Seat consists of stainless steel rings with a TFM™ insert. Recommended trim for fire test applications and for higher pressure steam service.** Temperature is -50°F to 500°F (-46°C to 260°C). Drop tight.</td>
</tr>
<tr>
<td>F03</td>
<td>Ni-Cr Alloy (UNS 6625) / TFM™</td>
<td>6 (VI)</td>
<td>Seat consists of Ni-Cr alloy (UNS 6625) with a TFM™ insert. Recommended trim for fire test applications and for higher pressure steam service.** Temperature range is -50°F to 500°F (-46°C to 260°C). Drop tight.</td>
</tr>
<tr>
<td>M01</td>
<td>316 SS</td>
<td>*</td>
<td>Recommended trim for superheated steam above 250 psi, hot oils and gases and temperatures to 750°F (399°C). Pressure / temperature range is same as body rating. Meets ASME/FCI 70-2.</td>
</tr>
<tr>
<td>M03</td>
<td>Ni-Cr Alloy (UNS 6625)</td>
<td>*</td>
<td>Same as M01 but for temperatures from 750°F to 1000°F (399°C to 538°C).</td>
</tr>
</tbody>
</table>

* Standard leakage rate of metal seated valves is less than .005 ml / psi / NPS. Class V Shut-Off can be furnished on request.
** Consult factory for steam applications with higher pressure.

SEAT PRESSURE / TEMPERATURE LIMITATIONS
Seat ratings are based on differential pressures with the disc in the FULLY CLOSED position and refer to seat only. Body pressure / temperature ratings appear on page 13.
DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES

Valve Body Pressure Ratings

Pressure / Temperature Ratings For Dynacentric Valves Bodies* All pressures are PSIG

<table>
<thead>
<tr>
<th>TEMP °F</th>
<th>CLASS 150</th>
<th>CLASS 300</th>
<th>CLASS 600</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CS</td>
<td>LCC 316 SS</td>
<td>CS</td>
</tr>
<tr>
<td>-20 to 100</td>
<td>285</td>
<td>290</td>
<td>740</td>
</tr>
<tr>
<td>200</td>
<td>260</td>
<td>260</td>
<td>675</td>
</tr>
<tr>
<td>300</td>
<td>230</td>
<td>230</td>
<td>655</td>
</tr>
<tr>
<td>400</td>
<td>200</td>
<td>200</td>
<td>635</td>
</tr>
<tr>
<td>500</td>
<td>170</td>
<td>170</td>
<td>600</td>
</tr>
<tr>
<td>600</td>
<td>140</td>
<td>140</td>
<td>550</td>
</tr>
<tr>
<td>650</td>
<td>125</td>
<td>125</td>
<td>535</td>
</tr>
<tr>
<td>▲ 700</td>
<td>110</td>
<td>110</td>
<td>535</td>
</tr>
<tr>
<td>▲ 750</td>
<td>95</td>
<td>95</td>
<td>505</td>
</tr>
<tr>
<td>▲ 800</td>
<td>80</td>
<td>80</td>
<td>410</td>
</tr>
<tr>
<td>▲ 850</td>
<td>–</td>
<td>65</td>
<td>–</td>
</tr>
<tr>
<td>▲ 900</td>
<td>–</td>
<td>50</td>
<td>–</td>
</tr>
<tr>
<td>▲ 950</td>
<td>–</td>
<td>35</td>
<td>–</td>
</tr>
<tr>
<td>▲ 1000</td>
<td>–</td>
<td>20</td>
<td>–</td>
</tr>
</tbody>
</table>

* In accordance with ASME B16.34

Ratings shown above are maximum working pressure ratings for the valve body at various temperatures. Partial pressure limitations according to actual service conditions are determined by seat, trim and packing ratings.

Following are recommended temperatures limits for standard materials available in WKM DynaCentric high performance butterfly valves.

Stem Materials:
- ASTM A564 Type 630, H1150 + H1150, Ni-Cr Alloy UNS 7718, or Ni-Cu alloy UNS 5500.
- Ni-Cr Alloy UNS 7718 or Ni-Cu alloy UNS 5500.

NOTE: Valve with 17-4 PH stems are only recommended up to a maximum temperature of 650° F (343° C). Ni-Cr alloy UNS 7718 stems are required for temperatures above 650° F (343° C). Ni-Cu alloy UNS 5500 stems can be furnished for applications requiring high corrosion resistance and full ASME ratings.

Body Materials:
- Carbon steel - ASTM A516 Gr. 70, ASTM A216 Gr. WCB
- Low temperature CS- ASTM A352 Gr. LCC
- Stainless steel - ASTM A351 Gr. CF8M

NOTE: Carbon steel listed is not recommended for prolonged usage above 800° F (427° C).

Maximum shut-off pressures for DynaCentric valves with 316 SS Stems (CWP)

<table>
<thead>
<tr>
<th>Size in.</th>
<th>△P MAX - 316 SS STEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class 150</td>
</tr>
<tr>
<td>2 1/2</td>
<td>285</td>
</tr>
<tr>
<td>3</td>
<td>285</td>
</tr>
<tr>
<td>4</td>
<td>285</td>
</tr>
<tr>
<td>5</td>
<td>285</td>
</tr>
<tr>
<td>6</td>
<td>285</td>
</tr>
<tr>
<td>8</td>
<td>285</td>
</tr>
<tr>
<td>10</td>
<td>180</td>
</tr>
<tr>
<td>12</td>
<td>250</td>
</tr>
<tr>
<td>14</td>
<td>200</td>
</tr>
<tr>
<td>16</td>
<td>285</td>
</tr>
<tr>
<td>18</td>
<td>285</td>
</tr>
<tr>
<td>20</td>
<td>285</td>
</tr>
<tr>
<td>24</td>
<td>285</td>
</tr>
<tr>
<td>30</td>
<td>285</td>
</tr>
<tr>
<td>36</td>
<td>285</td>
</tr>
</tbody>
</table>

Seal Group:
- S01-TFE 350° F (400° F intermittent)
- S02-TFM™ 450° F (500° F intermittent)
- F02-SS / TFM™ 450° F (500° F intermittent)
- F03-Ni-Cr / TFM™ 450° F (500° F intermittent)
- M01-316 SS 750° F
- M03-Ni-Cr 1000° F

Trim Group:
- 01-Cs Disc/17-4 Stem 650° F
- 02-SS Disc/17-4 Stem 650° F
- 03-SS Disc/Ni-Cr Stem 700° F
- 04-Ni-Cu Disc/Ni-Cr Stem 750° F
- 05-SS Disc/316 Stem 700° F
- 06-SS Disc HF/6-17-4 Stem 650° F
- 07-SS Disc HF/6-Ni-Cr Stem 1000° F

Trim Group:
- 11 - TFE “V” 450° F
- 13 - High Temp Graphitized 700° F
- 14 - Grafoil 1000° F

* For trim group 08 through 13 consult factory for temperature limitations.

NOTE: Cold working pressures for DynaCentric butterfly valves with 316 SS stems are derated per table to the right. These derated pressures are based on torque with FO / MO seats downstream. Ni-Cr stems are available for those applications requiring higher working pressure with maximum corrosion resistance.
WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES

VALVE SIZING FORMULAS

Proper valve selection is dependent on several factors for both liquid and gas flow, as well as the physical limitations of the valve as established by the manufacturer.

The following information is presented for handy and quick reference. The flow coefficient ($C_V$) is the most universally accepted measure of a valve’s capacity to handle flow.

A dimensionless entity, $C_V$ is defined as the number of gallons per minute of water at standard conditions (60°F (16°C) and 14.7 psia) which will flow through a given flow restriction with a pressure drop of 1 psi.

