

## Pressure Reducing Valve PRV425 general situation

The SBM PTV PRV425 is internally piloted piston-operated pressure reducing valves. It is pilot-controlled for accurate regulation of pressure under widely ranging flow. The internal-pilot design eliminates external components and piping. Internally piloted PRV425 valves are capable of larger capacity and greater accuracy than direct-acting valves. Internally piloted PRV425 valves are rated for dead-end service and have a 20:1 turn down ratio and an accuracy of  $\pm 0.5$  Bar of set point.

It mainly composed of main valve and pilot valve. The main valve consists of valve seat, main valve disc, piston, cylinder sleeve, and spring. The piston valve consists of valve seat, plug, membrane, spring and adjusting spring. Set the outlet pressure through adjusting spring, sense the change of pressure of outlet with membrane, adjust the flow area of throttling part of main valve through open and close of pilot valve and drive the piston, to realize the function of reducing and regulating valve. The product is mainly applied on steam or fluid piping, to reduce and regulate the pressure.

Completely supported by piping, lightweight PRV425 valves install easily with NPT or flanged connections. A stainless steel diaphragm, hardened stainless steel working parts and integral removable strainer team up to provide higher performance over a long, trouble-free service life.

Valves are equipped with a caged main valve assembly (separate shutoff surfaces and flow-control ports), piston valve rings for longer life, and an external adjusting screw with locking nut and cover. All working parts are renewable in-line.

### Internally Piloted:

This type of PRV incorporates two valves—a pilot and main valve—in one unit. The pilot valve has a design similar to that of the direct-acting valve. The discharge from the pilot valve acts on top of a piston, which opens the main valve. This design makes use of inlet pressure in opening a large main valve than could otherwise be opened directly. As a result, there is greater capacity per line size and greater accuracy than with the direct-acting valve. As with direct-acting valves, the pressure is sensed internally, eliminating the need for an external sensing line.

## Main Difference between Pilot and Non Pilot Operated

### Direct Acting (Non-piloted)

Used for small loads where extremely close pressure control is not needed.

Pros: Compact size, low price, easy to install.

Cons: Higher droop (variation from set pressure) than Pilot-operated PRV.

### Pilot-Operated (Internally piloted PRV425 series, externally piloted DP143 series)

Used for larger loads where close pressure control is required

Pros: Close pressure control, fast response to load variation, may be used across a broader range of

flow rates than the direct acting types.

Cons: Larger size, higher price.

From the above characteristics, it can be seen that the function and applications of non-piloted direct acting PRVs differ substantially from those of pilot-operated PRVs.

In short:

- Direct-operated valves are used when loads are small and some down-stream pressure droop may be accepted. They are generally used in light load services.
- Pilot-operated pressure reducing valves can respond quickly to varying load conditions while maintaining stable secondary pressure where precise pressure control is needed. They are generally intended for larger load applications.

