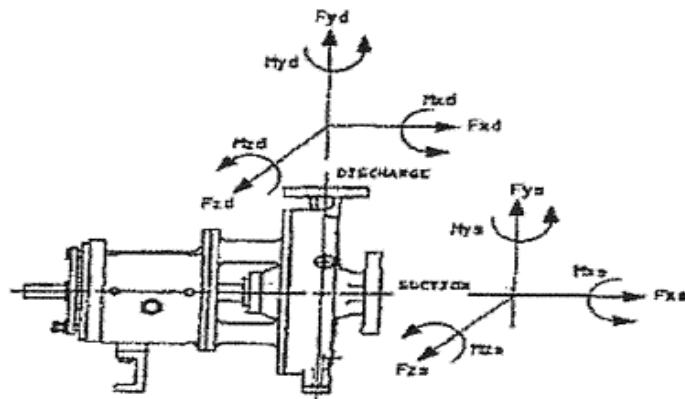


725.1A400

June 15, 2001

(Sup. 06/09/00)

MAXIMUM ALLOWABLE FLANGE LOADS ON GOULDS END SUCTION PUMPS (Model 3196)



Terms:

Fxs, Fys, Fzs, Fxd, Fyd, Fzd,
Mxs, Mys, Mzs, Mxd, Myd, Mzd,
Ft
Fc
Fmax, Famax, Mmax, Mymax

Applied forces as shown in Figure 1, units in lbs.

Applied moments as shown in Figure 1, units in ft-lbs.

Tensile force on discharge (Fyd if Fyd ≥ 0, 0 if Fyd ≤ 0), units in lbs.

Compressive force on discharge (-Fyd if Fyd < 0, 0 if Fyd ≥ 0), units in lbs.

Constants dependent on pump size & flange (Tables 1-8) (Tables 1-8)

(When no entry is found in tables, equations using these constants may be disregarded.)

Loads applied to flanges must meet the following criteria:

$$\begin{aligned}
 (1) \quad & \frac{\sqrt{F_{xs}^2 + F_{ys}^2 + F_{zs}^2}}{F_{max}} + \frac{\sqrt{M_{xs}^2 + M_{ys}^2 + M_{zs}^2}}{M_{max}} \leq 1 & (1) \quad & \frac{\sqrt{F_{xd}^2 + F_{td}^2 + F_{zd}^2}}{F_{max}} + \frac{\sqrt{M_{xd}^2 + M_{yd}^2 + M_{zd}^2}}{M_{max}} \leq 1 \\
 (2) \quad & \frac{\sqrt{F_{xs}^2 + F_{ys}^2 + F_{zs}^2}}{F_{amax}} + \frac{\sqrt{M_{xs}^2 + M_{ys}^2 + M_{zs}^2}}{M_{bmax}} \leq 1 & (2) \quad & \frac{\sqrt{F_{xd}^2 + F_{td}^2 + F_{zd}^2}}{F_{amax}} + \frac{\sqrt{M_{xd}^2 + M_{yd}^2 + M_{zd}^2}}{M_{bmax}} \leq 1 \\
 (3) \quad & \frac{|F_{xs}|}{.85 F_{max}} + \frac{\sqrt{M_{ys}^2 + M_{zs}^2}}{.64 M_{max}} \leq 1 & (3) \quad & \frac{F_t}{.85 F_{max}} + \frac{\sqrt{M_{xd}^2 + M_{zd}^2}}{.64 M_{max}} \leq 1 \\
 (4) \quad & \frac{|F_{xs}|}{.85 F_{amax}} + \frac{\sqrt{M_{ys}^2 + M_{zs}^2}}{.64 M_{bmax}} \leq 1 & (4) \quad & \frac{F_t}{.85 F_{amax}} + \frac{\sqrt{M_{xd}^2 + M_{zd}^2}}{.64 M_{bmax}} \leq 1 \\
 (5) \quad & F_c \leq F_{max}
 \end{aligned}$$

725.1A400

January 30, 2005

(Sup. 03/30/03)

FLANGE LOADING CONSTANTS

MODEL 3196 (EXCEPT TITANIUM XLT-X)

Materials: DI, Steel

Flanges: 150 & 300

| Size | Fmax | | Mmax | | Famax | | Mbmax | |
|--------------------------------------|------------------|--------------------|--------------------|----------------------|------------------|--------------------|--------------------|----------------------|
| | Suction (lbs) | Discharge (lbs) | Suction (ft-lb) | Discharge (ft-lb) | Suction (lbs) | Discharge (lbs) | Suction (ft-lb) | Discharge (ft-lb) |
| 1 x 1 ¹ / ₂ -6 | 970 | 200 | 1,150 | 535 | 7,470 | 2,565 | 995 | 365 |
| 1 ¹ / ₂ x 3-6 | 1,060 | 210 | 1,250 | 565 | 6,865 | 3,440 | 965 | 265 |
| 2 x 3-6 STX | 870 | 210 | 1,055 | 570 | 4,580 | 2,005 | 965 | 465 |
| 1 x 1 ¹ / ₂ -8 | 970 | 200 | 1,155 | 535 | 7,470 | 2,565 | 995 | 365 |
| 1 ¹ / ₂ x 3-8 | 1,060 | 210 | 1,250 | 565 | 6,865 | 3,440 | 965 | 265 |
| 2 x 3-6 MTX | 885 | 450 | 1,160 | 610 | - | - | - | - |
| 2 x 3-8 | 1,115 | 650 | 1,675 | 975 | - | - | - | - |
| 3 x 4-7 | 1,050 | 620 | 1,400 | 1,160 | - | - | - | - |
| 3 x 4-8/G | 1,050 | 620 | 1,400 | 1,160 | - | - | - | - |
| 1 x 2-10 | 1,410 | 1,020 | 1,980 | 1,660 | 11,560 | 6,600 | 1,040 | 330 |
| 1 ¹ / ₂ x 3-10 | 1,110 | 735 | 1,710 | 1,030 | - | - | - | - |
| 2 x 3-10 | 1,075 | 730 | 1,655 | 1,060 | - | - | - | - |
| 3 x 4-10/H | 1,080 | 620 | 1,440 | 1,170 | - | - | - | - |
| 4 x 6-10/G/H | 840 | 725 | 1,460 | 1,190 | - | - | - | - |
| 1 ¹ / ₂ x 3-13 | 985 | 655 | 1,450 | 1,060 | - | - | - | - |
| 2 x 3-13 | 1,330 | 790 | 2,950 | 1,740 | - | - | - | - |
| 3 x 4-13 | 1,140 | 785 | 2,300 | 1,925 | - | - | - | - |
| 4 x 6-13 | 1,480 | 625 | 2,960 | 1,480 | - | - | - | - |
| 6 x 8-13 | 4,735 | 1,560 | 10,125 | 11,395 | 15,415 | 7,335 | 7,585 | 6,710 |
| 8 x 10-13 | 4,580 | 1,855 | 9,640 | 14,240 | 12,175 | 9,640 | 5,655 | 7,595 |
| 6 x 8-15 | 4,500 | 1,045 | 9,280 | 8,010 | - | - | - | - |
| 8 x 10-15/G | 3,995 | 1,495 | 8,360 | 11,755 | 8,380 | 3,615 | 7,345 | 9,905 |

MATERIAL: DI, STEEL

| | | | | | | | | |
|-------------|-------|-------|-------|--------|--------|-------|-------|-------|
| 8 x 10- 16H | 5,092 | 1,832 | 9,055 | 14,750 | 9,308 | 7,444 | 7,189 | 8,505 |
| 4 x 6-17 | 4,847 | 1,556 | 7,197 | 7,740 | 9,223 | 7,170 | 7,649 | 5,090 |
| 6 x 8-17 | 4,902 | 1,559 | 8,827 | 9,377 | 15,704 | 7,289 | 7,585 | 6,710 |
| 8 x 10-17 | 4,828 | 1,750 | 8,992 | 14,741 | 9,236 | 7,334 | 7,713 | 8,452 |