Once determined, the $C_V$ of a valve provides a capacity index by which one is able to readily estimate the required size of a flow restriction for controlling the fluid flow of any system.

For Liquid Service:

$$C_V = \frac{Q_L}{\sqrt{S_g \Delta P}}$$

$$Q_L = C_V \sqrt{\frac{\Delta P}{S_g}}$$

$$\Delta P = S_g \left( \frac{Q_L}{C_V} \right)^2$$

For Steam Service (Superheated):

$$C_V = \frac{W (1 + 0.0007 T_s)}{2.1 \sqrt{\Delta P (P_1 + P_2)}}$$

$$W = 2.1 C_V \sqrt{\Delta P (P_1 + P_2)}$$

Cavitation

DynaCentric high performance butterfly valves, because of their inherently high flow capacities, have a greater tendency to cavitate at high pressure drops.

Cavitation occurs in liquids if the static pressure of the flowing liquid decreases to a value less than the fluid under pressure. This phenomenon can create accelerated wear and deterioration of valves and piping as well noise and vibration problems.

To avoid cavitation in piping, the following formula should be employed:

$$\Delta P_{max} = 0.33 (P_1 - P_v)$$

This formula can also be safely used where reducers are employed.

NOTE: Valve sizing program available at www.c-a-m.com under Transact Cameron Commerce.

For Gas Service:

$$C_V = \frac{Q_g \sqrt{S_g T_r}}{1360 \Delta P \times P_1}$$

$$Q_g = 1360 C_V \sqrt{\Delta P \times P_1}$$

$$\Delta P = \frac{S_g T_r}{P_1} \left( \frac{Q_g}{1360 C_V} \right)^2$$

For Steam Service (Saturated):

$$C_V = \frac{W}{2.1 \sqrt{\Delta P (P_1 + P_2)}}$$

$$W = 2.1 \sqrt{\Delta P (P_1 + P_2)}$$

Reducers

When valves are mounted between pipe reducers, a loss in valve capacity occurs with an additional pressure drop across the system due to contractions and sudden enlargements. This arrangement is often employed with DynaCentric high performance butterfly valves where the desired $C_V$ for the control valve results in a valve size that is smaller than the line size.

Use the following equation to obtain the corrected flow coefficients for the DynaCentric high performance butterfly valve when installed in combination with reducers.

$$C_{VR} = C_V \frac{1}{1 + 1.5 \left( \frac{1}{R} - \frac{d^2}{D^2} \right)^2}$$

Where:

- $C_V$ = valve flow coefficient
- $P_1$ = upstream pressure, psia
- $P_2$ = downstream pressure, psia
- $\Delta P$ = pressure drop $P_1 - P_2$, psi
- $Q_g$ = gas flow rate, SCFH
- $Q_L$ = liquid flow rate, U.S. gpm
- $S_g$ = specific gravity of fluid
- $T_r$ = temperature, °R (460 + °F)
- $T_s$ = steam superheat, °F
- $W$ = flow rate, lbs / hr
- $P_v$ = vapor pressure, psia

These formulas are generally accurate for gas flow where $\Delta P \leq .1 P_1$.

For $\Delta P > .1 P_1$, consult factory for assistance in sizing.
WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES

FLOW CHARACTERISTICS ($C_V$)

The practical control range of this type of valve occurs where continuous throttling can be effected without significant loss of accuracy or valve life.

The usable range for DynaCentric high performance butterfly valves is between 20° and 70° opening, resulting in a ratio of 10:1.

In sizing the DynaCentric high performance butterfly valve for throttling applications, a full open CV should be selected that is approximately 1.8 times the CV determined from calculations.

Under normal flow conditions, this selection will provide a valve opening of 50°-60°.

CV values equal the flow of water in U.S. gallons per minute per 1 psi pressure drop.

**Series 5100 Class 150**

<table>
<thead>
<tr>
<th>VALVE SIZE</th>
<th>DISC ANGLE, DEGREES OPEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>in. (mm)</td>
<td>20</td>
</tr>
<tr>
<td>2 1/2 (65)</td>
<td>8</td>
</tr>
<tr>
<td>3 (80)</td>
<td>14</td>
</tr>
<tr>
<td>4 (100)</td>
<td>31</td>
</tr>
<tr>
<td>5 (125)</td>
<td>54</td>
</tr>
<tr>
<td>6 (150)</td>
<td>85</td>
</tr>
<tr>
<td>8 (200)</td>
<td>174</td>
</tr>
<tr>
<td>10 (250)</td>
<td>300</td>
</tr>
<tr>
<td>12 (300)</td>
<td>440</td>
</tr>
<tr>
<td>14 (350)</td>
<td>523</td>
</tr>
<tr>
<td>16 (400)</td>
<td>659</td>
</tr>
<tr>
<td>18 (450)</td>
<td>885</td>
</tr>
<tr>
<td>20 (500)</td>
<td>1066</td>
</tr>
<tr>
<td>24 (600)</td>
<td>1554</td>
</tr>
<tr>
<td>30 (750)</td>
<td>2752</td>
</tr>
<tr>
<td>36 (900)</td>
<td>3963</td>
</tr>
</tbody>
</table>

**Series 5300 Class 300**

<table>
<thead>
<tr>
<th>VALVE SIZE</th>
<th>DISC ANGLE, DEGREES OPEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>in. (mm)</td>
<td>20</td>
</tr>
<tr>
<td>2 1/2 (65)</td>
<td>8</td>
</tr>
<tr>
<td>3 (80)</td>
<td>14</td>
</tr>
<tr>
<td>4 (100)</td>
<td>31</td>
</tr>
<tr>
<td>5 (125)</td>
<td>54</td>
</tr>
<tr>
<td>6 (150)</td>
<td>85</td>
</tr>
<tr>
<td>8 (200)</td>
<td>174</td>
</tr>
<tr>
<td>10 (250)</td>
<td>300</td>
</tr>
<tr>
<td>12 (300)</td>
<td>440</td>
</tr>
<tr>
<td>14 (350)</td>
<td>523</td>
</tr>
<tr>
<td>16 (400)</td>
<td>659</td>
</tr>
<tr>
<td>18 (450)</td>
<td>885</td>
</tr>
<tr>
<td>20 (500)</td>
<td>1066</td>
</tr>
<tr>
<td>24 (600)</td>
<td>1554</td>
</tr>
<tr>
<td>30 (750)</td>
<td>2752</td>
</tr>
<tr>
<td>36 (900)</td>
<td>3963</td>
</tr>
</tbody>
</table>

**Series 5600 Class 600**

<table>
<thead>
<tr>
<th>VALVE SIZE</th>
<th>DISC ANGLE, DEGREES OPEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>in. (mm)</td>
<td>20</td>
</tr>
<tr>
<td>3 (80)</td>
<td>14</td>
</tr>
<tr>
<td>4 (100)</td>
<td>23</td>
</tr>
<tr>
<td>6 (150)</td>
<td>67</td>
</tr>
<tr>
<td>8 (200)</td>
<td>155</td>
</tr>
<tr>
<td>10 (250)</td>
<td>241</td>
</tr>
<tr>
<td>12 (300)</td>
<td>336</td>
</tr>
</tbody>
</table>

NOTE: Valve sizing program available at www.c-a-m.com under Transact Cameron Commerce.
## WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES

### TORQUE VALUES

The torque values shown in these tables are net required operating torques for actuator sizing.

An appropriate safety factor is included for normal wet operating torque.

