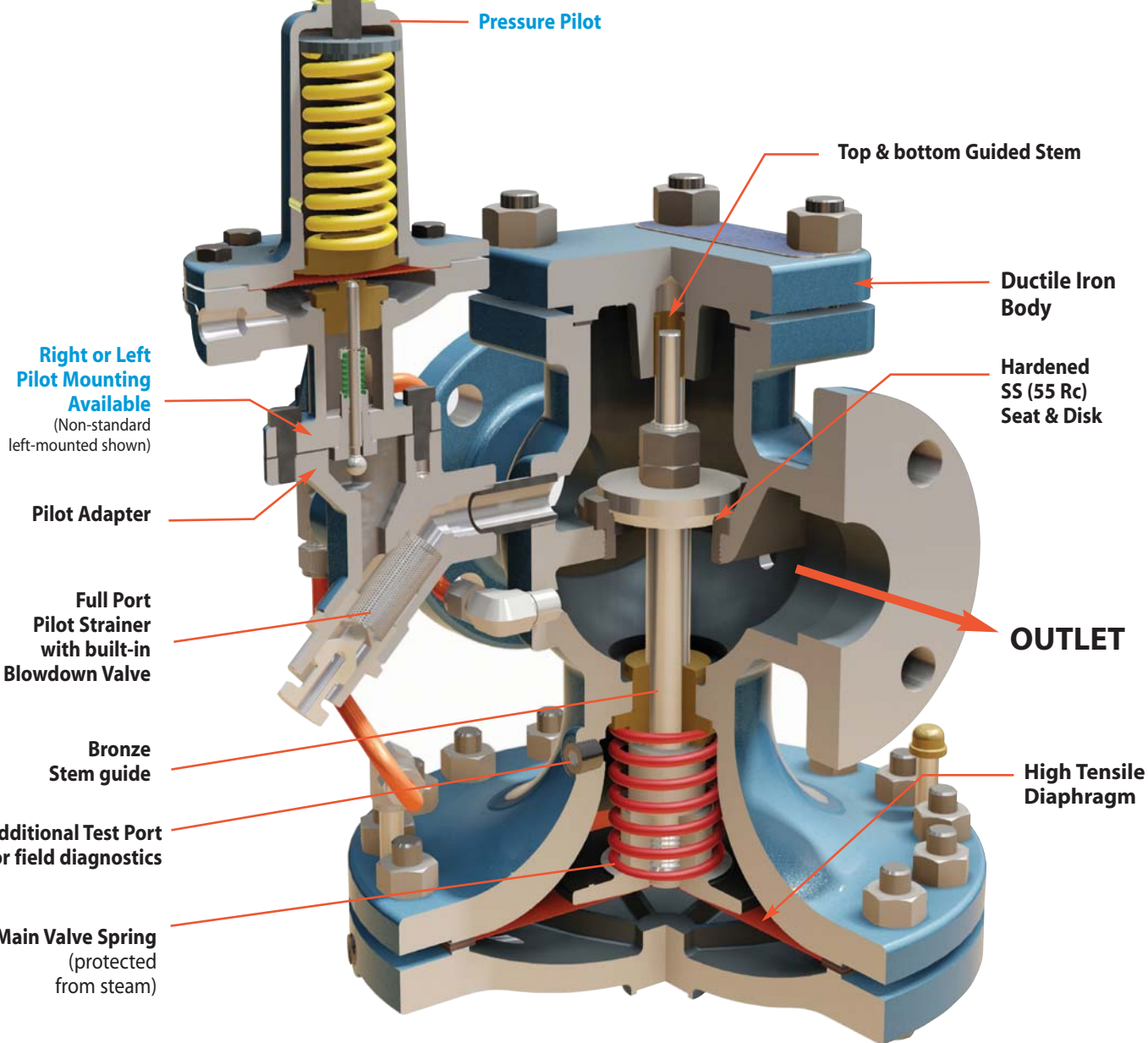


HD Main Valve (shown with Pressure Pilot) Ductile Iron Body



Features of the HD Regulating Valve

- No external power source is required.
- Pressure & temperature pilots can be used in combination, eliminating the need for a separate pressure and temperature regulator.
- Ductile iron body for higher pressure ranges and increased safety when compared to cast iron.
- Full port strainer and blowdown valve on pilot adapter for ultimate protection against dirt and scale.
- Hardened stainless steel trim (55 Rc) for extended life even in the most demanding applications.
- The innovative design allows the pilot to be mounted on either side of the regulator and is easily field-reversible without having to rebend tubing.
- Tubing and pilot adapter is pre-mounted on main valve. The control pilot requires only four bolts to complete the installation.

