

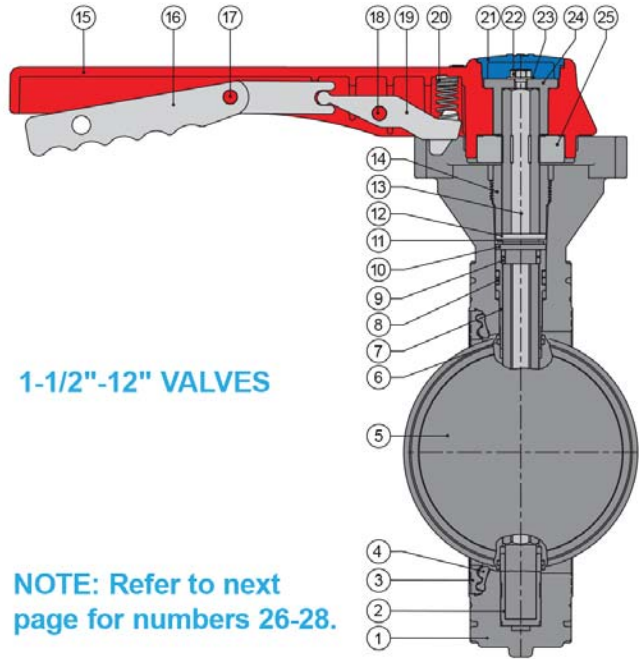
Butterfly Valve Dimensions & Operational Information



Replacement Parts for 1-1/2" - 12" PVC & CPVC Standard, True Lug and Polypropylene Valves

| No | Component | Qty. | Material |
|-----------------------------------|------------------------|----------------------|----------------------|
| 1 | Body | 1 | PVC/CPVC/PP |
| 2 | Stem Bearing | 1 | PTFE/GFPP |
| 3 | Seal Carrier | 1 | PVC/CPVC/PP |
| 4 | Seat | 1 | Buna-N, EPDM, FKM |
| 5 | Disc | 1 | PVC/CPVC/PP |
| 6 | Disc O-ring | 2 | Buna-N, EPDM, FKM |
| 7 | Stem Bushing | 1 | PTFE/GFPP |
| 8 | Stem Bushing O-ring | 2 | Buna-N, EPDM, FKM |
| 9 | Stem O-ring | 2 | Buna-N, EPDM, FKM |
| 10 | Stem Washer - Hex | 1 | PTFE |
| 11 | Stem Washer - Slot* | 1-2 | SS 316 |
| 12 | Stem Washer - Round | 1 | PTFE/GFPP |
| 13 | Stem | 1 | SS 316 |
| 14 | Stem Nut | 1 | PVC/CPVC |
| 15 | Handle Body | 1 | PP |
| 16 | Handle Grip | 1 | GFPVC |
| 17 | Grip Pin | 1 | PP |
| 18 | Lock Pin | 1 | PP |
| 19 | Handle Lock | 1 | GFPVC |
| 20 | Handle Spring | 1 | SS 316 |
| 21 | Handle Cover | 1 | PP |
| 22 | Hex Bolt | 1 | SS 316 |
| 23 | Flat Washer | 1 | SS 316 |
| 24 | Handle Bushing | 1 | GFPVC |
| 25 | Disc Timing Stop | 1 | CPVC |
| 26 | Lug Insert | 4-12 | SS/Zinc Plated Steel |
| 27 | Gear Operator Assembly | 1 | Cast Aluminum |
| 28 | Hand Wheel | 1 | PP |
| True Lug Only (not shown): | | | |
| Seal Carrier Flange Plate | 1 | PVC/CPVC | |
| Lug & Nut | 4-12 | SS/Zinc Plated Steel | |
| Plate O-ring | 1 | Buna-N, EPDM, FKM | |

Note: *2-Slotted washers used on 6" & larger
 1: See 14"-24" PP valve illustration for Gear Operator Components, No. 8 - 16



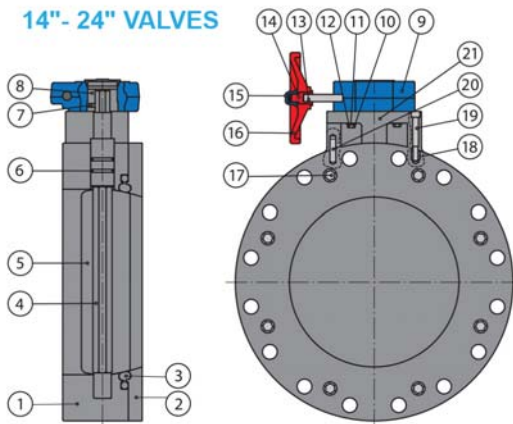
1-1/2"-12" VALVES

NOTE: Refer to next page for numbers 26-28.