#### S0 Seats Upstream - Valve Torque (in. lb.)

<table>
<thead>
<tr>
<th>Size in. (mm)</th>
<th>2 1/2 (65)</th>
<th>3 (80)</th>
<th>4 (100)</th>
<th>5 (125)</th>
<th>6 (150)</th>
<th>8 (200)</th>
<th>10 (250)</th>
<th>12 (300)</th>
<th>14 (350)</th>
<th>16 (400)</th>
<th>18 (450)</th>
<th>20 (500)</th>
<th>24 (600)</th>
<th>30 (750)</th>
<th>36 (900)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50 psi</td>
<td>111</td>
<td>155</td>
<td>348</td>
<td>503</td>
<td>728</td>
<td>1125</td>
<td>2154</td>
<td>3291</td>
<td>4277</td>
<td>6334</td>
<td>8129</td>
<td>11685</td>
<td>15770</td>
<td>23040</td>
<td>36030</td>
</tr>
<tr>
<td>100 psi</td>
<td>136</td>
<td>190</td>
<td>395</td>
<td>583</td>
<td>860</td>
<td>1290</td>
<td>2430</td>
<td>3790</td>
<td>5050</td>
<td>7469</td>
<td>9533</td>
<td>13556</td>
<td>18540</td>
<td>26980</td>
<td>44450</td>
</tr>
<tr>
<td>200 psi</td>
<td>179</td>
<td>250</td>
<td>490</td>
<td>737</td>
<td>1110</td>
<td>1600</td>
<td>2990</td>
<td>4790</td>
<td>6610</td>
<td>9740</td>
<td>12340</td>
<td>17297</td>
<td>24080</td>
<td>35390</td>
<td>61520</td>
</tr>
<tr>
<td>285 psi</td>
<td>214</td>
<td>300</td>
<td>570</td>
<td>871</td>
<td>1330</td>
<td>1900</td>
<td>3460</td>
<td>5640</td>
<td>7930</td>
<td>11670</td>
<td>14276</td>
<td>20477</td>
<td>28790</td>
<td>43200</td>
<td>75000</td>
</tr>
<tr>
<td>300 psi</td>
<td>225</td>
<td>315</td>
<td>590</td>
<td>899</td>
<td>1370</td>
<td>1950</td>
<td>3720</td>
<td>5790</td>
<td>8160</td>
<td>12010</td>
<td>15147</td>
<td>21038</td>
<td>29620</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>375 psi</td>
<td>271</td>
<td>380</td>
<td>680</td>
<td>1053</td>
<td>1630</td>
<td>2280</td>
<td>4100</td>
<td>6800</td>
<td>9720</td>
<td>14281</td>
<td>19076</td>
<td>26670</td>
<td>39400</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>500 psi</td>
<td>318</td>
<td>445</td>
<td>780</td>
<td>1205</td>
<td>1880</td>
<td>2610</td>
<td>4660</td>
<td>7800</td>
<td>11270</td>
<td>16551</td>
<td>20762</td>
<td>28521</td>
<td>40700</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>600 psi</td>
<td>364</td>
<td>510</td>
<td>875</td>
<td>1368</td>
<td>2140</td>
<td>2940</td>
<td>5220</td>
<td>8800</td>
<td>12820</td>
<td>18821</td>
<td>23570</td>
<td>32262</td>
<td>46240</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>700 psi</td>
<td>411</td>
<td>575</td>
<td>970</td>
<td>1526</td>
<td>2400</td>
<td>3270</td>
<td>5780</td>
<td>9800</td>
<td>14380</td>
<td>21092</td>
<td>26377</td>
<td>36003</td>
<td>51780</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>740 psi</td>
<td>429</td>
<td>600</td>
<td>1020</td>
<td>1597</td>
<td>2500</td>
<td>3400</td>
<td>6000</td>
<td>10200</td>
<td>15000</td>
<td>22000</td>
<td>27500</td>
<td>37500</td>
<td>54000</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

#### S0 Seats Downstream - Valve Torque (in. lb.)

<table>
<thead>
<tr>
<th>Size in. (mm)</th>
<th>2 1/2 (65)</th>
<th>3 (80)</th>
<th>4 (100)</th>
<th>5 (125)</th>
<th>6 (150)</th>
<th>8 (200)</th>
<th>10 (250)</th>
<th>12 (300)</th>
<th>14 (350)</th>
<th>16 (400)</th>
<th>18 (450)</th>
<th>20 (500)</th>
<th>24 (600)</th>
<th>30 (750)</th>
<th>36 (900)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50 psi</td>
<td>111</td>
<td>155</td>
<td>348</td>
<td>503</td>
<td>728</td>
<td>1125</td>
<td>2154</td>
<td>3291</td>
<td>4277</td>
<td>6334</td>
<td>8129</td>
<td>11685</td>
<td>15770</td>
<td>23040</td>
<td>36030</td>
</tr>
<tr>
<td>100 psi</td>
<td>136</td>
<td>190</td>
<td>395</td>
<td>583</td>
<td>860</td>
<td>1290</td>
<td>2430</td>
<td>3790</td>
<td>5050</td>
<td>7469</td>
<td>9533</td>
<td>13556</td>
<td>18540</td>
<td>26980</td>
<td>44450</td>
</tr>
<tr>
<td>200 psi</td>
<td>179</td>
<td>250</td>
<td>490</td>
<td>737</td>
<td>1110</td>
<td>1600</td>
<td>2990</td>
<td>4790</td>
<td>6610</td>
<td>9740</td>
<td>12340</td>
<td>17297</td>
<td>24080</td>
<td>35390</td>
<td>61520</td>
</tr>
<tr>
<td>285 psi</td>
<td>214</td>
<td>300</td>
<td>570</td>
<td>871</td>
<td>1330</td>
<td>1900</td>
<td>3460</td>
<td>5640</td>
<td>7930</td>
<td>11670</td>
<td>14276</td>
<td>20477</td>
<td>28790</td>
<td>43200</td>
<td>75000</td>
</tr>
<tr>
<td>300 psi</td>
<td>225</td>
<td>315</td>
<td>590</td>
<td>899</td>
<td>1370</td>
<td>1950</td>
<td>3720</td>
<td>5790</td>
<td>8160</td>
<td>12010</td>
<td>15147</td>
<td>21038</td>
<td>29620</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>375 psi</td>
<td>271</td>
<td>380</td>
<td>680</td>
<td>1053</td>
<td>1630</td>
<td>2280</td>
<td>4100</td>
<td>6800</td>
<td>9720</td>
<td>14281</td>
<td>19076</td>
<td>26670</td>
<td>39400</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>500 psi</td>
<td>318</td>
<td>445</td>
<td>780</td>
<td>1205</td>
<td>1880</td>
<td>2610</td>
<td>4660</td>
<td>7800</td>
<td>11270</td>
<td>16551</td>
<td>20762</td>
<td>28521</td>
<td>40700</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>600 psi</td>
<td>364</td>
<td>510</td>
<td>875</td>
<td>1368</td>
<td>2140</td>
<td>2940</td>
<td>5220</td>
<td>8800</td>
<td>12820</td>
<td>18821</td>
<td>23570</td>
<td>32262</td>
<td>46240</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>700 psi</td>
<td>411</td>
<td>575</td>
<td>970</td>
<td>1526</td>
<td>2400</td>
<td>3270</td>
<td>5780</td>
<td>9800</td>
<td>14380</td>
<td>21092</td>
<td>26377</td>
<td>36003</td>
<td>51780</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>740 psi</td>
<td>429</td>
<td>600</td>
<td>1020</td>
<td>1597</td>
<td>2500</td>
<td>3400</td>
<td>6000</td>
<td>10200</td>
<td>15000</td>
<td>22000</td>
<td>27500</td>
<td>37500</td>
<td>54000</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

For severe service, additional safety factor should be added:

- Dry gas or slurry............................... 1.25
- Low temperature.........................1.20
- Emergency shutdown...................... 1.60
**WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES**

**TORQUE VALUES**

The torque values shown in these tables are net required operating torques for actuator sizing. An appropriate safety factor is included for normal wet operating torque.