Regulators

Pilot-Operated Regulating Valves

HD Series

HD Main Valve • Ductile Iron

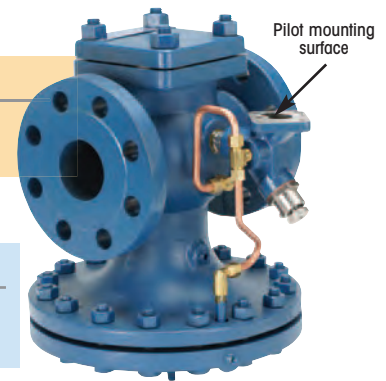
Main Valve	HD-Series		
Sizes	1/2" – 6"		
Connections	NPT: 1/2" - 2" FLG: 1" - 6"		
Body Material	Ductile Iron		
PMO Max. Operating Pressure	300 PSIG		
Design Pressure/ Temperature Ratings	NPT	450 PSIG @ 650° F	
	150# FLG	150 PSIG @ 566° F	
	300# FLG	450 PSIG @ 650° F	
TMA/PMA			

STANDARD Main Valve Spring:

Inlet Pressure: **15-300 PSIG**
Example Model Code: **HD-12-N**

LOW-PRESSURE Main Valve Spring:

Inlet Pressure: **5-20 PSIG**
Example Model Code: **HD-12-N-LP**



Pilot-Operated
REGULATORS

Model Code Configuration Chart

Models		Code	Size	Code	Connection Type	Options	(Suffix)
HD	Full Port	12	1/2"	N	NPT (1/2"–2")	SSD	SS Diaphragm
HDR	Reduced Port	13	3/4"	BSP	BSPT (1/2"–2")	SSXT	SS External Tubing
		14	1"	F150	150# FLG (1"–6")	LP	Low Pressure (LP Spring, EPDM Diaphragm, & By-Pass Tubing)
		15	1 1/4"	F300	300# FLG (1"–6")	LDP	Low-Differential Pressure (LDP Spring & Bronze Diaphragm)
		16	1 1/2"				Note: For more than one Option, combine suffixes.
		17	2"				Example: SSD-SSXT
		18	2 1/2"				
		19	3"				
		20	4"				
		22	6"				

Model Codes below are for HD Main Valve ONLY. Control Pilot must be ordered separately. When two or more pilots are used on the same valve, a pilot adapter must be ordered also. Use Part Number BADAPTER.

ANSI/FCI 70-3 Class IV Shut-off

Size/Connection	STANDARD Inlet Pressure 15 - 300 PSI	LOW-PRESSURE Inlet Pressure 5 - 20 PSI	Weight lbs
1/2" NPT	HD-12-N	HD-12-N-LP	24
3/4" NPT	HD-13-N	HD-13-N-LP	24
1" NPT	HD-14-N	HD-14-N-LP	30
1" 150# FLG	HD-14-F150	HD-14-F150-LP	31
1" 300# FLG	HD-14-F300	HD-14-F300-LP	34
1 1/4" NPT	HD-15-N	HD-15-N-LP	50
1 1/2" NPT	HD-16-N	HD-16-N-LP	51
1 1/2" 150# FLG	HD-16-F150	HD-16-F150-LP	54
1 1/2" 300# FLG	HD-16-F300	HD-16-F300-LP	60
2" NPT	HD-17-N	HD-17-N-LP	72
2" 150# FLG	HD-17-F150	HD-17-F150-LP	80
2" 300# FLG	HD-17-F300	HD-17-F300-LP	82
2 1/2" 150# FLG	HD-18-F150	HD-18-F150-LP	105
2 1/2" 300# FLG	HD-18-F300	HD-18-F300-LP	109
3" 150# FLG	HD-19-F150	HD-19-F150-LP	150
3" 300# FLG	HD-19-F300	HD-19-F300-LP	158
4" 150# FLG	HD-20-F150	HD-20-F150-LP	230
4" 300# FLG	HD-20-F300	HD-20-F300-LP	250
6" 150# FLG	HD-22-F150	HD-22-F150-LP	450
6" 300# FLG	HD-22-F300	HD-22-F300-LP	472