MODEL 3196 XLT-X

Materials: Titanium

Flanges: 150

| Size | Fmax | | Mmax | | Famax | | Mbmax | |
|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 6x8-13 | 5,375 | 2,015 | 11,495 | 14,735 | 16,915 | 14,955 | 5,320 | 4,240 |
| 8x10-13 | 5,175 | 2,280 | 10,906 | 17,535 | 10,130 | 16,555 | 5,410 | 5,320 |
| 6x8-15 | 5,455 | 1,920 | 11,490 | 14,735 | 17,170 | 14,255 | 5,320 | 4,240 |
| 8x10-15/G | 5,210 | 2,230 | 9,195 | 17,525 | 10,127 | 3,780 | 5,410 | 5,320 |
| 8x10-16H | 5,601 | 2,015 | 9,960 | 16,225 | 10,238 | 8,188 | 7,908 | 9,355 |
| 4x6-17 | 5,251 | 2,010 | 8,171 | 8,787 | 10,120 | 14,619 | 5,365 | 3,216 |
| 6x8-17 | 5,565 | 2,014 | 10,022 | 10,645 | 17,231 | 14,862 | 5,320 | 4,240 |
| 8x10-17 | 5,230 | 2,260 | 10,210 | 16,735 | 10,135 | 14,953 | 5,410 | 5,340 |

G972 A/B
Raw water make-up pump/s

FLANGE LOADING

MAXIMUM ALLOWABLE FLANGE LOADS ON MODEL 3180

Materials: Iron
Flanges: ANSI 125

| Sizes (in.) | F _{max} | | M _{max} | | F _{amax} | | M _{bmax} | |
|----------------|------------------|----------------|--------------------|------------------|-------------------|----------------|--------------------|------------------|
| | Suction (lbs) | Disch (lbs) | Suction (ft-lb) | Disch (ft-lb) | Suction (lbs) | Disch (lbs) | Suction (ft-lb) | Disch (ft-lb) |
| 3x6-12 | 2,839 | 3,505 | 611 | 420 | — | — | — | — |
| 4x6-12 | 4,157 | 5,924 | 894 | 905 | — | — | — | — |
| 6x8-12 | 4,962 | 4,157 | 1,350 | 894 | — | — | — | — |
| 8x8-12 | 6,340 | 6,340 | 2,846 | 2,624 | 7,231 | 7,231 | 1,968 | 1,968 |
| 3x6-14 | 4,157 | 4,430 | 894 | 531 | — | — | — | — |
| 4x6-14 | 4,157 | 5,924 | 894 | 905 | — | — | — | — |
| 4x6-16 | 3,747 | 6,273 | 806 | 958 | — | — | — | — |
| 6x8-14 | 2,097 | 1,767 | 1,318 | 565 | — | — | — | — |
| 8x8-14 | 7,231 | 7,231 | 1,968 | 1,968 | — | — | — | — |
| 10x10-14 | 4,928 | 4,928 | 1,622 | 1,622 | — | — | — | — |
| 12x12-14 | 1,990 | 1,990 | 764 | 764 | — | — | — | — |
| 6x8-16 | 4,001 | 3,747 | 1,089 | 806 | — | — | — | — |
| 4x6-19 | 5,601 | 6,691 | 1,205 | 1,022 | — | — | — | — |
| 6x10-16 | 9,469 | 11,255 | 3,272 | 2,421 | — | — | — | — |
| 8x10-16 | 6,914 | 11,643 | 2,275 | 3,167 | — | — | — | — |
| 10x12-16 | 9,653 | 9,880 | 4,298 | 3,251 | 10,923 | — | 4,196 | — |
| 14x14-16 | 10,382 | 9,568 | 4,657 | 8,641 | — | 10,382 | — | 4,657 |
| 4x8-19 | 3,875 | 7,000 | 1,054 | 1,069 | — | — | — | — |
| 6x10-19 | 11,348 | 10,349 | 4,394 | 4,860 | — | 12,174 | — | 2,618 |
| 8x10-19 | 9,178 | 12,190 | 3,067 | 9,974 | — | 20,845 | — | 5,676 |
| 10x12-19 | 8,322 | 8,322 | 2,739 | 2,739 | — | — | — | — |
| 6x10-22 | 3,623 | 8,100 | 1,192 | 1,743 | — | — | — | — |
| 8x10-22 | 7,398 | 6,194 | 2,076 | 2,275 | — | — | — | — |
| 12x14-19 | 11,239 | 9,304 | 6,553 | 6,522 | — | — | — | — |
| 16x16-19 | 10,890 | 10,308 | 12,123 | 6,131 | 12,128 | — | 6,131 | — |
| 10x12-22 | 8,827 | 10,571 | 3,391 | 3,479 | — | — | — | — |
| 12x14-22 | 8,750 | 8,827 | 3,925 | 3,391 | — | — | — | — |
| 14x16-22 | 9,130 | 11,255 | 4,800 | 9,957 | — | 17,587 | — | 7,888 |
| 18x18-22 | 9,124 | 9,124 | 9,851 | 8,330 | 15,329 | — | 8,605 | — |
| 6x10-25 | 10,352 | 13,242 | 3,407 | 2,849 | — | — | — | — |
| 8x12-25 | 9,095 | 10,608 | 3,680 | 10,316 | — | 20,849 | — | 5,945 |
| 10x14-25 | 6,461 | 5,148 | 6,087 | 2,691 | — | — | — | — |
| 20x20-25 | 8,914 | 8,914 | 10,599 | 9,080 | — | — | — | — |

Doc No: 253021 FL Rev0

pg 2 of 2



Operation and Maintenance

Flange Loading

770.1

March 31, 1962
(Sup. 5/10/62)