**F0 / M0 Seats Upstream - Valve Torque (in. lb.)**

<table>
<thead>
<tr>
<th>Size in. (mm)</th>
<th>2 1/2 (65)</th>
<th>3 (80)</th>
<th>4 (100)</th>
<th>5 (125)</th>
<th>6 (150)</th>
<th>8 (200)</th>
<th>10 (250)</th>
<th>12 (300)</th>
<th>14 (350)</th>
<th>16 (400)</th>
<th>20 (500)</th>
<th>24 (600)</th>
<th>30 (750)</th>
<th>36 (900)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50 psi</td>
<td>238</td>
<td>333</td>
<td>609</td>
<td>920</td>
<td>1389</td>
<td>2710</td>
<td>4422</td>
<td>6547</td>
<td>7728</td>
<td>9709</td>
<td>13116</td>
<td>18395</td>
<td>25623</td>
<td>36600</td>
</tr>
<tr>
<td>100 psi</td>
<td>261</td>
<td>366</td>
<td>694</td>
<td>1046</td>
<td>1578</td>
<td>3050</td>
<td>5043</td>
<td>7595</td>
<td>8956</td>
<td>11218</td>
<td>15432</td>
<td>21289</td>
<td>29746</td>
<td>42805</td>
</tr>
<tr>
<td>200 psi</td>
<td>308</td>
<td>431</td>
<td>863</td>
<td>1300</td>
<td>1957</td>
<td>3729</td>
<td>6286</td>
<td>9689</td>
<td>11412</td>
<td>14235</td>
<td>20063</td>
<td>27097</td>
<td>37991</td>
<td>55130</td>
</tr>
<tr>
<td>285 psi</td>
<td>348</td>
<td>487</td>
<td>1006</td>
<td>1514</td>
<td>2278</td>
<td>4307</td>
<td>7343</td>
<td>11470</td>
<td>13500</td>
<td>16800</td>
<td>24000</td>
<td>32000</td>
<td>45000</td>
<td>64980</td>
</tr>
<tr>
<td>300 psi</td>
<td>355</td>
<td>497</td>
<td>1032</td>
<td>1552</td>
<td>2335</td>
<td>4409</td>
<td>7531</td>
<td>11784</td>
<td>13868</td>
<td>17253</td>
<td>24695</td>
<td>32868</td>
<td>46237</td>
<td></td>
</tr>
<tr>
<td>400 psi</td>
<td>401</td>
<td>562</td>
<td>1201</td>
<td>1805</td>
<td>2714</td>
<td>5089</td>
<td>8773</td>
<td>13878</td>
<td>16325</td>
<td>20270</td>
<td>29326</td>
<td>38658</td>
<td>54482</td>
<td></td>
</tr>
<tr>
<td>500 psi</td>
<td>449</td>
<td>682</td>
<td>1370</td>
<td>2058</td>
<td>3092</td>
<td>5769</td>
<td>10016</td>
<td>15973</td>
<td>18781</td>
<td>23288</td>
<td>33958</td>
<td>44447</td>
<td>67228</td>
<td></td>
</tr>
<tr>
<td>600 psi</td>
<td>495</td>
<td>693</td>
<td>1539</td>
<td>2311</td>
<td>3470</td>
<td>6448</td>
<td>11259</td>
<td>18068</td>
<td>21237</td>
<td>26305</td>
<td>38589</td>
<td>50237</td>
<td>70974</td>
<td></td>
</tr>
<tr>
<td>700 psi</td>
<td>542</td>
<td>759</td>
<td>1707</td>
<td>2563</td>
<td>3849</td>
<td>7128</td>
<td>12503</td>
<td>20162</td>
<td>23693</td>
<td>29323</td>
<td>43221</td>
<td>56026</td>
<td>79219</td>
<td></td>
</tr>
<tr>
<td>740 psi</td>
<td>561</td>
<td>785</td>
<td>1775</td>
<td>2665</td>
<td>4000</td>
<td>7400</td>
<td>13000</td>
<td>21000</td>
<td>24675</td>
<td>30530</td>
<td>48074</td>
<td>58342</td>
<td>82518</td>
<td></td>
</tr>
</tbody>
</table>

**F0 / M0 Seats Downstream - Valve Torque (in. lb.)**

<table>
<thead>
<tr>
<th>Size in. (mm)</th>
<th>2 1/2 (65)</th>
<th>3 (80)</th>
<th>4 (100)</th>
<th>5 (125)</th>
<th>6 (150)</th>
<th>8 (200)</th>
<th>10 (250)</th>
<th>12 (300)</th>
<th>14 (350)</th>
<th>16 (400)</th>
<th>20 (500)</th>
<th>24 (600)</th>
<th>30 (750)</th>
<th>36 (900)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50 psi</td>
<td>238</td>
<td>333</td>
<td>609</td>
<td>920</td>
<td>1389</td>
<td>2710</td>
<td>4422</td>
<td>6547</td>
<td>7728</td>
<td>9709</td>
<td>13116</td>
<td>18395</td>
<td>25623</td>
<td>36600</td>
</tr>
<tr>
<td>100 psi</td>
<td>261</td>
<td>366</td>
<td>694</td>
<td>1046</td>
<td>1578</td>
<td>3050</td>
<td>5043</td>
<td>7595</td>
<td>8956</td>
<td>11218</td>
<td>15432</td>
<td>21289</td>
<td>29746</td>
<td>42805</td>
</tr>
<tr>
<td>200 psi</td>
<td>308</td>
<td>431</td>
<td>863</td>
<td>1300</td>
<td>1957</td>
<td>3729</td>
<td>6286</td>
<td>9689</td>
<td>11412</td>
<td>14235</td>
<td>20063</td>
<td>27097</td>
<td>37991</td>
<td>55130</td>
</tr>
<tr>
<td>285 psi</td>
<td>348</td>
<td>487</td>
<td>1006</td>
<td>1514</td>
<td>2278</td>
<td>4307</td>
<td>7343</td>
<td>11470</td>
<td>13500</td>
<td>16800</td>
<td>24000</td>
<td>32000</td>
<td>45000</td>
<td>64980</td>
</tr>
<tr>
<td>300 psi</td>
<td>355</td>
<td>497</td>
<td>1032</td>
<td>1552</td>
<td>2335</td>
<td>4409</td>
<td>7531</td>
<td>11784</td>
<td>13868</td>
<td>17253</td>
<td>24695</td>
<td>32868</td>
<td>46237</td>
<td></td>
</tr>
<tr>
<td>400 psi</td>
<td>401</td>
<td>562</td>
<td>1201</td>
<td>1805</td>
<td>2714</td>
<td>5089</td>
<td>8773</td>
<td>13878</td>
<td>16325</td>
<td>20270</td>
<td>29326</td>
<td>38658</td>
<td>54482</td>
<td></td>
</tr>
<tr>
<td>500 psi</td>
<td>449</td>
<td>682</td>
<td>1370</td>
<td>2058</td>
<td>3092</td>
<td>5769</td>
<td>10016</td>
<td>15973</td>
<td>18781</td>
<td>23288</td>
<td>33958</td>
<td>44447</td>
<td>67228</td>
<td></td>
</tr>
<tr>
<td>600 psi</td>
<td>495</td>
<td>693</td>
<td>1539</td>
<td>2311</td>
<td>3470</td>
<td>6448</td>
<td>11259</td>
<td>18068</td>
<td>21237</td>
<td>26305</td>
<td>38589</td>
<td>50237</td>
<td>70974</td>
<td></td>
</tr>
<tr>
<td>700 psi</td>
<td>542</td>
<td>759</td>
<td>1707</td>
<td>2563</td>
<td>3849</td>
<td>7128</td>
<td>12503</td>
<td>20162</td>
<td>23693</td>
<td>29323</td>
<td>43221</td>
<td>56026</td>
<td>79219</td>
<td></td>
</tr>
<tr>
<td>740 psi</td>
<td>561</td>
<td>785</td>
<td>1775</td>
<td>2665</td>
<td>4000</td>
<td>7400</td>
<td>13000</td>
<td>21000</td>
<td>24675</td>
<td>30530</td>
<td>48074</td>
<td>58342</td>
<td>82518</td>
<td></td>
</tr>
</tbody>
</table>