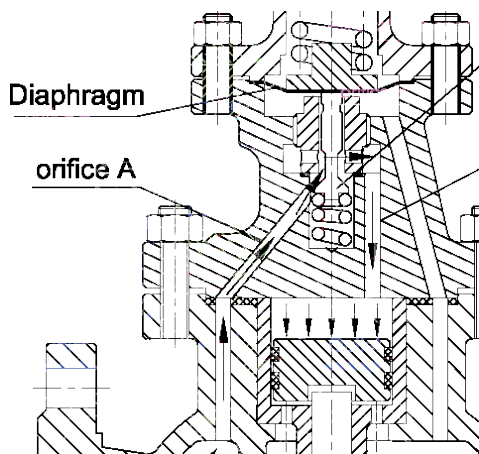


### Typical Applications in a Steam-Using Plant:

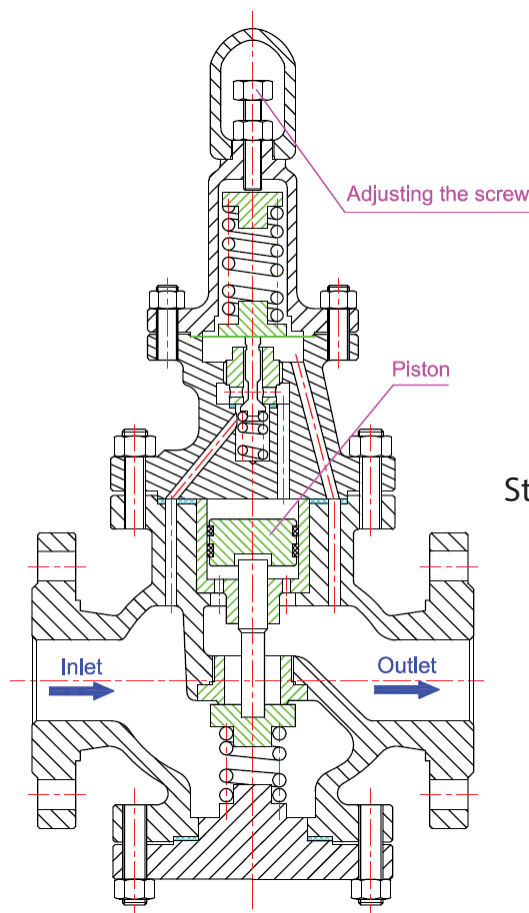
- Small load applications such as sterilizers, unit heaters, humidifiers, and small process equipment may typically use a simple Direct Acting PRV for pressure reduction.
- In case of larger flows, such as steam distribution piping, loads may fluctuate greatly depending on the operational status of the recipient equipment. Such load variations and large capacity would call for the use of a Pilot-operated PRV to reduce pressure.
- Furthermore, the amount of steam used by certain equipment at start-up may differ significantly from the amount required during normal operation. Such wide variations may also necessitate the use of a Pilot-operated PRV for pressure reduction.

### How it works

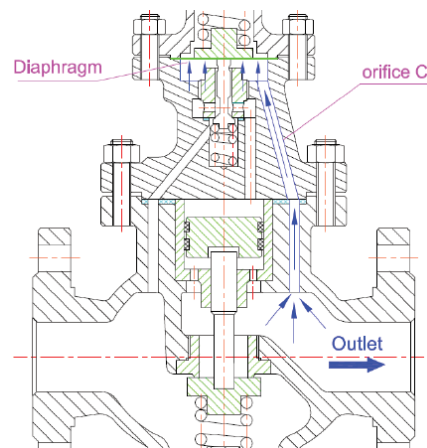
When the pressure reducing valve is released from the factory, its adjusting spring is in an uncompressed state while its main valve and pilot valve disc are in the closed state. To use it, rotate the adjusting screw clockwise to compress the adjusting spring and make the diaphragm move down to open the pilot valve disc. The medium flows from the orifice A to the orifice B through the pilot valve seat and then into the area above the piston. Acted by the medium pressure, the piston moves down to drive the main valve disc to leave the main valve seat and make the medium flow to the outlet of the valve and meanwhile through the orifice C and into the area below the diaphragm. When the outlet pressure exceeds the set value, it will push the diaphragm upwards to compress the adjusting spring. Then the pilot valve disc will move in the closed direction to reduce the medium flowing to the area above the piston, and the pressure will drop as well; here the main valve disc will be pushed by the main valve disc's spring force to move upwards to reduce the clearance between the main valve's disc and seat while the medium flow will reduce as well and the outlet pressure will also drop to strike a new balance. Contrarily, when the outlet pressure is lower than the set value, the clearance between the main valve's disc and seat will increase and the medium flow will increase as well so that the outlet pressure will increase to strike a new balance.