MAXIMUM ALLOWABLE FLANGE LOADING ON CENTRIFUGAL PUMPS

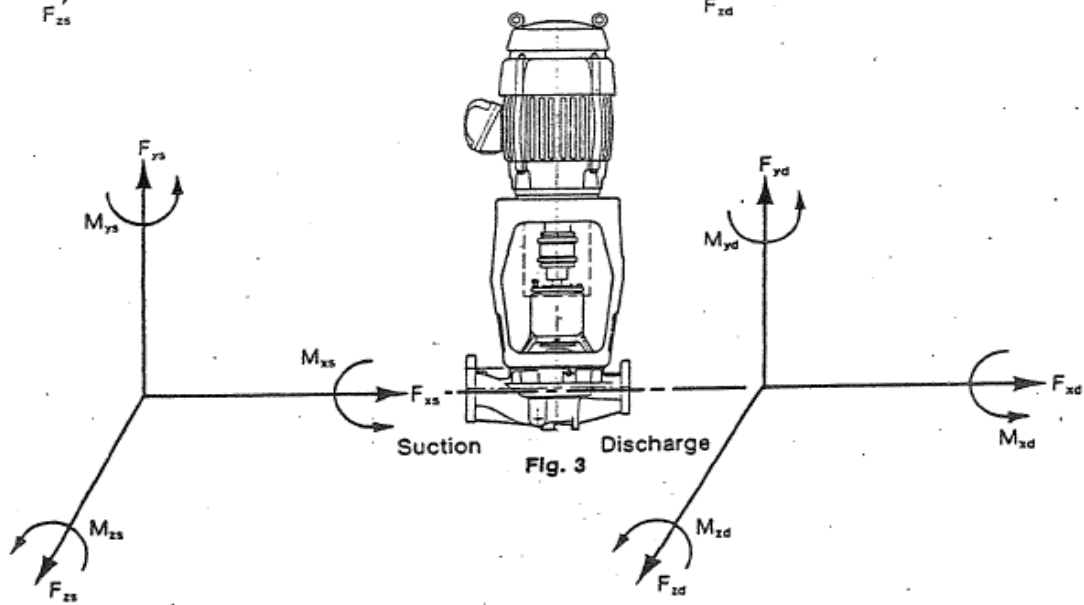
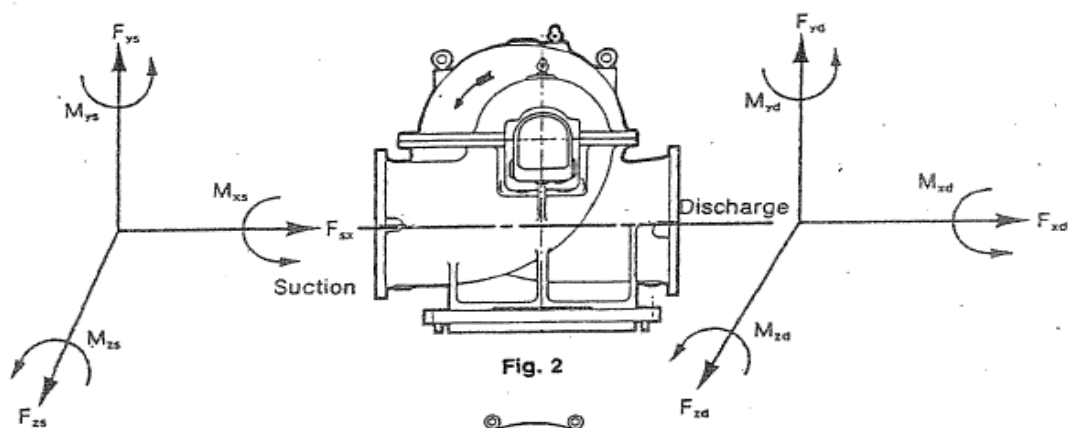
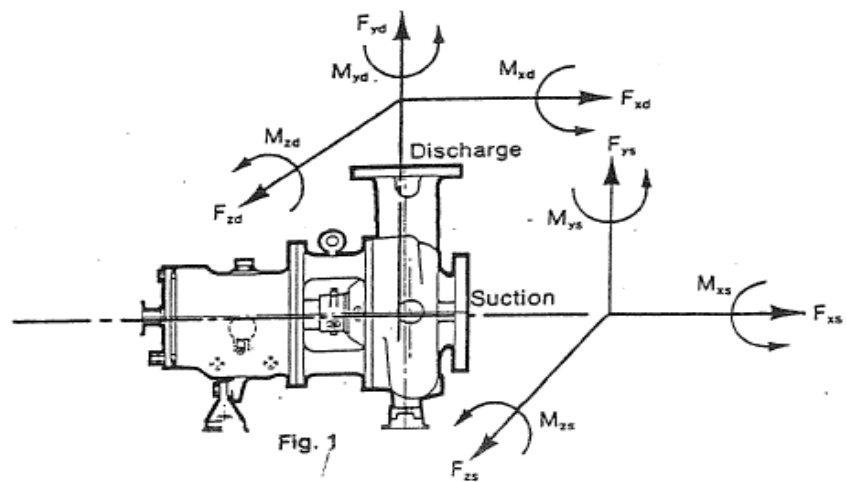
The attached data provides information to determine the maximum allowable flange loads on a particular pump. Tables with values specified by model, size, metallurgy, and flange loads are included. The values in tables 1 through 19 are based on the maximum pressure limitations of the pump flange.

If the calculated flange load exceeds specified limits, calculations based on the exact pumping conditions may allow higher flange loads. Contact EPD Applications with complete information on pump service and actual flange loads.

INDEX TO TABLES

| Model | Casing Material | Class of Flanges | Table |
|----------|-----------------|------------------|-------|
| 3175 | Iron | 125 | 1 |
| | Bronze | 150 | |
| | Steel | 150 | 2 |
| | Steel | 300 | 3 |
| 3196 | DI & Steel | 150 | 4 |
| | DI & Steel | 300 | |
| 3196 XLT | Titanium | 150 | 5 |
| 3316 | Iron | 250 | 17 |
| | Bronze | 300 | 18 |
| | Steel | 300 | |
| 3405 | Iron | 125 | 9 |
| | Bronze | 150 | 10 |
| | Iron | 250 | |
| | Bronze | 300 | 11 |
| | Steel | 150 | |
| 3415 | Steel | 300 | 12 |
| | Iron | 125* | 13 |
| | Bronze | 150** | |
| | Steel | 150 | 14 |
| 3420 | Iron | 125 | 15 |
| | Bronze | 150 | |
| | Steel | 150 | 16 |
| 3735 | Steel | 300 | 6 |
| 3735 M | Steel | 600 | |
| 3735 L | Steel | 600 | 7 |
| 3736 | Steel | 300 | 8 |
| | | 600 | |
| 3996 | DI & Steel | 150 | 19 |

* 250 discharge on 8x10-22, 10x12-22 & 12x14-18.
** 300 discharge on 8x10-22, 10x12-22 & 12x14-18.



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MAXIMUM ALLOWABLE FLANGE LOADS ON GOULDS END SUCTION PUMPS

(Models 3175, 3196, 3735, 3736)

Terms:

$F_{xs}, F_{ys}, F_{zs}, F_{xd}, F_{yd}, F_{zd}$
 $M_{xs}, M_{ys}, M_{zs}, M_{xd}, M_{yd}, M_{zd}$
 F_t
 F_c
 $F_{max}, F_{amax}, M_{max}, M_{bmax}$

Applied forces as shown in fig. 1, units in lbs.

Applied moments as shown in fig. 1, units in ft.-lbs.

Tensile force on discharge (F_{yd} if $F_{yd} \geq 0$, 0 if $F_{yd} < 0$), units in lbs.

Compressive force on discharge (F_{yd} if $F_{yd} < 0$), units in lbs.

Constants dependent on pump size & flange (Tables 1-8)

(When no entry is found in tables, equations using these constants may be disregarded.)

Limits: Loads applied to flanges must meet the following criteria.

Suction:

$$\frac{\sqrt{F_{xs}^2 + F_{ys}^2 + F_{zs}^2}}{F_{max}} + \frac{\sqrt{M_{xs}^2 + M_{ys}^2 + M_{zs}^2}}{M_{max}} \leq 1$$

$$\frac{\sqrt{F_{xs}^2 + F_{ys}^2 + F_{zs}^2}}{F_{amax}} + \frac{\sqrt{M_{xs}^2 + M_{ys}^2 + M_{zs}^2}}{M_{bmax}} \leq 1$$

$$\frac{|F_{xs}|}{.85 F_{max}} + \frac{\sqrt{M_{ys}^2 + M_{zs}^2}}{.64 M_{max}} \leq 1$$

$$\frac{|F_{xs}|}{.85 F_{amax}} + \frac{\sqrt{M_{ys}^2 + M_{zs}^2}}{.64 M_{bmax}} \leq 1$$

Discharge:

$$\frac{\sqrt{F_{xd}^2 + F_{td}^2 + F_{zd}^2}}{F_{max}} + \frac{\sqrt{M_{xd}^2 + M_{yd}^2 + M_{zd}^2}}{M_{max}} \leq 1$$

$$\frac{\sqrt{F_{xd}^2 + F_{td}^2 + F_{zd}^2}}{F_{amax}} + \frac{\sqrt{M_{xd}^2 + M_{yd}^2 + M_{zd}^2}}{M_{bmax}} \leq 1$$

$$\frac{F_t}{.85 F_{max}} + \frac{\sqrt{M_{xd}^2 + M_{zd}^2}}{.64 M_{max}} \leq 1$$

$$\frac{F_t}{.85 F_{amax}} + \frac{\sqrt{M_{xd}^2 + M_{zd}^2}}{.64 M_{bmax}} \leq 1$$

$$F_c \leq F_{max}$$

MAXIMUM ALLOWABLE FLANGE LOADS ON GOULDS HORIZONTALLY SPLIT & INLINE PUMPS

(Models 3316, 3405, 3415, 3420, 3996)

Terms:

$F_{xs}, F_{ys}, F_{zs}, F_{xd}, F_{yd}, F_{zd}$
 $M_{xs}, M_{ys}, M_{zs}, M_{xd}, M_{yd}, M_{zd}$

$F_{max}, F_{amax}, M_{max}, M_{bmax}$

Applied forces as shown in fig. 2 or 3, units in lbs.

Applied moments as shown in fig. 2 or 3, units in ft.-lbs.

Constants dependent on pump size & flange (Tables 9-19):

(When no entry is found in tables, equations using these constants may be disregarded.)

Limits: Loads applied to flanges must meet the following criteria.