Replacement Parts for 14" - 24" Polypropylene Valves

| No. | Component | Qty | Material |
|-----|---------------------|------|-----------------------|
| 1 | Body | 1 | PP |
| 2 | Seal Carrier | 1 | PP |
| 3 | Seat | 1 | EPDM/FKM |
| 4 | Stem | 1 | SS 316L |
| 5 | Disc | 1 | PP |
| 6 | Stem O-ring | 2 | EPDM/FKM |
| 7 | Set Screw | 1 | Steel |
| 8 | Drive Bushing | 1 | Steel |
| 9 | Gear Operator | 1 | Epoxy Coated Aluminum |
| 10 | Flat Washer | 4 | SS 316 |
| 11 | Lock Washer | 4 | SS 316 |
| 12 | Hex Head Cap Screw | 4 | SS 316 |
| 13 | Handwheel Pin | 1 | SS 316 |
| 14 | Handwheel Adapter | 1 | GFPVC |
| 15 | Handwheel Nut | 1 | PP |
| 16 | Handwheel | 1 | PP |
| 17 | Hex Bolts | 6-12 | Nylon |
| 18 | Thread Insert | 2 | Steel |
| 19 | Hex Head Cap Screws | 2 | SS 316 |
| 20 | Dowel Pin | 1 | Steel |
| 21 | Tower | 1 | PP |