Step2



Step1



Step3

## Features

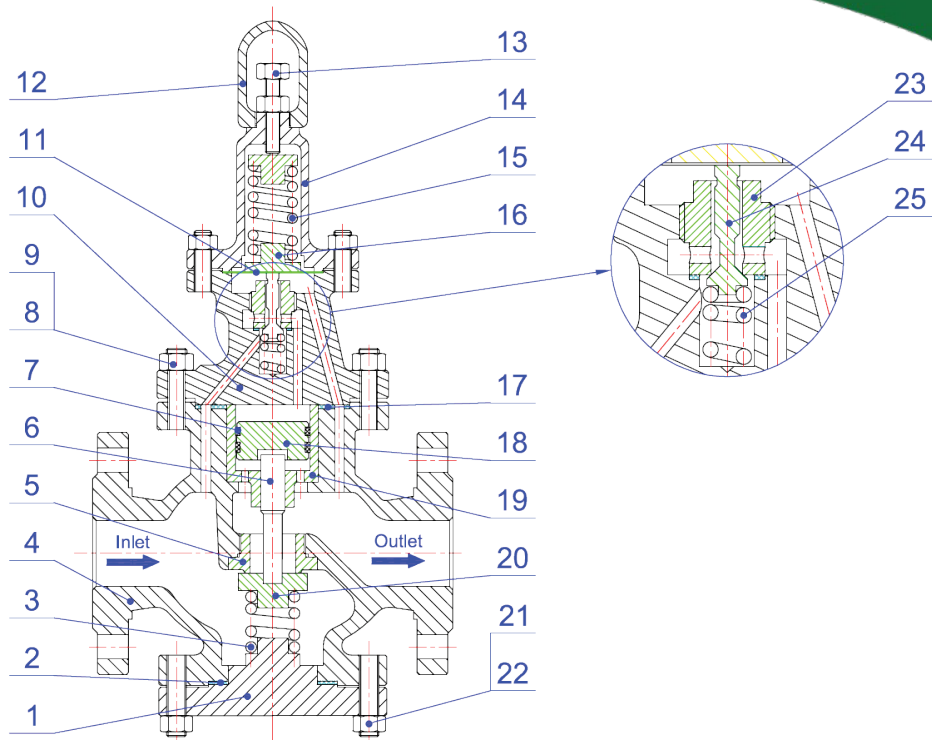
- A) **Self-acting** using spring and piston operation, no need for electrical supplies.
- B) **Internally piloted** piston-operated.
- C) **Self-aligning feature** allows the piston to move smoothly, resulting in accurate responsive control.
- D) **Stable outlet pressure can be maintained** even with fluctuations in upstream pressure or flow rate.
- E) **Accurate control of pressure with one spring.**
- F) **Stainless steel internals** for excellent durability and resistance to corrosion.
- G) **Wide range of screwed and flanged** connections to match plant standards.
- H) **Metal-to-metal seat**

### Performance Standard

1. Design & Manufacture standard as to: ASME PTC 25.3 / ASME B16.34
2. Face to Face dimension standard as to: MFR-STD
3. Flange dimension conforms as to: ASME B16.5 / BS EN 1092  
Threaded Standard as to: NPT : ASME B1.20.1  
BSP : ISO 7-2: 2000
4. Testing and inspection as to: API 598 / ASTM E 1008-2003
5. Pressure-temperature conforms as to: ASME B16.34
6. Anti Corrosion as per NACE MR-0175(2002) requirement

### Technical Data BVFS607

1. Size range NPT: 1/2" ~ 2"  
RF: 1/2" ~ 16"
2. Body design conditions: 150LB / 300LB / PN16 / PN25 / PN40
3. Maximum inlet pressure: 300LB / PN40 : 50 Bar @ 40°C  
150LB / PN25 / PN16: 25 Bar @ 40°C
4. Maximum design temperature: 300°C @ 24 Bar
5. Minimum design temperature: -29°C
6. Outlet Pressure Range: 300LB / PN40 : 0~30 Bar  
150LB / PN25 / PN16: 3~16 Bar
7. Maximum operating temperature: 300°C @ 24 Bar  
Maximum temperature instantaneous: 425°C
8. Outlet pressure deviations:  $\leq \pm 0.5$  Bar
9. Differential pressure between inlet/outlet: 2 Bar
10. Suitable Medium: Suitable for steam, gas, compressed air. etc