**For Severe service, additional safety factor should be added:**

- Dry gas or slurry............................... 1.25  
- Emergency shutdown...................... 1.60  
- Low temperature ......................... 1.20  
- High temperature 600° F - 700° F (316° C - 371° C)............... 1.30  
- Extended high temp. 750° F - 1000° F (399° C - 538° C)........ 1.50  

Flow

Flow
**Installation manual is available with complete flange bolt / stud information.**

Pressure ratings are in accordance with ASME B16.34 for group 1.1 carbon steel valves. Pressure ratings will vary with different body materials.

**Series B5100, Class 150, 285 psi CWP**

- **DIMENSIONAL DATA**
  - **Series A5100, Class 150, 285 psi CWP**

| Series | Class | CWP | 
|--------|-------|-----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| B5100 | 150   | 285 | **Weight** |
| 30    | (750) | 34.50 (876) | 7.63 (194) | 22.88 (581) | 30.94 (780) | 1 1/4-8 | 1 1/4-8 | 38.00 (914) | 6.00 (152) | 12.00 (305) | 1.50 (38) | 3.00 (76) | 3/4-10 | 27.90 (709) |

- **Weight**
  - **Lug Body Wafer Body**
    - **lb. (kg)**
      - **Series B5100, Class 150, 285 psi CWP**
        - **Series A5100, Class 150, 285 psi CWP**
          - **Pressure ratings**

* Pressure ratings are in accordance with ASME B16.34 for group 1.1 carbon steel valves. Pressure ratings will vary with different body materials.

**Installation manual is available with complete flange bolt / stud information.**

---

**DISTRIBUTED VALVES**

**WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES**

**NOTE:** MINIMUM PIPE I.D. REQUIRED FOR DISC SWING CLEARANCE. SEE (BB) FOR APPLICABLE PIPE SCHEDULE.
**WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES**

**DIMENSIONAL DATA**

**Series B5300, Class 300, 740 psi CWP**

<table>
<thead>
<tr>
<th>in. (mm)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G**</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 1/2</td>
<td>(65)</td>
<td>4.13 (105)</td>
<td>1.87 (48)</td>
<td>7.94 (202)</td>
<td>3/4-10</td>
<td>3/4</td>
<td>8</td>
<td>5.58 (142)</td>
<td>2.00 (51)</td>
<td>4.00 (102)</td>
<td>0.44 (11)</td>
<td>0.88 (22)</td>
<td>3/8-16</td>
<td>2.09 (53)</td>
</tr>
<tr>
<td>3</td>
<td>(80)</td>
<td>5.00 (127)</td>
<td>2.00 (51)</td>
<td>5.50 (140)</td>
<td>3/4-10</td>
<td>3/4</td>
<td>8</td>
<td>6.63 (168)</td>
<td>2.00 (51)</td>
<td>4.00 (102)</td>
<td>0.44 (11)</td>
<td>0.88 (22)</td>
<td>3/8-16</td>
<td>2.62 (63)</td>
</tr>
<tr>
<td>4</td>
<td>(100)</td>
<td>6.19 (157)</td>
<td>2.12 (54)</td>
<td>6.38 (162)</td>
<td>8.50 (216)</td>
<td>3/4-10</td>
<td>3/4</td>
<td>8</td>
<td>7.88 (200)</td>
<td>2.00 (51)</td>
<td>4.00 (102)</td>
<td>0.44 (11)</td>
<td>0.88 (22)</td>
<td>3/8-16</td>
</tr>
<tr>
<td>5</td>
<td>(125)</td>
<td>7.31 (186)</td>
<td>2.25 (57)</td>
<td>7.50 (191)</td>
<td>9.63 (245)</td>
<td>3/4-10</td>
<td>3/4</td>
<td>8</td>
<td>9.25 (235)</td>
<td>2.00 (51)</td>
<td>4.00 (102)</td>
<td>0.44 (11)</td>
<td>0.88 (22)</td>
<td>3/8-16</td>
</tr>
<tr>
<td>6</td>
<td>(150)</td>
<td>8.50 (216)</td>
<td>2.28 (58)</td>
<td>7.63 (194)</td>
<td>9.75 (248)</td>
<td>3/4-10</td>
<td>3/4</td>
<td>12</td>
<td>10.63 (270)</td>
<td>2.00 (51)</td>
<td>4.00 (102)</td>
<td>0.44 (11)</td>
<td>0.88 (22)</td>
<td>3/8-16</td>
</tr>
</tbody>
</table>

**Weight**

<table>
<thead>
<tr>
<th>in. (mm)</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
<th>AA</th>
<th>BB</th>
<th>Wafer Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 1/2</td>
<td>(65)</td>
<td>0.50 (13)</td>
<td>0.375 (10)</td>
<td>7.38 (187)</td>
<td>2.25 (57)</td>
<td>0.34 (9)</td>
<td>3.00 (76)</td>
<td>0.41 (10)</td>
<td>6.69 (170)</td>
<td>Sch 160</td>
<td>17 (8)</td>
<td>–</td>
</tr>
<tr>
<td>3</td>
<td>(80)</td>
<td>0.625 (16)</td>
<td>0.437 (11)</td>
<td>8.12 (206)</td>
<td>2.25 (57)</td>
<td>0.34 (9)</td>
<td>3.00 (76)</td>
<td>0.41 (10)</td>
<td>7.30 (187)</td>
<td>Sch 160</td>
<td>20 (9)</td>
<td>11 (5)</td>
</tr>
<tr>
<td>4</td>
<td>(100)</td>
<td>0.875 (22)</td>
<td>0.625 (16)</td>
<td>10.75 (273)</td>
<td>2.25 (57)</td>
<td>0.34 (9)</td>
<td>3.00 (76)</td>
<td>0.41 (10)</td>
<td>8.38 (213)</td>
<td>Sch 80</td>
<td>24 (11)</td>
<td>15 (7)</td>
</tr>
<tr>
<td>5</td>
<td>(125)</td>
<td>0.875 (22)</td>
<td>0.625 (16)</td>
<td>12.12 (308)</td>
<td>2.25 (57)</td>
<td>0.34 (9)</td>
<td>3.00 (76)</td>
<td>0.41 (10)</td>
<td>9.47 (242)</td>
<td>Sch 80</td>
<td>35 (16)</td>
<td>23 (10)</td>
</tr>
<tr>
<td>6</td>
<td>(150)</td>
<td>0.875 (22)</td>
<td>0.625 (16)</td>
<td>12.12 (308)</td>
<td>2.25 (57)</td>
<td>0.34 (9)</td>
<td>3.00 (76)</td>
<td>0.41 (10)</td>
<td>9.47 (242)</td>
<td>Sch 80</td>
<td>40 (17)</td>
<td>28 (13)</td>
</tr>
</tbody>
</table>

*Pressure ratings are in accordance with ASME B16.34 for group 1.1 carbon steel valves. Pressure ratings will vary with different body materials.