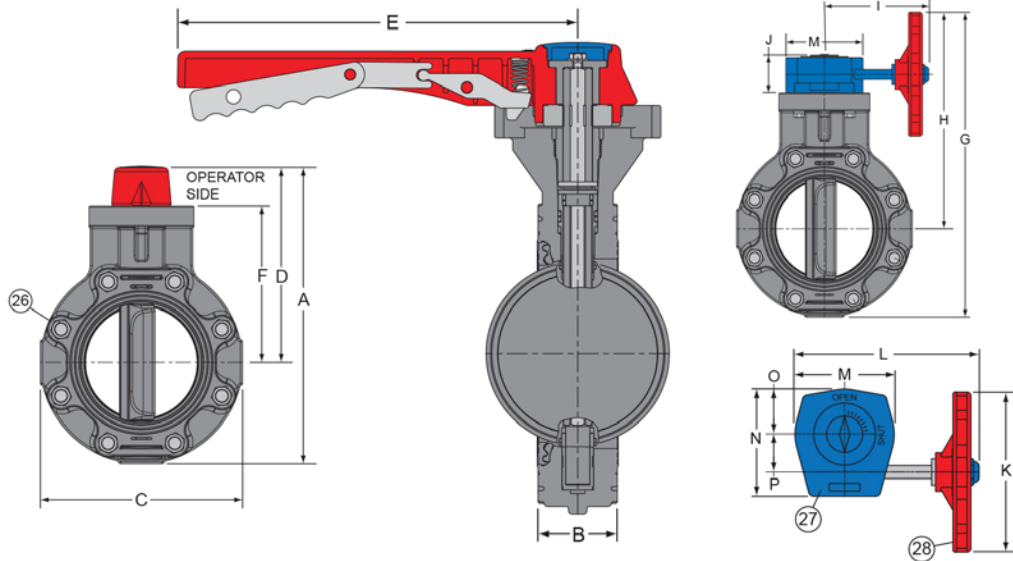
14" - 24" VALVES





Butterfly Valve Dimensions & Operational Information

Standard, True Lug & Polypropylene



Dimensions

| Nominal Size | Pressure Rating ¹ (psi) | A | B | | C | D | E | F | G |
|--------------|---|----------|---------------------------------------|----------|----------|---------|----------|----------|---------|
| | | | Standard, Lug Insert, & Polypropylene | True Lug | | | | | |
| 1-1/2 | 150 | 8-5/32 | 1-9/16 | 2-1/4 | 5 | 5-19/32 | 9-3/32 | 4-3/32 | 11-5/32 |
| 2 | 150 | 9-11/32 | 1-15/16 | 2-9/16 | 6 | 6-13/32 | 9 | 4-3/4 | 13-1/8 |
| 2-1/2 | 150 | 10-9/32 | 2 | 2-3/4 | 7 | 6-25/32 | 9-1/4 | 5-1/4 | 13-1/8 |
| 3 | 150 | 11-1/2 | 2-3/32 | 2-13/16 | 7-1/2 | 7-27/32 | 12 | 5-5/8 | 14-5/32 |
| 4 | 150 | 13 | 2-9/32 | 3 | 9 | 8-1/2 | 12 | 6-1/4 | 15-5/8 |
| 6 | 150 | 16-19/32 | 2-3/4 | 3-13/32 | 10-31/32 | 11-3/32 | 13-7/8 | 8-19/32 | 19-7/32 |
| 8 | 150 | 18-5/8 | 2-15/16 | 3-23/32 | 13-1/2 | 12 | 13-15/16 | 9-1/2 | 21-7/16 |
| 10 | 150 | N/A | 3-1/4 | 4-1/4 | 16 | N/A | N/A | 11 | 26-5/8 |
| 12 | 150 | N/A | 3-1/2 | 4-1/2 | 19 | N/A | N/A | 12 | 29-1/8 |
| 14 | 100 ² | N/A | 6-1/4 | N/A | 21 | N/A | N/A | 13-3/16 | 29 |
| 16 | 85 ² | N/A | 6-3/4 | N/A | 23-1/2 | N/A | N/A | 14-7/16 | 31-1/2 |
| 18 | 70 ² | N/A | 7-1/8 | N/A | 25 | N/A | N/A | 15-3/16 | 33 |
| 20 | 50 ² | N/A | 7-3/4 | N/A | 27-1/2 | N/A | N/A | 16-7/16 | 35-1/2 |
| 24 | 50 ² | N/A | 8-7/16 | N/A | 32 | N/A | N/A | 18-11/16 | 40 |
| 30-60 | Contact Spears® for 30" to 60" Valve Dimensions | | | | | | | | |

| Nominal Size | H | I | J | K | L | M | N | O | P |
|--------------|---|--------|---------|---------|----------|---------|---------|---------|---------|
| 1-1/2 | 8-21/32 | 6-7/16 | 2-3/8 | 8 | 8-13/16 | 4-13/16 | 5-3/16 | 2-13/16 | 1-27/32 |
| 2 | 10-1/8 | 6-7/16 | 2-3/8 | 8 | 8-13/16 | 4-13/16 | 5-3/16 | 2-13/16 | 1-27/32 |
| 2-1/2 | 9-5/8 | 6-7/16 | 2-3/8 | 8 | 8-13/16 | 4-13/16 | 5-3/16 | 2-13/16 | 1-27/32 |
| 3 | 10-17/32 | 6-7/16 | 2-3/8 | 8 | 8-13/16 | 4-13/16 | 5-3/16 | 2-13/16 | 1-27/32 |
| 4 | 11-1/8 | 6-7/16 | 2-3/8 | 8 | 8-13/16 | 4-13/16 | 5-3/16 | 2-13/16 | 1-27/32 |
| 6 | 13-23/32 | 6-7/16 | 2-13/32 | 7-15/16 | 8-7/8 | 4-27/32 | 5-5/32 | 2-7/32 | 1-27/32 |
| 8 | 14-11/16 | 6-7/16 | 2-13/32 | 7-15/16 | 8-7/8 | 4-27/32 | 5-3/16 | 2-7/32 | 1-27/32 |
| 10 | 18-5/8 | 7-1/8 | 2-3/8 | 8 | 9-13/16 | 5-3/8 | 5-15/16 | 2-7/16 | 2-11/32 |
| 12 | 19-5/8 | 7-1/8 | 2-3/8 | 8 | 9-13/16 | 5-3/8 | 5-15/16 | 2-7/16 | 2-11/32 |
| 14 | 18-1/2 | 7-3/8 | 2-9/16 | 8 | 10-13/16 | 6-7/8 | 7-7/16 | 3-1/8 | 3 |
| 16 | 19-3/4 | 7-3/8 | 2-9/16 | 8 | 10-13/16 | 6-7/8 | 7-7/16 | 3-1/8 | 3 |
| 18 | 20-1/2 | 7-3/8 | 2-9/16 | 8 | 10-13/16 | 6-7/8 | 7-7/16 | 3-1/8 | 3 |
| 20 | 21-3/4 | 7-3/8 | 2-9/16 | 8 | 10-13/16 | 6-7/8 | 7-7/16 | 3-1/8 | 3 |
| 24 | 24 | 7-3/8 | 2-9/16 | 8 | 10-13/16 | 6-7/8 | 7-7/16 | 3-1/8 | 3 |
| 30-60 | Contact Spears® for 30" to 60" Valve Dimensions | | | | | | | | |