Ordering Instructions:

NOTE: When two or more pilots are used on the same valve:
An additional Pilot Adapter for Second Pilot is required:
(Not required for Solenoid Pilot)

Use part number: **(BADAPTER)**

Options & Adders:	Code
Low Pressure Main Valve:	LP
Reduced Port Valves:	HDR
Stainless Steel Diaphragm:	SSD
Stainless Steel External Tubing:	SSXT
Required for secondary Pilot: (Not required for Solenoid Pilot)	BADAPTER

*Low-Differential Valves: **LDP**

*Special Low-Differential Main Valve available when Inlet pressure is 25 PSIG or above, and differential pressure requirement is 10 PSI or less; Consult factory.

By-Pass Tubing (pre-installed)

See Parts Section for Kit #

Use for improved control when excessive system condensate is possible (included on LP valves)

Low-Pressure Main Valve not available
with SS Diaphragms

Example Model Codes for Main Valve:

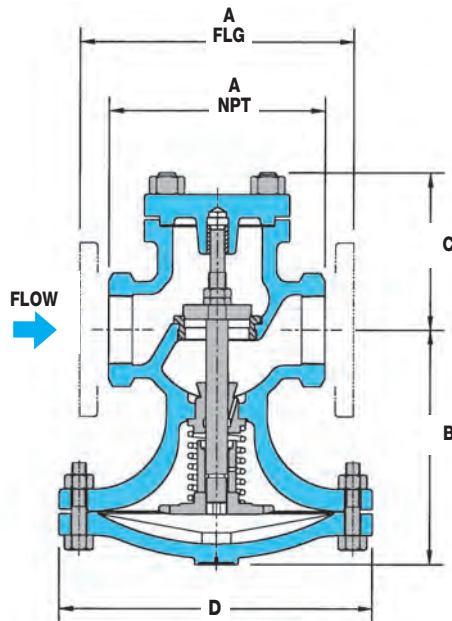
- HD-15-N**
(HD Series Valve with 1 1/4" Threaded,
NPT connections)
- HDR-16-F150**
(HD Series Valve, Reduced Port with 1 1/2"
150# Flanged connections)
- HD-20-F300-SSXT**
(HD Series Valve with 4" 300# Flanged
connections & SS External tubing)

Regulators

Pilot-Operated Regulating Valves

HD Series

HD Main Valve • Ductile Iron



OPERATING PRESSURES

Inlet Pressure Range: (for Main Valve):
15-300 PSIG (Standard Main Valve)
5-20 PSIG (Low-Pressure Main Valve)

Minimum Differential Pressure (for Main Valve):*
10 PSI (Standard Main Valve)
3 PSI (Low-Pressure Main Valve)

* Not required for Temperature Pilot applications

HD-Series DIMENSIONS – inches

Size	(A) Face-To-Face			B	C	D	Weight (lbs)		
	NPT	150#	300#				NPT	150#	300#
1/2"	4 3/8			5 5/8	3 3/8	6 3/4	24		
3/4"	4 3/8			5 5/8	3 3/8	6 3/4	24		
1"	5 3/8	5 1/2	6	6 1/4	3 1/2	7 1/8	30	31	34
1 1/4"	6 1/2			7 3/8	4 7/8	8 7/8	50		
1 1/2"	7 1/4	6 7/8	7 3/8	7 3/8	4 7/8	8 7/8	51	54	60
2"	7 1/2	8 1/2	9	8 1/4	5 3/8	10 7/8	72	80	82
2 1/2"		9 3/8	10	9	5 3/4	11 3/4		105	109
3"		10	10 3/4	8 7/8	6 3/4	13 1/4		150	158
4"		11 7/8	12 1/2	11	7 1/2	14 3/4		230	250
6"		15 1/8	16	14 1/2	10	19 3/4		450	472

Note: 150# flanges are flat face.
 300# flanges are raised face.

Option: Stainless diaphragms and external tubing - consult factory

Standard pilot mounting is on the right side of the regulator when looking into the outlet port (as shown). Pilot mounting on HD regulators are field-reversible.