**Installation manual is available with complete flange bolt / stud information.**
# WKM Dynacentric High Performance Butterfly Valves

## Dimensional Data

### Series A5600, Class 600, 1480 psi CWP*

<table>
<thead>
<tr>
<th>in. (mm)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G**</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>3(80)</td>
<td>5.38 (137)</td>
<td>1.93 (49)</td>
<td>5.50 (140)</td>
<td>7.63 (194)</td>
<td>3/4-10</td>
<td>3/4</td>
<td>6.63 (168)</td>
<td>2.00 (51)</td>
<td>4.00 (102)</td>
<td>0.44 (11)</td>
<td>0.88 (22)</td>
<td>3/8-16</td>
<td>2.62 (67)</td>
<td></td>
</tr>
<tr>
<td>4(100)</td>
<td>6.88 (175)</td>
<td>2.37 (60)</td>
<td>6.75 (171)</td>
<td>8.88 (226)</td>
<td>7/8-9</td>
<td>7/8</td>
<td>8.50 (216)</td>
<td>2.00 (51)</td>
<td>4.00 (102)</td>
<td>0.44 (11)</td>
<td>0.88 (22)</td>
<td>3/8-16</td>
<td>3.63 (92)</td>
<td></td>
</tr>
<tr>
<td>6(150)</td>
<td>9.00 (229)</td>
<td>2.91 (74)</td>
<td>9.00 (229)</td>
<td>11.68 (297)</td>
<td>1-8</td>
<td>1</td>
<td>12</td>
<td>11.50 (292)</td>
<td>2.13 (54)</td>
<td>4.25 (108)</td>
<td>0.63 (16)</td>
<td>1.25 (32)</td>
<td>3/8-16</td>
<td>5.62 (143)</td>
</tr>
<tr>
<td>8(200)</td>
<td>11.50 (292)</td>
<td>3.65 (93)</td>
<td>9.88 (251)</td>
<td>13.36 (339)</td>
<td>1-8-8</td>
<td>1 1/8</td>
<td>12</td>
<td>17.00 (432)</td>
<td>2.75 (70)</td>
<td>5.50 (140)</td>
<td>0.81 (21)</td>
<td>1.62 (41)</td>
<td>1/2-13</td>
<td>7.61 (193)</td>
</tr>
<tr>
<td>10(250)</td>
<td>13.50 (343)</td>
<td>4.65 (118)</td>
<td>12.00 (305)</td>
<td>16.18 (411)</td>
<td>1 1/4-8</td>
<td>1 1/4-8</td>
<td>12</td>
<td>19.25 (489)</td>
<td>2.75 (70)</td>
<td>5.50 (140)</td>
<td>0.81 (21)</td>
<td>1.62 (41)</td>
<td>1/2-13</td>
<td>9.50 (241)</td>
</tr>
</tbody>
</table>

### Weight

<table>
<thead>
<tr>
<th>in. (mm)</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
<th>AA</th>
<th>BB</th>
</tr>
</thead>
<tbody>
<tr>
<td>3(80)</td>
<td>–</td>
<td>–</td>
<td>0.625 (16)</td>
<td>0.437 (11)</td>
<td>8.12 (206)</td>
<td>2.25 (57)</td>
<td>0.34 (9)</td>
<td>3.00 (76)</td>
<td>0.41 (10)</td>
<td>6.38 (162)</td>
<td>Sch 160</td>
</tr>
<tr>
<td>4(100)</td>
<td>–</td>
<td>–</td>
<td>0.875 (22)</td>
<td>0.625 (16)</td>
<td>10.50 (267)</td>
<td>2.25 (57)</td>
<td>0.34 (9)</td>
<td>3.00 (76)</td>
<td>0.41 (10)</td>
<td>7.63 (194)</td>
<td>Sch 120</td>
</tr>
<tr>
<td>6(150)</td>
<td>1.56 (40)</td>
<td>0.250 (6.35) Sq.</td>
<td>1.125 (29)</td>
<td>–</td>
<td>13.63 (346)</td>
<td>–</td>
<td>–</td>
<td>3.50 (89)</td>
<td>0.56 (14)</td>
<td>10.12 (257)</td>
<td>Sch 120</td>
</tr>
<tr>
<td>8(200)</td>
<td>2.00 (51)</td>
<td>0.312 (7.92) Sq.</td>
<td>1.375 (35)</td>
<td>–</td>
<td>16.12 (409)</td>
<td>3.50 (89)</td>
<td>0.56 (14)</td>
<td>5.31 (135)</td>
<td>0.69 (18)</td>
<td>11.38 (289)</td>
<td>Sch 80</td>
</tr>
<tr>
<td>10(250)</td>
<td>2.75 (70)</td>
<td>0.375 (9.53) Sq.</td>
<td>1.750 (44)</td>
<td>–</td>
<td>19.50 (495)</td>
<td>3.50 (89)</td>
<td>0.56 (14)</td>
<td>5.31 (135)</td>
<td>0.69 (18)</td>
<td>13.50 (343)</td>
<td>Sch 120</td>
</tr>
</tbody>
</table>

### Series A5600, Class 600, 1480 psi CWP*

<table>
<thead>
<tr>
<th>in. (mm)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G**</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>12(300)</td>
<td>16.25 (413)</td>
<td>5.53 (140)</td>
<td>12.94 (329)</td>
<td>19.58 (497)</td>
<td>1 1/4-8</td>
<td>1 1/4-8</td>
<td>20</td>
<td>19.25 (489)</td>
<td>4.75 (121)</td>
<td>9.50 (242)</td>
<td>1.00 (25)</td>
<td>2.00 (51)</td>
<td>-</td>
<td>11.50 (292)</td>
</tr>
</tbody>
</table>

### Weight

<table>
<thead>
<tr>
<th>in. (mm)</th>
<th>Q</th>
<th>V</th>
<th>R</th>
<th>S</th>
<th>U</th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
<th>AA</th>
<th>BB</th>
</tr>
</thead>
<tbody>
<tr>
<td>12(300)</td>
<td>3.00 (76)</td>
<td>0.500 (12.7) Sq.</td>
<td>2.00 (51)</td>
<td>21.75 (552)</td>
<td>0.69 (18)</td>
<td>4.78 (121)</td>
<td>0.81 (21)</td>
<td>2.88 x 6.94</td>
<td>0.94 (24)</td>
<td>15.94 (405)</td>
<td>Sch 80</td>
</tr>
</tbody>
</table>

---

* Pressure ratings are in accordance with ASME B16.34 for group 1.1 carbon steel valves. Pressure ratings will vary with different body materials. Installation manual is available with complete flange bolt / stud information.
WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES

MANUAL ACTUATORS

Worm Gear Actuators

Worm gear actuators are available as optional equipment, for DynaCentric high performance butterfly valves sizes 2 1/2 in. through 8 in. (65 mm - 200 mm). All larger size valves require worm gear actuators or power actuation.

Handle operated valves, sizes 2 1/2 in. through 8 in. (65 mm through 200 mm), can be converted in the field to worm gear operation. No modification is required to accommodate the addition of the worm gear unit.
WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES

MATERIAL SELECTION GUIDE

A selection of body, disc, stem and seat/seal materials for DynaCentric high performance butterfly valves are available. The following list is intended as a guide in the selection of materials for corrosive service.

No material can be expected to resist the corrosive action of all the many ladings found in modern industry. Experience has shown, however, that certain materials can perform satisfactorily within certain limits. The physical properties of a material are affected differently by each corrosive medium. Therefore, it sometimes becomes necessary to sacrifice value in another property. As a result, the user must decide which property is of prime importance for his application.