Suction:

$$\frac{\sqrt{F_{xs}^2 + F_{ys}^2 + F_{zs}^2}}{F_{max}} + \frac{\sqrt{M_{xs}^2 + M_{ys}^2 + M_{zs}^2}}{M_{max}} \leq 1$$

$$\frac{\sqrt{F_{xs}^2 + F_{ys}^2 + F_{zs}^2}}{F_{amax}} + \frac{\sqrt{M_{xs}^2 + M_{ys}^2 + M_{zs}^2}}{M_{bmax}} \leq 1$$

$$\frac{|F_{xs}|}{.85 F_{max}} + \frac{\sqrt{M_{ys}^2 + M_{zs}^2}}{.64 M_{max}} \leq 1$$

$$\frac{|F_{xs}|}{.85 F_{amax}} + \frac{\sqrt{M_{ys}^2 + M_{zs}^2}}{.64 M_{bmax}} \leq 1$$

Discharge:

$$\frac{\sqrt{F_{xd}^2 + F_{yd}^2 + F_{zd}^2}}{F_{max}} + \frac{\sqrt{M_{xd}^2 + M_{yd}^2 + M_{zd}^2}}{M_{max}} \leq 1$$

$$\frac{\sqrt{F_{xd}^2 + F_{yd}^2 + F_{zd}^2}}{F_{amax}} + \frac{\sqrt{M_{xd}^2 + M_{yd}^2 + M_{zd}^2}}{M_{bmax}} \leq 1$$

$$\frac{|F_{xd}|}{.85 F_{max}} + \frac{\sqrt{M_{yd}^2 + M_{zd}^2}}{.64 M_{max}} \leq 1$$

$$\frac{|F_{xd}|}{.85 F_{amax}} + \frac{\sqrt{M_{yd}^2 + M_{zd}^2}}{.64 M_{bmax}} \leq 1$$

TABLE #1

Model 3175

Material: Iron Bronze
Flanges: 125 150

| Size | F _{max} | | M _{max} | | F _{amax} | | M _{amax} | |
|----------|------------------|-----------|------------------|-----------|-------------------|-----------|-------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 3x6-14 | 2,435 | 7,445 | 530 | 47,045 | — | 12,005 | — | 1,475 |
| 4x6-14 | 1,585 | 6,880 | 595 | 45,225 | — | 8,670 | — | 1,340 |
| 4x6-18 | 3,695 | 6,515 | 815 | 43,830 | — | 7,595 | — | 1,175 |
| 6x8-14 | 3,850 | 6,760 | 1,065 | 46,315 | — | 9,945 | — | 2,170 |
| 6x8-18 | 7,150 | 5,705 | 1,300 | 42,870 | — | 9,080 | — | 1,985 |
| 6x8-22 | 6,090 | 5,025 | 1,290 | 43,005 | — | 8,180 | — | 1,785 |
| 8x10-14 | 9,060 | 6,345 | 3,045 | 53,010 | — | 8,800 | — | 2,435 |
| 8x10-18 | 9,775 | 6,035 | 3,285 | 52,665 | — | 13,255 | — | 3,670 |
| 8x10-18H | 9,375 | 5,760 | 3,155 | 52,495 | — | 12,365 | — | 3,425 |
| 8x10-22 | 9,060 | 5,560 | 900 | 52,965 | — | 11,815 | — | 3,270 |
| 10x12-18 | 5,400 | 5,405 | 2,145 | 54,310 | — | 9,060 | — | 2,895 |
| 10x12-22 | 5,400 | 5,215 | 2,145 | 54,020 | — | 9,060 | — | 2,895 |
| 12x14-18 | 10,185 | 5,400 | 4,300 | 2,145 | — | — | — | — |
| 12x14-22 | 10,445 | 5,090 | 4,410 | 2,020 | — | — | — | — |
| 14x14-18 | 12,245 | 4,765 | 9,230 | 54,555 | 18,125 | 18,370 | 7,650 | 7,755 |
| 14x14-22 | 11,430 | 4,405 | 9,610 | 54,740 | 18,125 | 17,825 | 7,650 | 7,700 |
| 16x18-22 | 10,640 | 3,195 | 42,145 | 46,915 | 29,135 | 11,720 | 18,730 | 5,785 |
| 18x18-22 | 7,600 | 4,140 | 5,240 | 59,085 | 9,115 | 33,695 | 5,125 | 18,910 |
| 20x24-28 | 5,765 | 1,785 | 3,940 | 1,040 | — | — | — | — |

TABLE 2

Model 3175

Materials: Steel
Flanges: 150

| Size | F _{max} | | M _{max} | | F _{amax} | | M _{amax} | |
|----------|------------------|-----------|------------------|-----------|-------------------|-----------|-------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 3x6-14 | 13,890 | 5,715 | 10,285 | 36,120 | 28,550 | 40,285 | 4,515 | 4,940 |
| 4x6-14 | 14,160 | 4,635 | 27,725 | 30,490 | 23,020 | 31,275 | 3,260 | 4,840 |
| 4x6-18 | 6,680 | 4,195 | 1,220 | 28,650 | — | 34,840 | — | 5,395 |
| 6x8-14 | 13,440 | 3,660 | 20,320 | 25,010 | 42,380 | 35,310 | 6,825 | 7,705 |
| 6x8-18 | 11,660 | 1,965 | 25,200 | 13,790 | 63,350 | — | 12,750 | — |
| 6x8-22 | 9,890 | 1,750 | 24,140 | 14,845 | 26,300 | — | 4,350 | — |
| 8x10-14 | 12,910 | 1,515 | 28,375 | 11,350 | — | — | — | — |
| 8x10-18 | 12,620 | 1,330 | 27,680 | 11,550 | — | — | — | — |
| 8x10-18H | 10,955 | 1,330 | 27,680 | 12,140 | 101,330 | — | 20,670 | — |
| 8x10-22 | 11,525 | 1,325 | 28,765 | 11,350 | 70,925 | — | 14,640 | — |
| 10x12-18 | 8,200 | 3,540 | 17,675 | 35,530 | 35,150 | 24,375 | 13,965 | 19,700 |
| 10x12-22 | 7,620 | 2,625 | 18,735 | 22,895 | — | — | — | — |
| 12x14-18 | 9,210 | 2,195 | 25,630 | 22,065 | — | — | — | — |
| 12x14-22 | 9,310 | 2,120 | 25,665 | 22,065 | — | — | — | — |
| 14x14-18 | 8,565 | 2,120 | 24,905 | 24,340 | — | — | — | — |
| 14x14-22 | 8,095 | 2,055 | 24,970 | 24,970 | — | — | — | — |
| 18x18-22 | 7,745 | 2,660 | 29,780 | 38,060 | 33,335 | 33,335 | 18,675 | 18,675 |
| 20x24-28 | 14,140 | 4,835 | 12,440 | 2,810 | — | — | — | — |

TABLE 3

Model 3175

Material: Steel
Flanges: 300

| Size | F _{max} | | M _{max} | | F _{max} | | M _{max} | |
|----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 3x6-14 | 13,715 | 4,590 | 27,310 | 28,980 | 63,295 | 37,405 | 13,435 | 5,985 |
| 4x6-14 | 13,055 | 3,860 | 25,565 | 25,375 | 58,120 | 26,660 | 16,010 | 8,985 |
| 4x6-18 | 13,115 | 3,495 | 25,290 | 23,880 | 52,460 | 22,800 | 17,075 | 9,455 |
| 6x8-14 | 11,915 | 2,435 | 22,975 | 16,655 | 14,420 | 6,790 | 22,410 | 13,435 |
| 6x8-18 | 10,430 | 2,665 | 22,535 | 20,060 | 20,585 | 9,855 | 19,965 | 14,200 |
| 6x8-22 | 8,950 | 2,105 | 21,845 | 17,855 | 9,975 | 4,800 | 21,550 | 15,380 |
| 8x10-14 | 11,570 | 2,300 | 25,775 | 19,165 | — | 3,665 | — | 17,830 |
| 8x10-18 | 11,475 | 2,010 | 25,170 | 17,465 | — | — | — | — |
| 8x10-18H | 9,960 | 1,910 | 25,170 | 17,470 | — | — | — | — |
| 8x10-22 | 10,330 | 2,015 | 25,775 | 19,175 | — | 3,220 | — | 17,830 |
| 10x12-18 | 7,940 | 2,480 | 22,915 | 24,895 | 11,590 | 4,090 | 22,005 | 23,000 |
| 10x12-22 | 8,190 | 2,280 | 23,395 | 23,725 | 10,615 | 3,580 | 22,795 | 22,140 |
| 12x14-18 | 8,430 | 2,775 | 24,780 | 30,795 | 12,430 | 5,480 | 23,770 | 28,205 |
| 12x14-22 | 8,520 | 2,685 | 24,780 | 30,800 | 12,565 | 5,305 | 23,770 | 28,205 |
| 14x14-18 | 9,350 | 2,685 | 27,200 | 30,785 | 23,120 | 9,830 | 23,770 | 23,770 |
| 14x14-22 | 8,985 | 2,685 | 28,100 | 33,315 | 31,365 | 13,265 | 22,130 | 22,130 |
| 18x18-22 | 7,985 | 2,185 | 25,025 | 31,185 | — | 4,965 | — | 25,025 |
| 20x24-28 | 11,230 | 5,220 | 12,440 | 15,000 | — | — | — | — |