MATERIALS

Body	Ductile Iron
Cover	Ductile Iron
Gasket	Grafoil/Garlock
Cover Screws	Steel
Pilot Adapter	Cast Steel
Screen	Stainless Steel
Tubing	Copper
Valve Seat	Hardened SST (55Rc)
Valve Disc	Hardened SST (55Rc)
Diaphragm	Phosphor Bronze (standard) EPDM (Low Pressure Main Valve)

Ordering Instructions: HD Series Regulator with a Pilot

Model Code for Main Valve: **HD-19-F150** HD Series Valve with 3" 150# Flanges
 Model Code for Pilot: **PP-B** Pressure Pilot, 20-100 PSIG (Blue spring color)

HD Valve with Pressure Pilot



Model Code for Main Valve: **HD-17-F150**
 (2" HD Series Valve with 150# Flanges)
 Model Code for Pilot: **PP-B**
 (Pressure Pilot with 20-100 PSIG Range)

HD Valve with Temperature Pilot



Model Code for Main Valve: **HD-17-F150**
 (2" HD Series Valve with 150# Flanges)
 Model Code for Pilot: **PTU-14-8**
 (Temperature Pilot (100-160° F)
 with 8 Ft. Capillary)

HD Valve with Pressure & Temperature Pilots



Model Code for Main Valve: **HD-17-F150**
 (2" HD Series Valve with 150# Flanges)
 Model Code for Pilot: **PP-B**
 (Pressure Pilot with 20-100 PSIG Range)
 Model Code for Pilot: **PTU-14-8**
 (Temperature Pilot (100-160° F) with 8 Ft. Capillary)
 Model Code for Secondary Pilot Adapter*: **BADAPTER**

* If 2 Pilots are used on the same valve, a Secondary Pilot Adapter is required.

Pilot-Operated
REGULATORS

Pressure Regulating with PP & PP5 Spring-loaded Pilot

Pressure Pilot	(Standard: 1.0 psig accuracy) (High-accuracy: 0.5 psig accuracy)	PP PP5
Pilot Body Material		Cast Steel
Max Inlet Pressure		300 PSIG
Reduced Outlet Pressure Range		3-200 PSIG
Inlet Pressure Range (with HD Standard main valve)		15-300 PSIG
(with HD Low-Pressure (LP) main valve)		5-20 PSIG
Minimum Differential Pressure (with HD Standard main valve)		10 PSI
(with HD Low-Pressure (LP) main valve)		3 PSI



Typical Applications

The **PP & PP5 Pressure Pilots** are used with the HD Regulator to control steam pressure in steam mains or for process equipment. Pilot-operated regulators maintain constant downstream pressure even when the inlet pressure to the valve fluctuates or steam usage varies. The PP-Pressure Pilot is adequate for controlling pressure in most industrial applications. For increased accuracy use the PP5 Pilot.

PP-Pressure Pilot (Standard) 1.0 PSIG accuracy

PP5-Pressure Pilot (Special Applications) 0.5 PSIG accuracy

Features

- The **PP**-Pilot can maintain downstream pressure to ± 1 PSIG
- **PP5**-Pilot can maintain downstream pressure to ± 0.5 PSIG
- Choices of three overlapping pressure ranges
- Pilot is easily installed on pilot adapter using four bolts, no tubing connections are required
- Full port strainer and blowdown valve on pilot adapter for protection of pilot from dirt and scale
- Solid floating diaphragm is more failure resistant
- Watson McDaniel's pilots can be used with other manufacturers' regulators

Options

- Pressure pilot can be used with temperature pilot to eliminate the need for two separate regulators
- Solenoid pilot can be added for remote on/off control of regulator

Example: PP-B Pilot at 20-100 PSIG

Reduced Pressure Range PSI	Model Code	Spring Color	Weight lbs
PP-Pressure Pilot (for Standard Industrial Applications) 1.0 PSIG accuracy			
3-25	PP-Y	Yellow	10
20-100	PP-B	Blue	10
80-200	PP-R	Red	10
PP5-Pressure Pilot (Special Applications) 0.5 PSIG accuracy			
1-10	PP5-Y*	Yellow	25
10-25	PP5-B*	Blue	25

* A Spacer (model # BAP-SPACE) is required when using PP5 Pressure Pilots on a 3" & 4" HD Main Valve.