1: Maximum Internal Pressure Rating @ 73°F

2: Additional pressure rating is possible with attention to flow direction.

Valves Technical Butterfly Valve Dimensions & Operational Information



C_v Values & Operating Torque

| Valve Size | C _v ¹ Degrees Open | | | | | | Operating ² Torque (in.-lbs.) |
|------------|--|------|------|------|-------|-------|--|
| | 15° | 30° | 45° | 60° | 75° | 90° | |
| 1-1/2 | 2 | 8 | 20 | 36 | 61 | 81 | 100 |
| 2 | 3 | 11 | 27 | 49 | 82 | 109 | 110 |
| 2-1/2 | 5 | 19 | 48 | 86 | 144 | 192 | 206 |
| 3 | 9 | 35 | 86 | 155 | 259 | 345 | 360 |
| 4 | 10 | 41 | 103 | 185 | 308 | 411 | 420 |
| 6 | 28 | 113 | 281 | 506 | 844 | 1125 | 720 |
| 8 | 56 | 225 | 562 | 1012 | 1687 | 2249 | 1200 |
| 10 | 111 | 444 | 1110 | 1998 | 3330 | 4440 | 1320 |
| 12 | 158 | 631 | 1577 | 2839 | 4732 | 6309 | 1920 |
| 14 | 176 | 705 | 1762 | 3172 | 5286 | 7048 | See Notes |
| 16 | 211 | 846 | 2114 | 3805 | 6341 | 8455 | |
| 18 | 273 | 1092 | 2730 | 4914 | 8190 | 10920 | |
| 20 | 355 | 1418 | 3545 | 6381 | 10635 | 14180 | |
| 24 | 467 | 1866 | 4665 | 8397 | 13995 | 18660 | |

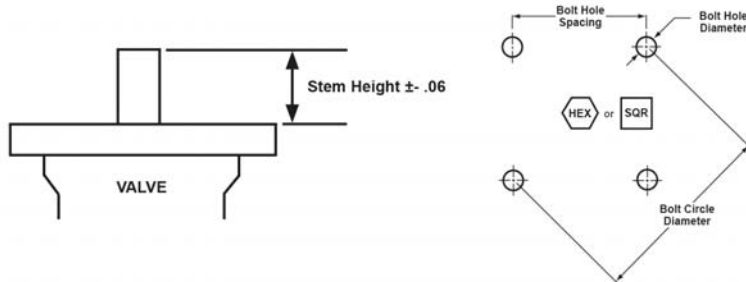
1: Gallons per minute at 1 psi pressure drop.

2: Operating torque for large diameter valves varies significantly with system operating pressure, flow direction and velocity. Contact Spears® for torque requirement based on application.