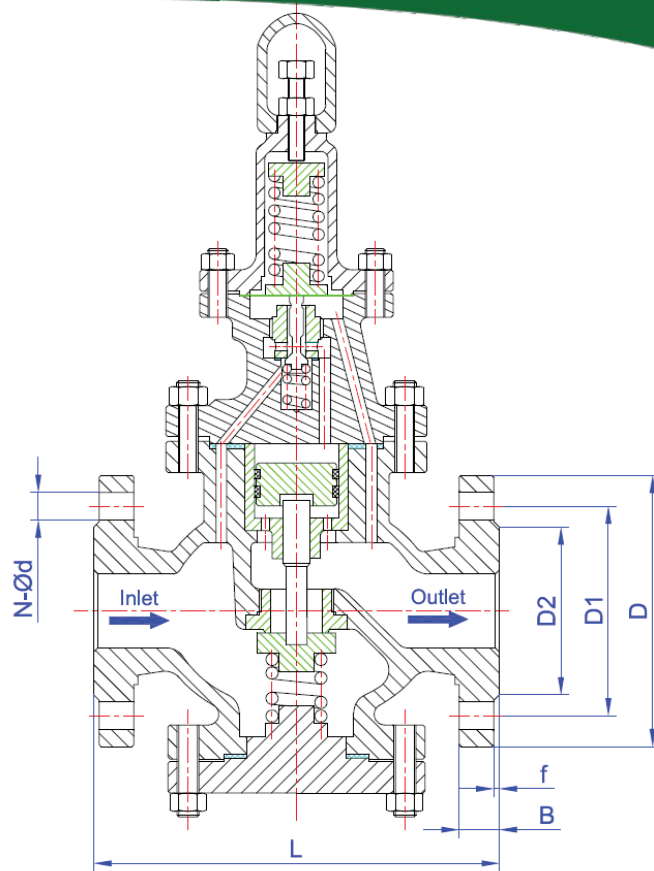


## Part List

### Pressure Reducing Valve PRV425

No.	Part Name	Material	Standard
1.	Bottom Cover	WCB	ASTM A216
2.	Bottom Gasket	SS316+Graphite	ASTM A276 / ASME B16.20a
3.	Main Valve Spring	60Si2Mn	EN 10089 :2002
4.	Main Valve Body	WCB	ASTM A216
5.	Main Valve Seat	SS410+Stellite.6	ASTM A276
6.	Push rod	SS410	ASTM A276
7.	Piston Ring	Ductile Iron K9	ASTM A536
8.	Pilot Valve Housing Bolt	B7	ASTM A193
9.	Pilot Valve Housing Nut	2H	ASTM A194
10.	Pilot Valve Housing	WCB	ASTM A216
11.	Diaphragm	SS304	ASTM A276
12.	Top Cap	PVC	MFR-STD
13.	Adjusting Screw	B7	ASTM A193
14.	Spring Chamber	WCB	ASTM A216
15.	Adjusting Spring	60Si2Mn	EN 10089 :2002
16.	Bottom Spring Plate	A105	ASTM A105
17.	Gasket	SS316+Graphite	ASTM A276 / ASME B16.20a
18.	Piston	SS410	ASTM A276
19.	Cylinder	SS410	ASTM A276
20.	Main Valve Disc	SS410	ASTM A276
21.	Bottom Bolt	B7	ASTM A193
22.	Bottom Nut	2H	ASTM A194
23.	Pilot Valve	SS304	ASTM A276
24.	Pilot Valve Disc	SS304	ASTM A276
25.	Pilot Valve Spring	60Si2Mn	EN 10089 :2002