TABLE 4

Model 3196 (except Titanium XLT)

Material: DI & Steel
Flanges: 150 & 300

| Size | F _{max} | | M _{max} | | F _{max} | | M _{max} | |
|----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 1x1½-6 | 970 | 200 | 1,150 | 535 | 7,470 | 2,565 | 995 | 365 |
| 1½x3-6 | 1,060 | 210 | 1,250 | 565 | 6,865 | 3,440 | 965 | 265 |
| 2x3-6 | 870 | 210 | 1,055 | 570 | 4,580 | 2,005 | 965 | 465 |
| 1x1½-8 | 970 | 200 | 1,155 | 535 | 7,470 | 2,565 | 995 | 365 |
| 1½x3-8 | 1,060 | 210 | 1,250 | 565 | 6,865 | 3,440 | 965 | 265 |
| 2x3-6 | 885 | 450 | 1,160 | 610 | — | — | — | — |
| 2x3-8 | 1,115 | 650 | 1,675 | 975 | — | — | — | — |
| 3x4-8 | 1,050 | 620 | 1,400 | 1,160 | — | — | — | — |
| 3x4-8G | 1,050 | 620 | 1,400 | 1,160 | — | — | — | — |
| 1x2-10 | 1,410 | 1,020 | 1,980 | 1,660 | 11,560 | 6,600 | 1,040 | 330 |
| 1½x3-10 | 1,110 | 735 | 1,710 | 1,030 | — | — | — | — |
| 2x3-10 | 1,075 | 730 | 1,655 | 1,060 | — | — | — | — |
| 3x4-10 | 1,080 | 620 | 1,440 | 1,170 | — | — | — | — |
| 4x6-10 | 840 | 725 | 1,460 | 1,190 | — | — | — | — |
| 1½x3-13 | 985 | 655 | 1,450 | 1,060 | — | — | — | — |
| 2x3-13 | 1,330 | 790 | 2,950 | 1,740 | — | — | — | — |
| 3x4-13 | 1,140 | 785 | 2,300 | 1,925 | — | — | — | — |
| 4x6-13 | 1,480 | 625 | 2,960 | 1,480 | — | — | — | — |
| 6x8-13 | 4,735 | 1,560 | 10,125 | 11,395 | 15,415 | 7,335 | 7,585 | 6,710 |
| 8x10-13 | 4,580 | 1,855 | 9,640 | 14,240 | 12,175 | 9,640 | 5,655 | 7,595 |
| 6x8-15 | 4,500 | 1,045 | 9,280 | 8,010 | — | — | — | — |
| 8x10-15 | 3,995 | 1,495 | 8,360 | 11,755 | 8,380 | 3,615 | 7,345 | 9,905 |
| 8x10-15G | 3,995 | 1,495 | 8,360 | 11,755 | 8,380 | 3,615 | 7,345 | 9,905 |

TABLE 5

Model 3196 XLT

Material: Titanium
Flanges: 150

| Size | F _{max} | | M _{max} | | F _{max} | | M _{max} | |
|----------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 6x8-13 | 5,375 | 2,015 | 11,495 | 14,735 | 16,915 | 14,955 | 5,320 | 4,240 |
| 8x10-13 | 5,175 | 2,280 | 10,906 | 17,535 | 10,130 | 16,555 | 5,410 | 5,320 |
| 6x8-15 | 5,455 | 1,920 | 11,490 | 14,735 | 17,170 | 14,255 | 5,320 | 4,240 |
| 8x10-15 | 5,210 | 2,230 | 9,195 | 17,525 | 10,127 | 3,780 | 5,410 | 5,320 |
| 8x10-15G | 5,210 | 2,230 | 9,195 | 17,525 | 10,127 | 3,780 | 5,410 | 5,320 |

TABLE 6

Model 3735

Material: Steel
Flanges: 300 (all) & 600 (M only)

| Size | F _{max} | | M _{max} | | F _{max} | | M _{max} | |
|---------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 1½x3-7 | 4,320 | 1,550 | 6,785 | 7,585 | — | 3,725 | — | 900 |
| 2x3-7 | 4,085 | 1,410 | 6,335 | 6,700 | — | 4,780 | — | 1,600 |
| 3x4-7 | 3,450 | 910 | 5,170 | 3,915 | — | — | — | — |
| 4x6-7 | 2,840 | 1,215 | 4,515 | 5,170 | — | — | — | — |
| 1x1½-8 | 4,170 | 2,190 | 6,555 | 10,675 | 22,870 | 2,210 | 1,540 | 890 |
| 1½x2-9 | 4,310 | 1,845 | 6,845 | 9,450 | 28,075 | 2,415 | 2,415 | 725 |
| 2x3-9 | 4,040 | 1,370 | 6,510 | 6,890 | 4,040 | 1,400 | 6,510 | 2,980 |
| 3x4-9 | 3,355 | 860 | 5,480 | 4,435 | — | 2,405 | — | 2,660 |
| 6x8-9 | 2,735 | 1,448 | 5,465 | 7,920 | 2,735 | 1,445 | 5,470 | 7,925 |
| 1x2-11 | 4,345 | 1,950 | 7,535 | 2,390 | 24,675 | 2,290 | 2,120 | 695 |
| 2x4-11 | 4,120 | 775 | 7,510 | 4,235 | 4,120 | 1,980 | 7,510 | 1,235 |
| 3x4-11 | 3,790 | 815 | 7,005 | 4,440 | 5,680 | 2,865 | 6,615 | 3,195 |
| 3x4-11H | 3,275 | 860 | 6,985 | 4,595 | 3,275 | 2,340 | 6,070 | 4,155 |
| 4x6-11G | 3,810 | 1,490 | 6,940 | 8,485 | 8,920 | 6,220 | 5,905 | 3,165 |
| 1x2-13 | 4,340 | 1,875 | 7,925 | 10,630 | 17,050 | 3,205 | 2,120 | 435 |
| 1½x4-13 | 6,770 | 2,545 | 15,725 | 17,320 | 41,625 | 4,560 | 6,615 | 1,170 |
| 2x4-13 | 6,600 | 2,565 | 15,225 | 17,480 | 39,770 | 4,640 | 6,615 | 1,405 |
| 3x6-13 | 6,010 | 3,745 | 14,285 | 4,385 | 20,810 | 6,165 | 5,905 | 3,080 |
| 4x6-13 | 5,330 | 2,360 | 12,860 | 16,490 | 24,535 | 13,265 | 7,725 | 7,930 |

TABLE 7

Model 3735 L

Material: Steel
Flanges: 600

| Size | F _{max} | | M _{max} | | F _{max} | | M _{max} | |
|---------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 1½x4-13 | 6,655 | 1,815 | 15,460 | 12,515 | 27,815 | 4,295 | 9,940 | 1,280 |
| 2x4-13 | 6,235 | 1,830 | 14,385 | 12,440 | 23,420 | 4,025 | 9,940 | 1,475 |
| 3x6-13 | 5,760 | 810 | 13,685 | 4,755 | — | 1,611 | — | 3,375 |
| 4x6-13 | 5,175 | 1,125 | 12,485 | 7,855 | — | — | — | — |