Internal moving parts, in contact with the lading, should always carry an “A” rating. Body materials with exposure to corrosive ladings can sometimes carry “B” rating because metal loss due to corrosion is not as critical.

The following information is designed for use by technically qualified individuals at their own discretion and risk. We strongly recommend that tests be run under actual operating conditions to obtain a material’s performance ability in any one corrosive medium.

RATING INTERPRETATION:
“A” - excellent
“B” - good (slightly attacked)
“C” - fair (moderately attacked, probably unsuitable)
“D” - not recommended

NOTE: All ladings at ambient temperatures except as noted.

* Size 14 in. (350 mm) and larger, class 150 / 300 valves are available with CS trim.
For trim group 08 thru 13 consult factory for material compatibility.
### MATERIAL SELECTION GUIDE (Cont.)

#### LADINGS

<table>
<thead>
<tr>
<th>GROUPS</th>
<th>MATERIALS OF CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BODY</td>
<td>TRIM</td>
</tr>
<tr>
<td>GROUPS</td>
<td>SEALS</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Chromic Acid C D D C C B C A A C C</td>
</tr>
<tr>
<td></td>
<td>Citrus Juices D B D C B B A A A B B</td>
</tr>
<tr>
<td></td>
<td>Coconut Oil B C B B B B A A B A B</td>
</tr>
<tr>
<td></td>
<td>Coffee Extracts, hot C A C B A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Coke Oven Gas B A B B A A A A A</td>
</tr>
<tr>
<td></td>
<td>Cooking Oil B A A B A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Copper Acetate, 10% C D D C B C B B A B</td>
</tr>
<tr>
<td></td>
<td>Copper Chloride D D D D D D D D D D C A A D D D</td>
</tr>
<tr>
<td></td>
<td>Copper Nitrates D B D D B C B A A B</td>
</tr>
<tr>
<td></td>
<td>Copper Sulfate D C D D C C B A A C C</td>
</tr>
<tr>
<td></td>
<td>Corn Oil C B C B B B B B A B B</td>
</tr>
<tr>
<td></td>
<td>Cottonseed Oil C B C B B B B A A B B</td>
</tr>
<tr>
<td></td>
<td>Creosote Oil B B B B B B B A A B B</td>
</tr>
<tr>
<td></td>
<td>Cresylic Acid B B B B B B A A B B</td>
</tr>
<tr>
<td></td>
<td>Crude Oil B A A A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Cutting Oils, water emul. B A B A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Cyclohexane A A A A A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Diacetone Alcohol A A A A A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Diesel Fuels A A A A A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Diethylenamine A A A A A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Dowtherms B A B A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Drying Oil C D D D D D D C D A A D D</td>
</tr>
<tr>
<td></td>
<td>Drying Mud B A B A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Drift Cocks, gas B A B B A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Dry Cleaning Fluids B A B A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Dryer Oil C B C B B B B B B B A A B B</td>
</tr>
<tr>
<td></td>
<td>Epson Salt C B C C B B B B A B B</td>
</tr>
<tr>
<td></td>
<td>Ethane A A A A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Ethers B A B B A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Ethyl Diethyl Acetate B B B B B B B B A B B</td>
</tr>
<tr>
<td></td>
<td>Ethylene, liquid or gas A A A A A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Ethyl Acrylate A A A A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Ethyl Chloride, dry B A B B A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Ethyl Chloride, wet D B B D B B B B B A A B B</td>
</tr>
<tr>
<td></td>
<td>Ethylene Glycol B B B B B B B B B B B</td>
</tr>
<tr>
<td></td>
<td>Ethylene Oxide B B B B B B B B A A B B</td>
</tr>
<tr>
<td></td>
<td>Fatty Acids D D D D D B B B B A A B</td>
</tr>
<tr>
<td></td>
<td>Ferric Chloride D D D D D D D D A D D</td>
</tr>
<tr>
<td></td>
<td>Ferric Nitrate D C D D C C C C A A C C</td>
</tr>
<tr>
<td></td>
<td>Ferric Sulfate D D B D B B B B A A B</td>
</tr>
<tr>
<td></td>
<td>Ferrous Chloride D D D D D D D D A A D</td>
</tr>
<tr>
<td></td>
<td>Ferrous Sulfate D B D D B B B B A A B</td>
</tr>
<tr>
<td></td>
<td>Ferrous Sulfate, saturated C A C C C A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Fish Oils B A B B B A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Fluorine, dry B A B B B B B B B A A A A</td>
</tr>
<tr>
<td></td>
<td>Fluoronic Acid D C D D C C C C A A C C</td>
</tr>
<tr>
<td></td>
<td>Food Fluids and Pastes C A C C C A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Formaldehyde, cold A A A A A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Formaldehyde, hot D C D D C C B C A A C C</td>
</tr>
<tr>
<td></td>
<td>Formic Acid, cold D B C D B B B B A B B</td>
</tr>
<tr>
<td></td>
<td>Formic Acid, hot D D D D D D D D A A D</td>
</tr>
<tr>
<td></td>
<td>Freon, dry (12) B A B A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Fruit Juices D A D D A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Fuel Oils B A B A A A A A A A A</td>
</tr>
<tr>
<td></td>
<td>Formic Acid D B D D B B B B A A B</td>
</tr>
</tbody>
</table>

### NOTE:
All ladings at ambient temperatures except as noted.

* Size 14 in. (350 mm) and larger, class 150 / 300 valves are available with CS trim.
For trim group 08 thru 13 consult factory for material compatibility.
### MATERIAL SELECTION GUIDE (Cont.)

#### WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES

<table>
<thead>
<tr>
<th>MATERIALS OF CONSTRUCTION</th>
<th>BODY GROUPS</th>
<th>TRIM GROUPS</th>
<th>SEAL GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LADINGS</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Mercuric Chloride</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Mercuric Cyanide, 10%</td>
<td>D</td>
<td>B</td>
<td>D</td>
</tr>
<tr>
<td>Mercury</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Mercaptans</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Methane</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Methyl Acetone</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Methylamine</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Methyl Cellosolve</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Methyl Chloride, dry</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Methyl Ethyl Ketone</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Nitril Formate</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Methylenne Chloride, dry</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Milk</td>
<td>D</td>
<td>A</td>
<td>D</td>
</tr>
<tr>
<td>Mine Waters, acid</td>
<td>D</td>
<td>B</td>
<td>D</td>
</tr>
<tr>
<td>Mineral Oil</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Mineral Spirits</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Mixed Acids, cold</td>
<td>C</td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td>Molasses</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Muratic Acid</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Mustard</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Naphthia</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Nickel Ammonium Sulfate, 20%</td>
<td>D</td>
<td>A</td>
<td>D</td>
</tr>
<tr>
<td>Nickel Chloride</td>
<td>D</td>
<td>B</td>
<td>D</td>
</tr>
<tr>
<td>Nickel Nitrate, 30%</td>
<td>D</td>
<td>B</td>
<td>D</td>
</tr>
<tr>
<td>Nickel Sulfate</td>
<td>D</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Nicotinic Acid</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Nitric Acid, 10-80%</td>
<td>D</td>
<td>A</td>
<td>D</td>
</tr>
<tr>
<td>Nitric Acid, 100%</td>
<td>A</td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td>Nitrobenzene</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Nitrous Ammonium Sulfate, 10%</td>
<td>D</td>
<td>A</td>
<td>D</td>
</tr>
<tr>
<td>Nitrous Gas</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Nitrous Oxide</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Oils, petroleum, refined</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Oil-water Mixtures</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Oleic Acid</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Oleum</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Olive Oil</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Oxalic Acid</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Oxygen</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Ozone, west</td>
<td>C</td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td>Ozone, dry</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Paints and solvents</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Palmic Acid</td>
<td>C</td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td>Palm Oil</td>
<td>C</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Paraffin</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Paraformaldehyde</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Pentane</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Perchlorethylene, dry</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Petroleum</td>
<td>C</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Phenol</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Phosphoric Acid, 10% cold</td>
<td>D</td>
<td>B</td>
<td>D</td>
</tr>
<tr>
<td>Phosphoric Acid, 10% hot</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Phosphoric Acid, 50% cold</td>
<td>D</td>
<td>B</td>
<td>D</td>
</tr>
</tbody>
</table>

**NOTE:** All ladings at ambient temperatures except as noted.

* Size 14 in. (350 mm) and larger, class 150 / 300 valves are available with CS trim.