## Main Dimensions

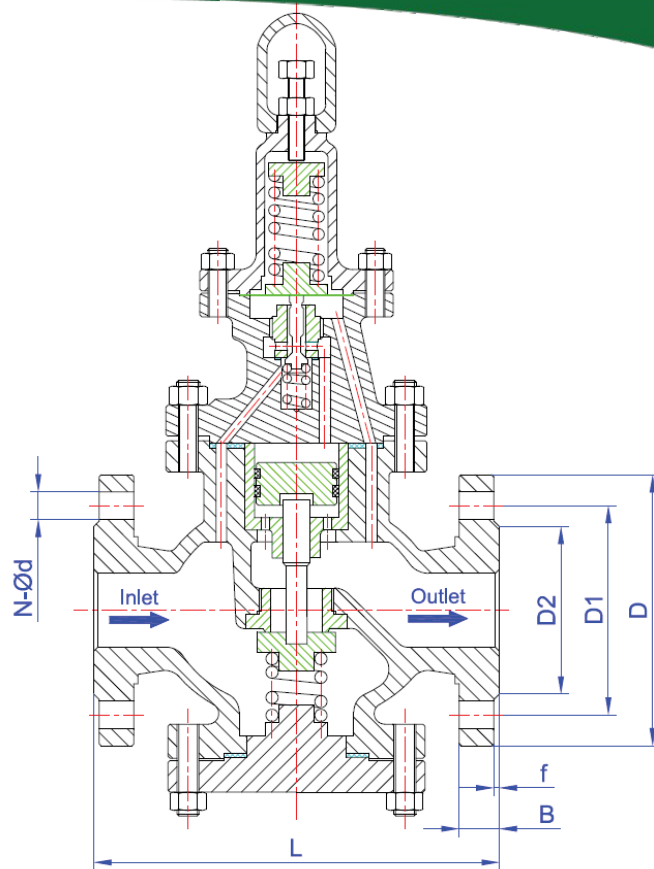


## Pressure Reducing Valve PRV425 Flanged ends RF ASME B16.5 150LB

NPS	L	D	D1	D2	B	n-Ød	f	Weight Kg
1/2"	160	Ø90	Ø60.3	Ø35	10	4-Ø16	2	11.5
3/4"	160	Ø100	Ø69.9	Ø43	11.5	4-Ø16	2	11.5
1"	180	Ø110	Ø79.4	Ø51	13	4-Ø16	2	15.5
1 1/4"	200	Ø115	Ø88.9	Ø64	14.5	4-Ø16	2	18.7
1 1/2"	220	Ø125	Ø98.4	Ø73	16	4-Ø16	2	22.7
2"	250	Ø150	Ø120.7	Ø92	17.5	4-Ø19	2	26.5
2 1/2"	280	Ø180	Ø139.7	Ø105	21	4-Ø19	2	30
3"	310	Ø190	Ø152.4	Ø127	22.5	4-Ø19	2	40
4"	350	Ø230	Ø190.5	Ø157	22.5	8-Ø19	2	48
5"	400	Ø255	Ø215.9	Ø186	22.5	8-Ø22	2	80
6"	450	Ø280	Ø241.3	Ø216	24	8-Ø22	2	95
8"	500	Ø345	Ø298.5	Ø270	27	8-Ø22	2	125
10"	650	Ø405	Ø362.0	Ø324	29	12-Ø25.5	2	270
12"	800	Ø485	Ø431.8	Ø381	31	12-Ø25.5	2	445
14"	850	Ø535	Ø476.3	Ø413	33.5	12-Ø29	2	680
16"	900	Ø595	Ø539.8	Ø470	35	16-Ø29	2	850



## Main Dimensions



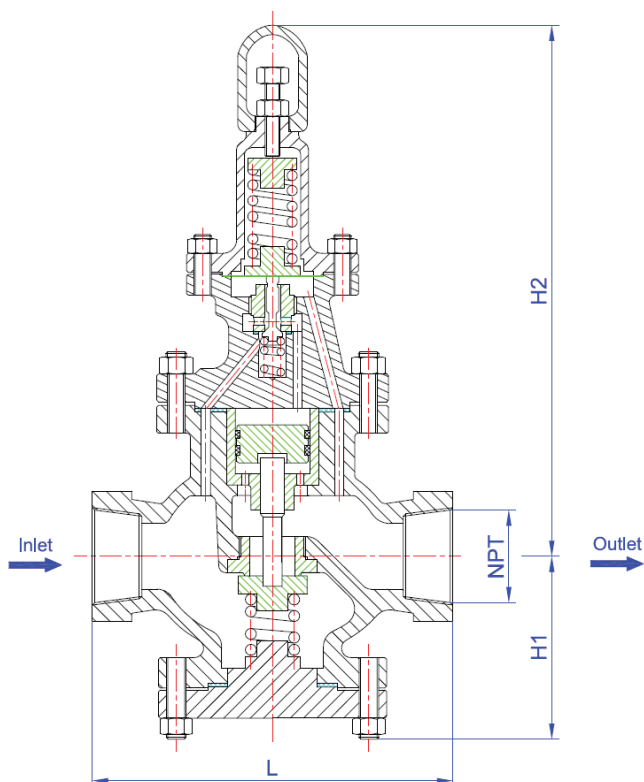
## Pressure Reducing Valve PRV425 Flanged ends RF ASME B16.5 300LB

NPS	L	D	D1	D2	B	n-Ød	f	Weight Kg
1/2"	180	Ø95	Ø66.7	Ø35	13	4-Ø16	2	13
3/4"	180	Ø115	Ø82.6	Ø43	14.5	4-Ø19	2	13
1"	200	Ø125	Ø88.9	Ø51	16	4-Ø19	2	16
1 1/4"	220	Ø135	Ø98.4	Ø64	17.5	4-Ø19	2	26
1 1/2"	240	Ø155	Ø114.3	Ø73	19.5	4-Ø22	2	32
2"	270	Ø165	Ø127	Ø92	21	8-Ø19	2	42
2 1/2"	300	Ø190	Ø149.2	Ø105	24	8-Ø22	2	56
3"	330	Ø210	Ø168.3	Ø127	27	8-Ø22	2	71
4"	380	Ø255	Ø200	Ø157	30.5	8-Ø22	2	80
5"	450	Ø280	Ø235	Ø186	33.5	8-Ø22	2	130
6"	500	Ø320	Ø269.9	Ø216	35	12-Ø22	2	165
8"	550	Ø380	Ø330.2	Ø270	40	12-Ø25.5	2	220
10"	650	Ø445	Ø387.4	Ø324	46.5	16-Ø29	2	310
12"	800	Ø520	Ø450.8	Ø381	50	16-Ø32	2	495
14"	850	Ø585	Ø514.4	Ø413	52.5	20-Ø32	2	740
16"	900	Ø650	Ø571.5	Ø470	56	20-Ø35	2	950