TABLE 8

Model 3736

Material: Steel
Flanges: 300 & 600

| Size | F _{max} | | M _{max} | | F _{max} | | M _{max} | |
|---------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 1½x3-7 | 2,625 | 700 | 4,305 | 2,975 | 6,725 | 3,610 | 3,555 | 900 |
| 2x3-7 | 2,295 | 535 | 3,760 | 2,250 | 2,295 | 4,780 | 3,760 | 1,600 |
| 3x4-7 | 2,210 | 825 | 3,620 | 3,535 | 4,850 | 2,705 | 3,135 | 2,640 |
| 4x6-7 | 1,720 | 1,210 | 2,770 | 5,350 | 7,555 | 3,915 | 1,730 | 4,005 |
| 1x1½-8 | 2,455 | 1,315 | 4,025 | 5,600 | 16,085 | 2,210 | 1,540 | 890 |
| 1½x2-9 | 2,620 | 1,005 | 4,370 | 4,455 | 13,160 | 2,220 | 2,415 | 725 |
| 2x3-9 | 2,270 | 505 | 3,760 | 2,245 | — | 1,890 | — | 1,810 |
| 3x4-9 | 2,180 | 785 | 3,620 | 3,535 | 4,780 | 2,575 | 3,135 | 2,640 |
| 6x8-9 | 2,020 | 1,345 | 3,610 | 6,870 | 5,765 | 5,510 | 1,940 | 4,515 |
| 1x2-11 | 3,170 | 1,340 | 5,490 | 6,520 | 20,660 | 2,135 | 2,120 | 695 |
| 2x4-11 | 3,020 | 335 | 5,195 | 1,725 | 3,020 | 885 | 5,185 | 1,135 |
| 3x4-11 | 2,895 | 660 | 5,065 | 3,475 | 6,075 | 3,030 | 4,450 | 2,085 |
| 3x4-11H | 2,545 | 785 | 4,395 | 4,080 | 4,550 | 2,295 | 4,005 | 3,210 |
| 4x6-11G | 1,940 | 1,000 | 3,400 | 5,265 | 3,365 | 4,670 | 3,125 | 3,165 |
| 1x2-13 | 3,170 | 1,275 | 5,485 | 3,000 | 20,635 | 3,205 | 2,120 | 435 |
| 1½x4-13 | 6,160 | 2,275 | 14,945 | 14,445 | 37,080 | 4,365 | 6,615 | 1,170 |
| 2x4-13 | 6,005 | 2,305 | 14,375 | 14,435 | 35,180 | 4,070 | 6,615 | 1,385 |
| 3x6-13 | 5,275 | 2,350 | 12,960 | 15,380 | 16,555 | 5,675 | 5,905 | 3,080 |
| 4x6-13 | 4,250 | 1,955 | 11,170 | 12,965 | 16,075 | 8,780 | 7,725 | 7,930 |

TABLE 9

Model 3405

Material: Iron Bronze
Flanges: 125 150

| Size | F _{max} | | M _{max} | | F _{amax} | | M _{bmax} | |
|------------|------------------|-----------|------------------|-----------|-------------------|-----------|-------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 2x3-11 | 7,825 | 2,705 | 1,060 | 230 | — | — | — | — |
| 3x4-12 | 6,410 | 8,135 | 990 | 1,100 | — | — | — | — |
| 3x4-14 | 6,300 | 7,170 | 990 | 1,100 | — | — | — | — |
| 4x6-12 | 6,790 | 6,410 | 1,865 | 990 | — | — | — | — |
| 3x4-17 | 6,410 | 9,010 | 990 | 1,100 | — | — | — | — |
| 4x6-11 | 8,555 | 6,410 | 1,865 | 990 | — | — | — | — |
| 4x6-14 | 8,555 | 6,410 | 1,865 | 990 | — | — | — | — |
| 4x6-17 | 8,555 | 6,410 | 1,865 | 990 | — | — | — | — |
| 5x8-12 | 12,890 | 6,035 | 3,630 | 1,140 | — | — | — | — |
| 5x8-14 | 10,825 | 5,625 | 3,380 | 1,045 | — | — | — | — |
| 6x8-12 | 12,145 | 8,050 | 3,355 | 1,755 | — | — | — | — |
| 6x8-14 | 10,450 | 7,720 | 3,205 | 1,680 | — | — | — | — |
| 6x8-17DV | 9,725 | 7,720 | 7,625 | 1,680 | 11,600 | — | 3,205 | — |
| 8x10-12DV | 6,940 | 8,885 | 13,885 | 16,775 | 8,765 | 11,630 | 2,940 | 3,205 |
| 6x8-22DV | 10,260 | 7,550 | 4,005 | 1,645 | 11,065 | — | 3,205 | — |
| 8x10-14 | 8,765 | 16,915 | 2,940 | 4,675 | — | — | — | — |
| 8x10-17 | 8,765 | 11,605 | 2,940 | 3,205 | — | — | — | — |
| 10x12-12 | 7,810 | 8,765 | 3,100 | 2,940 | — | — | — | — |
| 10x12-14 | 7,810 | 8,765 | 3,100 | 2,940 | — | — | — | — |
| 10x12-17 | 7,810 | 8,765 | 3,100 | 2,940 | — | — | — | — |
| 12x14-12DV | 8,140 | 7,810 | 3,510 | 3,100 | — | — | — | — |
| 12x14-14DV | 8,140 | 7,810 | 3,510 | 3,100 | — | — | — | — |

TABLE 10

Model 3405

Material: Iron Bronze
Flanges: 250 300

| Size | F _{max} | | M _{max} | | F _{amax} | | M _{bmax} | |
|------------|------------------|-----------|------------------|-----------|-------------------|-----------|-------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 2x3-11 | 7,595 | 5,460 | 9,245 | 535 | 13,645 | — | 1,880 | — |
| 3x4-12 | 6,855 | 6,330 | 6,890 | 4,985 | 18,130 | 10,770 | 3,115 | 1,485 |
| 3x4-14 | 5,565 | 5,190 | 9,065 | 7,430 | 16,530 | 9,345 | 3,115 | 1,485 |
| 4x6-12 | 5,285 | 6,110 | 6,155 | 7,405 | 12,950 | 18,135 | 3,180 | 3,115 |
| 3x4-17 | 13,800 | 10,825 | 16,385 | 1,485 | 17,525 | — | 3,115 | — |
| 4x6-11 | 11,745 | 13,160 | 11,185 | 8,390 | 12,950 | 18,130 | 3,180 | 3,115 |
| 4x6-14 | 12,950 | 17,335 | 3,180 | 4,580 | — | 18,130 | — | 3,115 |
| 4x6-17 | 10,980 | 12,200 | 6,870 | 16,415 | 12,950 | 18,130 | 3,180 | 3,115 |
| 5x8-12 | 5,570 | 15,090 | 1,712 | 8,200 | — | 17,835 | — | 3,715 |
| 5x8-14 | 8,800 | 11,860 | 7,470 | 16,460 | 10,470 | 20,450 | 3,215 | 4,530 |
| 6x8-12 | 10,630 | 13,650 | 5,140 | 16,270 | 11,135 | 16,975 | 3,420 | 4,385 |
| 6x8-14 | 8,590 | 10,402 | 12,780 | 10,847 | 17,040 | 19,920 | 5,235 | 4,890 |
| 6x8-17DV | 7,990 | 9,155 | 14,790 | 14,450 | 16,595 | 19,245 | 5,235 | 4,892 |
| 8x10-12DV | 6,085 | 7,515 | 14,460 | 14,165 | 12,360 | 15,415 | 5,515 | 5,235 |
| 6x8-22DV | 9,305 | 8,930 | 27,250 | 24,345 | 20,645 | 16,230 | 7,320 | 4,440 |
| 8x10-14 | 12,885 | 16,150 | 11,125 | 8,530 | 15,050 | 17,040 | 5,515 | 5,234 |
| 8x10-17 | 11,135 | 13,770 | 13,320 | 18,180 | 15,050 | 17,040 | 5,515 | 5,235 |
| 10x12-12 | 10,400 | 14,080 | 6,168 | 5,513 | — | — | — | — |
| 10x12-14 | 10,960 | 13,355 | 6,170 | 5,515 | — | — | — | — |
| 10x12-17 | 9,825 | 11,830 | 6,170 | 5,515 | — | — | — | — |
| 12x14-12DV | 9,580 | 11,830 | 6,170 | 6,170 | — | — | — | — |
| 12x14-14DV | 9,580 | 11,830 | 6,170 | 6,170 | — | — | — | — |