Units: inches

HD Main Valve

with
PP-Pressure Pilot



Model Code for Main Valve: **HD-17-F150**
(2" HD Series Valve with 150# Flanges)

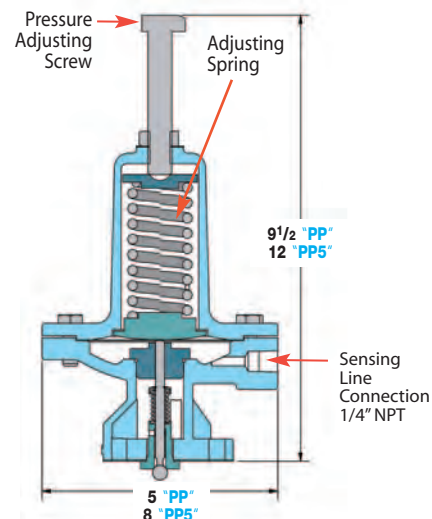
Model Code for Pilot: **PP-B**
(Pressure Pilot with 20-100 PSIG Range)

MATERIALS for PP Pressure Pilot

PP Pilot Body	WCB 216 Cast Steel
PP5 Pilot Body	WCB 216 Cast Steel
Head & Seat Gasket	302 SS
Diaphragm	Phosphor Bronze
Head & Seat Assembly	Hardened SST (55 Rc)

MATERIALS for HD Main Valve

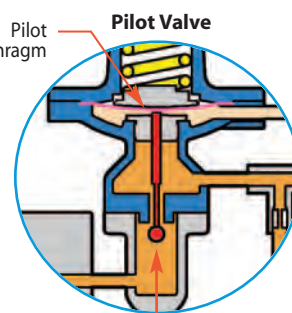
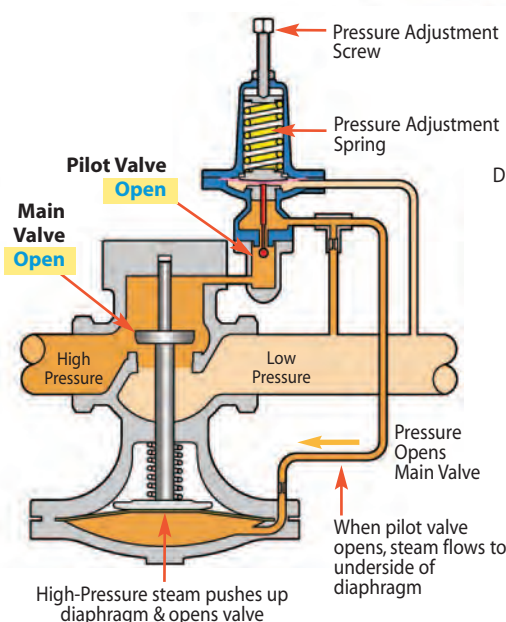
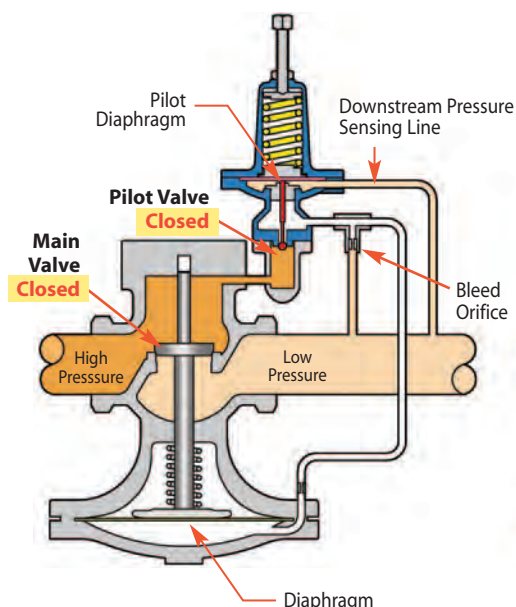
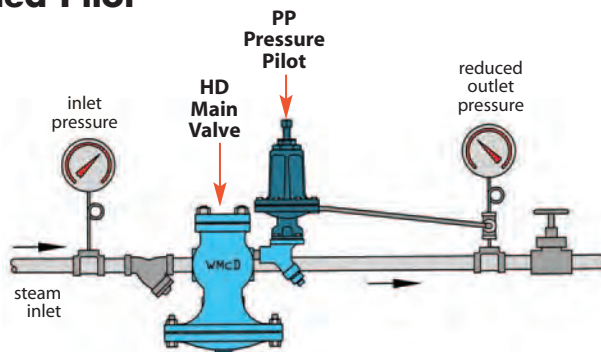
Body	Ductile Iron
Cover	Ductile Iron
Gasket	Grafoil/Garlock
Cover Screws	Steel
Pilot Adapter	Cast Steel
Screen	Stainless Steel
Tubing	Copper
Valve Seat	Hardened SST (55 Rc)
Valve Disc	Hardened SST (55 Rc)
Diaphragm	Phosphor Bronze