## Main Dimensions of pressure reducing valve PRV425

Threaded ends NPT PN16 / PN25 / PN40

NPS	NPT	L	H1	H2	Weight (Kg)
1/2"	1/2"	140	90	295	7.5
3/4"	3/4"	140	98	330	9
1"	1"	160	110	330	12.5
1 1/4"	1 1/4"	180	110	330	15
1 1/2"	1 1/2"	200	125	345	20
2"	2"	230	125	345	25



## PTV Engineering Data

### CV Values of PRV425

NPS	2"	2,5"	3"	4"	5"	6"	8"	10"	12"	14"	16"
CV	1	2.5	4	6.5	9	16	25	36	64	100	140

# ©PTV Engineering Data

## PRV425 Direct Acting Type

Capacities for Steam, Air and Non-Corrosive Gas      Kg/hr										
Inlet	Outlet	Connection Size (mm)								
Bar		15	20	25	32	40	50	65	80	100
Cv Factor		1	2.3	4	6.5	9	16	25	36	64
1.03	0.55	18	42	73	119	164	292	456	657	1,168
	0.34	21	49	85	138	191	339	529	762	1,355
1.38	0.90	20	46	80	129	179	319	498	717	1,274
	0.34	27	63	109	177	245	435	680	980	1,741
2.07	1.59	23	53	92	149	206	366	572	824	1,464
	.34-.48	35	80	139	225	312	555	867	1,248	2,219
2.76	2.28	26	59	102	166	230	408	638	918	1,632
	1.72	36	82	143	233	323	574	896	1,290	2,294
	.34-.83	42	98	170	276	382	679	1,061	1,527	2,715
3.45	2.90	30	68	119	193	267	475	742	1,069	1,900
	2.07.34-	45	102	178	290	401	713	1,114	1,604	2,852
	1.17	50	115	201	326	452	803	1,255	1,807	3,212
5.17	4.34	43	98	171	278	384	683	1,067	1,537	2,732
	3.10	64	147	255	415	574	1,020	1,594	2,296	4,081
	.34-2.1	70	160	278	452	626	1,113	1,739	2,505	4,453
6.89	5.86	54	124	216	351	486	864	1,350	1,945	3,457
	4.83	74	169	295	479	663	1,179	1,842	2,652	4,715
	.34-2.9	89	205	356	578	801	1,423	2,224	3,203	5,694
8.62	7.31	67	154	268	436	603	1,072	1,675	2,412	4,288
	6.89	76	175	304	494	684	1,215	1,899	2,735	4,862
	5.17	102	235	408	663	918	1,632	2,550	3,673	6,529
	.48-3.7	108	249	433	704	975	1,734	2,709	3,901	6,935
10.00	8.62	83	191	332	540	748	1,330	2,077	2,991	5,318
	6.89	113	259	450	732	1,013	1,801	2,815	4,053	7,206
	5.52	128	295	513	834	1,155	2,054	3,209	4,621	8,215
	.55-4.6	128	294	511	830	1,150	2,044	3,194	4,599	8,176
12.07	10.20	93	214	372	604	836	1,487	—	—	—
	8.62	122	281	489	795	1,100	1,956	—	—	—
	6.89	144	331	576	936	1,295	2,303	—	—	—
	.62-5.5	147	338	589	956	1,324	2,354	—	—	—
13.79	11.72	104	240	417	678	938	1,668	—	—	—
	10.34	131	302	525	853	1,181	2,099	—	—	—
	8.62	155	357	621	1,009	1,398	2,485	—	—	—
	.68-6.3	167	383	666	1,082	1,499	2,665	—	—	—
15.51	13.17	117	270	469	762	1,055	1,876	—	—	—
	12.07	140	321	558	907	1,256	2,233	—	—	—
	10.34	166	382	664	1,078	1,493	2,654	—	—	—
	.82-7.24	186	428	744	1,209	1,673	2,975	—	—	—
17.24	13.79	147	339	590	959	1,327	2,360	—	—	—
	12.07	176	404	703	1,143	1,583	2,814	—	—	—
	10.34	197	454	790	1,283	1,776	3,158	—	—	—
	.89-8.06	205	472	821	1,335	1,848	3,285	—	—	—

For air capacities m3/hr, multiply steam capacities kg/hr by 1.35.