Actuator Mounting Dimensions For Custom Actuation

| Size | Bolt Hole Spacing | | Bolt Hole Diameter | | Bolt Circle Diameter | | Hex | Square | Stem Height | |
|-------|-------------------|-------|--------------------|-------|----------------------|-------|---------------|---------------|-------------|-------|
| | Standard | Wafer | Standard | Wafer | Standard | Wafer | + .000 - .006 | + .000 - .002 | Standard | Wafer |
| 1-1/2 | 1.95 | N/A | .34 | N/A | 2.75 | N/A | .375 | N/A | .75 | N/A |
| 2 | 1.95 | 2.47 | .34 | .40 | 2.75 | 3.50 | .500 | .375 | .75 | 1.30 |
| 2-1/2 | 1.95 | 2.47 | .34 | .40 | 2.75 | 3.50 | .500 | .375 | .75 | 1.34 |
| 3 | 2.65 | 2.47 | .41 | .40 | 3.75 | 3.50 | .563 | .500 | 1.00 | 1.34 |
| 4 | 2.65 | 2.47 | .41 | .40 | 3.75 | 3.50 | .625 | .500 | 1.04 | 1.37 |
| 6 | 3.17 | 2.83 | .41 | .40 | 4.48 | 4.00 | .875 | .750 | 1.27 | 1.80 |
| 8 | 3.17 | 3.17 | .41 | .40 | 4.48 | 4.48 | 1.000 | .875 | 1.29 | 1.96 |
| 10 | 3.54 | 3.54 | .41 | .41 | 5.00 | 5.00 | 1.125 | 1.000 | 1.38 | 1.38 |
| 12 | 3.54 | 3.54 | .41 | .41 | 5.00 | 5.00 | 1.250 | 1.000 | 1.38 | 1.38 |
| 14 | 3.54 | N/A | .41 | N/A | 5.00 | N/A | 1.250 | N/A | 1.62 | N/A |
| 16 | 3.54 | N/A | .41 | N/A | 5.00 | N/A | 1.250 | N/A | 1.75 | N/A |
| 18 | 3.54 | N/A | .41 | N/A | 5.00 | N/A | 1.250 | N/A | 1.75 | N/A |
| 20 | 3.93 | N/A | .41 | N/A | 5.56 | N/A | 1.250 | N/A | 1.75 | N/A |
| 24 | 4.33 | N/A | .41 | N/A | 6.12 | N/A | 1.250 | N/A | 1.75 | N/A |

Note: Standard = Standard, Lug & True Lug Style Valves
Wafer = Wafer Style Valves





Butterfly Valve Dimensions & Operational Information

General Installation Information

Spears® Butterfly Valves are designed for system connections either between two flanges, or with single-side (flange one-side only) connection for dead-end service using lug style valves. Lug Insert Valves require attention to flow direction; True Lug valves may be installed either direction. The valve handle (or gear operator) is reversible 180° for either left or right side operation. Spears® Butterfly Valves are designed for installation with user supplied 1/8" full-faced gaskets, hex bolts, nuts and flat washers.

Caution: Spears® Butterfly Valves are designed for use with flanges or flanged equipment having minimum waterway inside diameter no less than that of Schedule 80 PVC pipe (ASTM D 1785). *Use of smaller inside diameter flange connections may result in obstruction and damage to the valve disc.*

PVC & CPVC Butterfly Valve Torque and Hardware Requirements

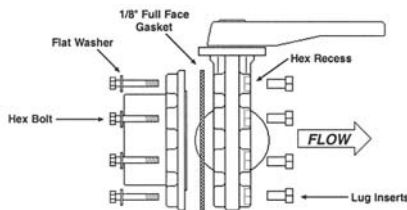
| Valve Size (in.) | No. of Bolt Holes | Bolt Torque (ft.- lb.) | Standard Valve | | | | | | Valve with Lug Inserts | | | | | True Lug Valve | | | |
|------------------|-------------------|------------------------|---------------------------------|--------------------------|---------------------|-----------------------|------------------------|---------------------------------|-------------------------|---------------------|----------------------|------------------------|---------------------------------|---------------------|----------------------|------------------------|--|
| | | | Bolt Lengths ¹ (in.) | | Bolt Diameter (in.) | Bolt Threads per inch | Flat Washer O.D. (in.) | Bolt Lengths ¹ (in.) | | Bolt Diameter (in.) | Lug Threads per inch | Flat Washer O.D. (in.) | Bolt Lengths ² (in.) | Bolt Diameter (in.) | Lug Threads per inch | Flat Washer O.D. (in.) | |
| | | | Single Side | Dual Flange ³ | | | | Single Side | 2nd Flange ² | | | | | | | | |
| 1-1/2 | 4 | 12 | 3-1/4 | 4-1/4 | 1/2 | 13 | 1-3/8 | 1-3/4 | 1-1/2 | 1/2 | 13 | 1-3/8 | 1-1/2 | 7/16 | 14 | 1-1/4 | |
| 2 | 4 | 25 | 3-3/4 | 4-3/4 | 5/8 | 11 | 1-3/4 | 2 | 1-3/4 | 5/8 | 11 | 1-3/4 | 1-1/2 | 1/2 | 13 | 1-3/8 | |
| 2-1/2 | 4 | 25 | 4-1/4 | 5-1/4 | 5/8 | 11 | 1-3/4 | 2-1/4 | 2 | 5/8 | 11 | 1-3/4 | 1-3/4 | 1/2 | 13 | 1-3/8 | |
| 3 | 4 | 25 | 4-1/4 | 5-1/2 | 5/8 | 11 | 1-3/4 | 2-1/4 | 2 | 5/8 | 11 | 1-3/4 | 2 | 1/2 | 13 | 1-3/8 | |
| 4 | 8 | 25 | 4-1/2 | 5-3/4 | 5/8 | 11 | 1-3/4 | 2-1/2 | 2 | 5/8 | 11 | 1-3/4 | 2 | 1/2 | 13 | 1-3/8 | |
| 6 | 8 | 40 | 5-1/4 | 6-3/4 | 3/4 | 10 | 2 | 3-1/4 | 2-1/4 | 3/4 | 10 | 2 | 2-1/4 | 5/8 | 11 | 1-3/4 | |
| 8 | 8 | 40 | 5-3/4 | 7-1/4 | 3/4 | 10 | 2 | 3-3/4 | 2-1/4 | 3/4 | 10 | 2 | 2-1/4 | 5/8 | 11 | 1-3/4 | |
| 10 | 12 | 64 | 6-1/2 | 8-1/4 | 7/8 | 9 | 2-1/4 | 4 | 3 | 7/8 | 9 | 2-1/4 | 2-3/4 | 3/4 | 10 | 2 | |
| 12 | 12 | 95 | 6-3/4 | 8-1/2 | 7/8 | 9 | 2-1/4 | 4-1/4 | 3 | 7/8 | 9 | 2-1/4 | 2-3/4 | 3/4 | 10 | 2 | |