TABLE 11

Model 3405

Material: Steel
Flanges: 150

| Size | F _{max} | | M _{max} | | F _{max} | | M _{max} | |
|------------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 2x3-11 | | | | | | | | |
| 3x4-12 | | | | | | | | |
| 3x4-14 | | | | | | | | |
| 4x6-12 | | | | | | | | |
| 3x4-17 | | | | | | | | |
| 4x6-11 | | | | | | | | |
| 4x6-14 | | | | | | | | |
| 4x6-17 | 6,993 | 4,447 | 14,128 | 8,059 | 15,670 | 14,130 | 11,623 | 5,552 |
| 5x8-12 | | | | | | | | |
| 5x8-14 | | | | | | | | |
| 6x8-12 | 8,391 | 7,865 | 16,332 | 12,840 | 16,293 | 15,379 | 6,836 | 3,350 |
| 6x8-14 | | | | | | | | |
| 6x8-17DV | 6,872 | 6,337 | 16,333 | 12,845 | 24,740 | 15,378 | 6,836 | 3,350 |
| 8x10-12DV | 5,413 | 3,947 | 12,243 | 6,836 | — | — | — | — |
| 6x8-22DV | 9,675 | 9,106 | 28,338 | 24,743 | 24,743 | 15,380 | 6,836 | 3,350 |
| 8x10-14 | | | | | | | | |
| 8x10-17 | 10,460 | 10,229 | 24,850 | 19,440 | 13,643 | 24,743 | 12,243 | 6,836 |
| 10x12-12 | 10,460 | 10,403 | 23,890 | 18,750 | 32,545 | 23,241 | 12,926 | 7,791 |
| 10x12-14 | | | | | | | | |
| 10x12-17 | 6,496 | 7,022 | 17,211 | 14,470 | 8,059 | — | 16,619 | — |
| 12x14-12DV | 7,078 | 7,027 | 16,606 | 12,926 | — | — | — | — |
| 12x14-14DV | 7,078 | 7,027 | 16,606 | 12,926 | — | — | — | — |

TABLE 12

Model 3405

Material: Steel
Flanges: 300

| Size | F _{max} | | M _{max} | | F _{max} | | M _{max} | |
|------------|------------------|-----------|------------------|-----------|------------------|-----------|------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 2x3-11 | | | | | | | | |
| 3x4-12 | | | | | | | | |
| 3x4-14 | | | | | | | | |
| 4x6-12 | | | | | | | | |
| 3x4-17 | | | | | | | | |
| 4x6-11 | | | | | | | | |
| 4x6-14 | | | | | | | | |
| 4x6-17 | | | | | | | | |
| 5x8-12 | | | | | | | | |
| 5x8-14 | | | | | | | | |
| 6x8-12 | | | | | | | | |
| 6x8-14 | | | | | | | | |
| 6x8-17DV | | | | | | | | |
| 8x10-12DV | 5,415 | 3,945 | 12,245 | 6,835 | — | — | — | — |
| 6x8-22DV | 9,675 | 9,105 | 28,340 | 24,845 | 24,745 | 15,380 | 6,835 | 3,350 |
| 8x10-14 | | | | | | | | |
| 8x10-17 | 10,460 | 10,230 | 24,850 | 19,440 | 13,645 | 24,745 | 12,245 | 6,835 |
| 10x12-12 | 9,000 | 7,330 | 20,555 | 13,220 | 15,400 | 15,440 | 18,465 | 11,130 |
| 10x12-14 | | | | | | | | |
| 10x12-17 | 6,495 | 7,020 | 17,210 | 14,470 | 8,060 | — | 16,620 | — |
| 12x14-12DV | 7,080 | 7,025 | 16,605 | 12,925 | — | — | — | — |
| 12x14-14DV | 7,080 | 7,025 | 16,605 | 12,925 | — | — | — | — |

TABLE 13

Model 3415

Iron
Bronze125 (250 Discharge on 8x10-22, 10x12-22, 12x14-18)
150 (300 Discharge on 8x10-22, 10x12-22, 12x14-18)

| Size | F _{max} | | M _{max} | | F _{amax} | | M _{amax} | |
|-----------|------------------|-----------|------------------|-----------|-------------------|-----------|-------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 8x10-22 | 9,389 | 10,344 | 31,093 | 29,985 | 20,319 | 20,602 | 6,812 | 5,692 |
| 10x12-22 | 11,113 | 12,237 | 40,124 | 42,496 | 16,365 | 26,426 | 6,500 | 8,860 |
| 12x14-18 | 9,620 | 7,801 | 32,787 | 23,406 | 31,016 | 10,043 | 13,380 | 3,989 |
| 14x16-18 | 6,644 | 8,388 | 29,369 | 22,931 | 28,143 | 17,161 | 13,848 | 7,401 |
| 14x16-22H | 8,918 | 9,125 | 41,199 | 35,158 | 28,143 | 18,041 | 13,848 | 7,781 |
| 16x18-18 | 6,862 | 4,819 | 31,370 | 13,665 | 19,580 | 10,914 | 23,064 | 5,370 |
| 16x18-22H | 8,628 | 4,400 | 43,200 | 18,592 | 16,296 | 11,777 | 30,403 | 5,793 |
| 18x20-22H | 6,281 | 4,110 | 33,267 | 18,563 | 10,037 | 8,507 | 30,426 | 15,726 |

TABLE 14

Model 3415

Material: Steel
Flanges: 150

| Size | F _{max} | | M _{max} | | F _{amax} | | M _{amax} | |
|-----------|------------------|-----------|------------------|-----------|-------------------|-----------|-------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 8x10-22 | 6,947 | 6,756 | 23,012 | 16,363 | 14,934 | 15,186 | 19,233 | 13,771 |
| 10x12-22 | 8,240 | 7,812 | 29,759 | 27,130 | 23,739 | 23,731 | 21,864 | 19,233 |
| 12x14-18 | 6,239 | 5,618 | 21,266 | 16,854 | 8,992 | 8,750 | 19,927 | 15,511 |
| 14x16-18 | 6,172 | 8,286 | 27,291 | 22,645 | 27,005 | 21,996 | 14,130 | 9,489 |
| 14x16-22H | 6,495 | 5,383 | 30,014 | 20,733 | 9,151 | 8,572 | 28,261 | 18,978 |
| 16x18-18 | 4,945 | 5,557 | 22,606 | 15,769 | 7,453 | 9,599 | 20,968 | 14,130 |
| 16x18-22H | 6,258 | 5,394 | 31,327 | 22,784 | 13,413 | 13,880 | 26,210 | 17,663 |
| 18x20-22H | 5,291 | 4,722 | 27,660 | 20,968 | — | — | — | — |

TABLE 15

Model 3420

Material: Iron Bronze
Flanges: 125 150

| Size | F _{max} | | M _{max} | | F _{amax} | | M _{amax} | |
|----------|------------------|-----------|------------------|-----------|-------------------|-----------|-------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 16x18-30 | 41,220 | 14,360 | 23,275 | 7,065 | — | — | — | — |
| 18x20-30 | 21,525 | 20,050 | 13,275 | 11,325 | — | — | — | — |
| 20x24-24 | 20,390 | 21,525 | 14,855 | 13,275 | — | — | — | — |
| 20x24-30 | 20,390 | 21,525 | 14,855 | 13,275 | — | — | — | — |
| 24x24-26 | 17,205 | 17,205 | 12,535 | 12,535 | — | — | — | — |
| 24x30-32 | 10,320 | 28,035 | 10,000 | 20,430 | — | — | — | — |
| 36x42-40 | 60,515 | 87,000 | 66,625 | 84,000 | — | — | — | — |
| 30x36-42 | 87,450 | 85,645 | 97,500 | 83,000 | — | — | — | — |