Pressure Regulating with PP & PP5 Spring-loaded Pilot

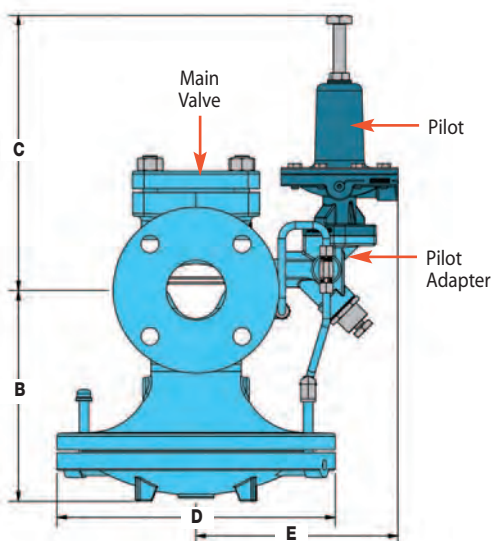
Reducing Pressure

The **PP-Pilot** and the **PP5-Pilot** are both **spring-adjusted** pressure pilots. The **PP-Pilot** is used on typical general-purpose pressure reducing applications. The **PP5-Pilot** is used when higher accuracy is required and is capable of maintaining a control pressure window of less than 1 PSI.



How it Works

The Pressure Pilot controls the operation of the HD Regulator. The sensing line connects the pressure pilot to the downstream side of the regulator. Pressure in the sensing line applies an upward force to the pilot diaphragm to compress the adjustment spring. When system pressure equals set point, the diaphragm moves upwards against the force of the adjusting spring, closing pilot valve. When the pilot valve is shut, steam cannot pass thru to the underside of the regulator diaphragm, closing the regulator. When the pilot pressure falls below its set point, the pilot valve opens allowing steam to lift the main valve diaphragm which opens up the regulating valve.



DIMENSIONS HD-Series – inches									
Size	Face-To-Face							Weight (lbs)	
	NPT	150#	300#	B	C*	D	E**	NPT	FLG
1/2"	4 ³ / ₈	-	-	5 ⁵ / ₈	11 ⁷ / ₈	6 ³ / ₄	7 ³ / ₄	18	-
3/4"	4 ³ / ₈	-	-	5 ⁵ / ₈	11 ⁷ / ₈	6 ³ / ₄	7 ³ / ₄	18	-
1"	5 ³ / ₈	5 ¹ / ₂	6	6 ¹ / ₄	11 ⁷ / ₈	7 ¹ / ₈	7 ³ / ₄	23	35
1 ¹ / ₄ "	6 ¹ / ₂	-	-	7 ³ / ₈	11 ⁷ / ₈	8 ⁷ / ₈	8 ¹ / ₄	43	-
1 ¹ / ₂ "	7 ¹ / ₄	6 ⁷ / ₈	7 ³ / ₈	7 ³ / ₈	11 ⁷ / ₈	8 ⁷ / ₈	8 ¹ / ₄	43	60
2"	7 ¹ / ₂	8 ¹ / ₂	9	8 ¹ / ₄	11 ⁷ / ₈	10 ⁷ / ₈	8 ¹ / ₂	65	85
2 ¹ / ₂ "	-	9 ³ / ₈	10	9	11 ⁷ / ₈	11 ³ / ₄	8 ¹ / ₂	-	105
3"	-	10	10 ³ / ₄	8 ⁷ / ₈	11 ⁷ / ₈	13 ¹ / ₄	9 ¹ / ₂	-	145
4"	-	11 ⁷ / ₈	12 ¹ / ₂	11	11 ⁷ / ₈	14 ³ / ₄	10 ¹ / ₂	-	235
6"	-	15 ¹ / ₈	16	14 ¹ / ₂	12 ¹ / ₂	19 ³ / ₄	11 ³ / ₄	-	470

For PP5 Pilot: * For sizes 1/2" to 1¹/₂" add 2¹/₂" to "C" dimension;
For sizes 2" to 6" add 5" to "C" dimension.
** Add 1¹/₂" to "E" dimension for all sizes.