1: Minimum bolt lengths based on use of Spears® flanges, 1/8" full faced gaskets, standard S.A.E. hex bolts and Standard Plate Series flat washers.

2: Specified bolt lengths are maximum allowable for maintaining proper clearance in initial Single-Side installation with Lugs where anticipated 2nd Flange installation option is to be retained without removal of valve.

3: Minimum bolt length through 2-flanges, 2-gaskets, 2-flat washers and 1-valve body.

Single-Side (flange one side) Installation Using Standard Valve with Lug Inserts (for field installable Insert Sets or valves with factory installed Lug Inserts)



CAUTION: Flange must be installed on side of valve **opposite** the hex nut recesses for Single-Side Installation as illustrated.

(Flange, bolts, nuts, washers and gaskets not included. Lug inserts may be ordered separately.)

Polypropylene Butterfly Valve Torque and Hardware Requirements

| Valve Size | No. of Bolt Holes | Bolt Diameter (in.) | Bolt Torque (ft.- lb.) | Bolt Lengths | Valve Lay Length |
|------------|-------------------|---------------------|------------------------|---|------------------|
| 1-1/2 | 4 | 1/2 | 12 | Bolt lengths will vary according to thickness of valve, mating flanges, nuts and gaskets used. The following formula may be use to calculate bolt length for installation with mating flange each side. $L = V + 2 (F + G + W) + N$ Where: L = Minimum Bolt Length V = Valve Lay Length F = Flange Thickness G = Gasket Thickness W = Washer Thickness N = Nut Thickness | 1-9/16 |
| 2 | 4 | 5/8 | 25 | | 1-7/8 |
| 2-1/2 | 4 | 5/8 | 25 | | 2-1/16 |
| 3 | 4 | 5/8 | 25 | | 2-1/8 |
| 4 | 8 | 5/8 | 25 | | 2-5/16 |
| 6 | 8 | 3/4 | 40 | | 3 |
| 8 | 8 | 3/4 | 40 | | 2-3/4 |
| 10 | 12 | 7/8 | 64 | | 3-1/4 |
| 12 | 12 | 7/8 | 95 | | 3-1/2 |
| 14 | 12 | 1 | 110 | | 6-1/4 |
| 16 | 16 | 1 | 110 | | 6-3/4 |
| 18 | 16 | 1-1/8 | 110 | | 7-1/8 |
| 20 | 20 | 1-1/8 | 110 | | 7-3/4 |
| 24 | 20 | 1-1/4 | 110 | | 8-1/2 |