TABLE 16

Model 3420

Material: Steel
Flanges: 150

| Size | F _{max} | | M _{max} | | F _{amax} | | M _{amax} | |
|----------|------------------|-----------|------------------|-----------|-------------------|-----------|-------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 16x18-30 | 92,835 | 71,800 | 52,420 | 35,325 | — | — | — | — |
| 18x20-30 | 112,115 | 92,835 | 69,150 | 52,420 | — | — | — | — |
| 20x24-24 | 101,945 | 71,755 | 74,285 | 44,255 | — | — | — | — |
| 20x24-30 | 108,315 | 76,240 | 78,930 | 47,020 | — | — | — | — |
| 24x24-26 | 89,200 | 89,200 | 65,000 | 65,000 | — | — | — | — |
| 24x30-32 | — | — | — | — | — | — | — | — |
| 36x42-40 | — | — | — | — | — | — | — | — |
| 30x36-42 | — | — | — | — | — | — | — | — |

TABLE 17

Model 3316

Material: Iron
Flanges: 250 Bronze
300

| Size | F _{max} | | M _{max} | | F _{amax} | | M _{amax} | |
|---------|------------------|-----------|------------------|-----------|-------------------|-----------|-------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 1½x2-9 | 1,485 | 7,000 | 145 | 465 | — | — | — | — |
| 2x3-9G | 4,085 | 2,965 | 565 | 255 | — | — | — | — |
| 2x3-9 | 4,085 | 2,965 | 565 | 255 | — | — | — | — |
| 2x3-11 | 1,995 | 6,135 | 275 | 525 | — | — | — | — |
| 3x4-11G | 5,175 | 11,465 | 890 | 13,360 | — | 30,165 | — | — |
| 3x4-11 | 5,175 | 11,465 | 890 | 13,360 | — | 30,165 | — | — |
| 4x6-11G | 3,275 | 9,825 | 805 | 13,350 | — | 30,043 | — | — |
| 6x8-17 | 9,130 | 5,335 | 2,805 | 1,310 | — | — | — | — |
| 8x10-17 | 6,970 | 3,005 | 2,555 | 925 | — | — | — | — |

TABLE 18

Model 3316

Material: Steel
Flanges: 300

| Size | F _{max} | | M _{max} | | F _{amax} | | M _{amax} | |
|---------|------------------|-----------|------------------|-----------|-------------------|-----------|-------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 1½x2-9 | 7,520 | 8,330 | 9,430 | 8,515 | 23,875 | 16,820 | 2,040 | 1,125 |
| 2x3-9G | 7,020 | 5,240 | 8,845 | 5,140 | 26,082 | 19,965 | 5,415 | 1,705 |
| 2x3-9 | 7,020 | 5,240 | 8,845 | 5,140 | 26,082 | 19,965 | 5,415 | 1,705 |
| 2x3-11 | 9,460 | 5,155 | 10,735 | 9,175 | 36,800 | 41,225 | 5,075 | 3,520 |
| 3x4-11G | 11,025 | 9,230 | 15,190 | 10,760 | 42,885 | 36,740 | 8,920 | 4,495 |
| 3x4-11 | 11,025 | 9,230 | 15,190 | 10,760 | 42,885 | 36,740 | 8,920 | 4,495 |
| 6x8-17 | 9,480 | 6,010 | 21,130 | 10,355 | — | — | — | — |
| 8x10-17 | 7,320 | 5,585 | 20,035 | 11,185 | — | — | — | — |
| 4x6-11G | 7,710 | 4,140 | 14,010 | 4,990 | — | — | — | — |

TABLE 19

Model 3996

Material: D.I. Steel
Flanges: 150 150

| Size | F _{max} | | M _{max} | | F _{amax} | | M _{amax} | |
|---------|------------------|-----------|------------------|-----------|-------------------|-----------|-------------------|-----------|
| | Suction | Discharge | Suction | Discharge | Suction | Discharge | Suction | Discharge |
| 1½x2-6 | 5,395 | 2,900 | 3,080 | 1,910 | 19,735 | 19,785 | 1,685 | 1,330 |
| 1½x3-6 | 14,320 | 2,910 | 6,370 | 1,910 | 30,035 | 19,785 | 3,945 | 1,330 |
| 2x3-6 | 14,325 | 5,275 | 6,370 | 3,045 | 30,035 | 19,640 | 3,945 | 1,675 |
| 1½x2-8 | 5,405 | 2,910 | 3,080 | 1,910 | 19,735 | 19,785 | 1,685 | 1,330 |
| 1½x3-8 | 14,330 | 2,915 | 6,370 | 1,910 | 30,035 | 19,785 | 3,945 | 1,330 |
| 1½x2-10 | 10,455 | 5,870 | 5,050 | 3,110 | 29,820 | 30,235 | 2,545 | 2,030 |
| 1½x3-10 | 24,725 | 5,885 | 9,785 | 3,110 | 40,545 | 30,235 | 4,975 | 2,030 |
| 2x3-10 | 24,735 | 9,960 | 9,780 | 4,855 | 40,545 | 30,235 | 4,975 | 2,030 |
| 3x4-10 | 31,850 | 23,895 | 16,100 | 9,545 | 48,785 | 40,105 | 4,855 | 4,920 |
| 1½x3-13 | 37,245 | 8,850 | 13,930 | 4,580 | 58,740 | 33,645 | 7,205 | 2,260 |
| 2x3-13 | 37,275 | 15,120 | 13,925 | 7,040 | 58,740 | 33,645 | 7,205 | 2,260 |
| 3x4-13 | 42,230 | 35,385 | 6,435 | 13,395 | — | 57,895 | — | 7,100 |
| 4x6-13 | 52,525 | 48,600 | 11,180 | 7,405 | — | — | — | — |

EXAMPLE 1

3405M 6x8-17DV
CI w/125# Flanges

Customer's flange load data:

$F_{xs} = 200$ lbs.
 $F_{ys} = 300$ lbs.
 $F_{zs} = 400$ lbs.
 $M_{xs} = 500$ lbs. FT-LBS
 $M_{ys} = 600$ lbs. FT-LBS
 $M_{zs} = 700$ lbs. FT-LBS

$$\text{Suction: } (1) \frac{\sqrt{F_{xs}^2 + F_{ys}^2 + F_{zs}^2}}{F_{max}} + \frac{\sqrt{M_{xs}^2 + M_{ys}^2 + M_{zs}^2}}{M_{max}} \leq 1$$

From Table 9: $F_{max} = 9725$
 $M_{max} = 7625$

Thus, the above equation becomes:

$$\frac{\sqrt{200^2 + 300^2 + 400^2}}{9725} + \frac{\sqrt{500^2 + 600^2 + 700^2}}{7625} \leq 1$$

$\frac{.056}{.55} + \frac{.19}{.14} = .69 < 1$

$$(2) \frac{\sqrt{F_{xs}^2 + F_{ys}^2 + F_{zs}^2}}{F_{amax}} + \frac{\sqrt{M_{xs}^2 + M_{ys}^2 + M_{zs}^2}}{M_{bmax}} \leq 1$$

From Table 9: $F_{amax} = 11,600$
 $M_{bmax} = 3,205$

$$\frac{\sqrt{200^2 + 300^2 + 400^2}}{11,600} + \frac{\sqrt{500^2 + 600^2 + 700^2}}{3,205} \leq 1$$

$\frac{.046}{.46} + \frac{.37}{.79} = .79 < 1$

$$(3) \frac{|F_{xs}|}{.85 F_{max}} + \frac{\sqrt{M_{ys}^2 + M_{zs}^2}}{.64 M_{max}} \leq 1$$

Substituting as before:

$$\frac{|200|}{.85 (9725)} + \frac{\sqrt{600^2 + 700^2}}{.64 (7625)} = .024 + .189 = .213 < 1$$

$$(4) \frac{|F_{xs}|}{.85 F_{amax}} + \frac{\sqrt{M_{ys}^2 + M_{zs}^2}}{.64 M_{bmax}} \leq 1$$

Substituting as before:

$$\frac{|200|}{.85 (11,600)} + \frac{\sqrt{600^2 + 700^2}}{.64 (3,205)} = .020 + .449 = .469 < 1$$