For trim group 08 thru 13 consult factory for material compatibility.
# WKM DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES

## MATERIAL SELECTION GUIDE (Cont.)

### MATERIALS OF CONSTRUCTION

<table>
<thead>
<tr>
<th>LADDINGS</th>
<th>MATERIALS OF CONSTRUCTION</th>
<th>BODY GROUPS</th>
<th>TRIM GROUPS</th>
<th>SEAL GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sodium Chromate</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Sodium Cyanide, 10%</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Sodium Fluoride</td>
<td>D</td>
<td>B</td>
<td>D</td>
<td>B</td>
</tr>
<tr>
<td>Sodium Hydrx., cold 20%</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Sodium Hydrx., hot 20%</td>
<td>C</td>
<td>B</td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>Sodium Hydrx., 50%</td>
<td>D</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Sodium Hydrx., cold 70%</td>
<td>C</td>
<td>B</td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>Sodium Hydrx., hot 70%</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Sodium Hypochlorite</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Sodium Metaphosphate</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Sodium Metasilicate, cold</td>
<td>C</td>
<td>A</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Sodium Metasilicate, hot</td>
<td>D</td>
<td>A</td>
<td>D</td>
<td>A</td>
</tr>
<tr>
<td>Sodium Nitrate</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Sodium Peroxide</td>
<td>C</td>
<td>B</td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>Sodium Phosphate</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Sodium Sulfate</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Sodium Sulfide</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Sodium Sulfide, hot</td>
<td>C</td>
<td>B</td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>Sodium Thiosulfate</td>
<td>D</td>
<td>B</td>
<td>D</td>
<td>B</td>
</tr>
<tr>
<td>Sour Gas and Oil</td>
<td>Consult Factory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soybean Oil</td>
<td>C</td>
<td>A</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Stannous Chloride</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Stannous Chloride</td>
<td>D</td>
<td>C</td>
<td>D</td>
<td>C</td>
</tr>
<tr>
<td>Starch</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Steam, 212°F</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Stearic Acid</td>
<td>C</td>
<td>A</td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>Stoddard Solvent</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Styrene</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Sugar Liquids</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Sulfate, black or gr. liq.</td>
<td>C</td>
<td>B</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Sulfate, white liq.</td>
<td>D</td>
<td>B</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Sulfit</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Sulphur Dioxide, dry</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>D</td>
</tr>
<tr>
<td>Sulphur Trioxide, dry</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Sulfuric Acid, 0-7%</td>
<td>D</td>
<td>B</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Sulfuric Acid, 20-50%</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Sulfuric Acid, 100%</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>D</td>
</tr>
<tr>
<td>Sulfurous Acid</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Synthesis Gas</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Tall Oild</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Tannic Acid</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Tar and Tar Oil</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Tartaric Acid</td>
<td>D</td>
<td>B</td>
<td>D</td>
<td>B</td>
</tr>
<tr>
<td>Tetraethly Lead</td>
<td>C</td>
<td>B</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Toluene, Toluol</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Tomato Juice</td>
<td>C</td>
<td>A</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Transformer Oil</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Tributyl Phosphate</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Turpentine</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Urea</td>
<td>C</td>
<td>B</td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>Varnish</td>
<td>C</td>
<td>A</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Vegetable Oil</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>

**NOTE:** All ladings at ambient temperatures except as noted.

* Size 14 in. (350 mm) and larger, class 150 / 300 valves are available with CS trim.

For trim group 08 thru 13 consult factory for material compatibility.
Cameroon’s Aftermarket Services’ goal is to help our customers lower the total cost of valve ownership. To that end we offer a full range of services from over twenty-five service centers worldwide and can provide experienced personnel trained to meet the specific service requirements of each valve type.

Aftermarket Services

- Supplies replacement valves and parts:
  - Maintains a full inventory of new and reconditioned valves for immediate delivery
  - Provides factory warranty support for all Cameron OEM brands as well as service for most other valves

- Field Service & Technical Support
  - Field service technicians on call 24 hours a day 7 days a week to handle service issues wherever they arise
  - Provides equipment installation, field repairs, as well as track and perform scheduled maintenance

- Customer Property Repair
  - The Customer Property Repair program allows Cameron valve customers to store assets at our service centers throughout the world
  - Valves tracked in electronic database accessible through the Internet

- Remanufactured Products
  - Offers a broad range of API-compliant reconditioned equipment with fast delivery

- Total Valve Management
  - Supply and service automation and control packages
  - Assist with valve installation, commissioning and start-up
TRADEMARK INFORMATION

WKM® is a registered trademark which is owned by Cameron.

This document contains references to registered trademarks or product designations, which are not owned by Cameron.

<table>
<thead>
<tr>
<th>Trademark</th>
<th>Owner</th>
<th>Common Name</th>
<th>Comparable Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFLAS</td>
<td>Asahi Glass Company</td>
<td>TFE Propylene</td>
<td>FXM</td>
</tr>
<tr>
<td>CELCON</td>
<td>Hoechst Celanese Corporation</td>
<td>CELCON Hoechst Celanese Corporation</td>
<td></td>
</tr>
<tr>
<td>DELRIN</td>
<td>E.I. DuPont De Nemours &amp; Company</td>
<td>DELRIN E.I. DuPont De Nemours &amp; Company</td>
<td></td>
</tr>
<tr>
<td>INCONEL</td>
<td>INCO Nickel Sales, Inc.</td>
<td>INCONEL INCO Nickel Sales, Inc.</td>
<td></td>
</tr>
<tr>
<td>MONEL</td>
<td>INCO Alloys International, Inc</td>
<td>MONEL INCO Alloys International, Inc</td>
<td></td>
</tr>
<tr>
<td>PEEK</td>
<td>Victrex PLC Corp. United Kingdom</td>
<td>PEEK Victrex PLC Corp. United Kingdom</td>
<td>PK</td>
</tr>
<tr>
<td>STELLITE</td>
<td>Stood Dehoro Stellite, Inc.</td>
<td>STELLITE Stood Dehoro Stellite, Inc.</td>
<td></td>
</tr>
<tr>
<td>TEFLOL</td>
<td>E.I. Dupont De Nemours &amp; Company</td>
<td>TEFLOL E.I. Dupont De Nemours &amp; Company</td>
<td>PTFE</td>
</tr>
<tr>
<td>VITON</td>
<td>Dupont Dow Elastomers L.L.C.</td>
<td>VITON Dupont Dow Elastomers L.L.C.</td>
<td>FKM</td>
</tr>
<tr>
<td>17-4PH</td>
<td>Armco Advanced Materials Corp.</td>
<td>17-4PH Armco Advanced Materials Corp.</td>
<td>Type 630</td>
</tr>
<tr>
<td>TFM™</td>
<td>DYNEON™ L.L.C.</td>
<td>TFM™ DYNEON™ L.L.C.</td>
<td>MTFE</td>
</tr>
</tbody>
</table>