

INDEX: SEVERE SERVICE DATA TABLES

TABLE TITLE	TABLE NUMBER
Insulation Factors	15-01
Cavitation Regimes	15-02
Acoustic power Ratio, r_w	15-03
Noise Attenuation vs. P_1/P_2 ratio for MegaStream trim	15-04
Noise Attenuation vs. P_1/P_2 ratio for MegaStream small hole trim	15-05
Noise Attenuation Adjustment Factor for MegaStream trim	15-06
Noise Attenuation vs. P_1/P_2 ratio for TigerTooth trim	15-07
Materials of Construction for CavControl Trim	15-08
Materials of Construction for MicroCav Trim	15-09
Materials of Construction for CavStream Trim	15-10
Materials of Construction for ChannelStream Trim	15-11
Materials of Construction for Kämmer 11000 Series	15-12
Materials of Construction for Kämmer 15000 Series	15-13
Materials of Construction for MegaStream Trim	15-14
Materials of Construction for TigerTooth Trim	15-15
Materials of Construction for Stealth Trim	15-16
Feedwater Material Selection: ChannelStream Pressure-Balanced Valves	15-17
Feedwater Material Selection: CavControl Pressure-Balanced Valves	15-18

TABLE 15-01: INSULATION FACTORS

Operating Temperature (°F)	80 thru 250	251 thru 400	401 thru 500	501 thru 600	601 thru 650	651 thru 700	701 thru 750	751 thru 800	801 thru 850	851 thru 900	901 thru 950	951 thru 1000	1001 thru 1050
Insulation Class	HC1 PP1	HC2 PP2	HC3 PP3	HC4 PP4	HC5 PP5	HC6 PP6	HC7 PP7	HC8 PP8	HC9 PP9	HC10 PP10	HC11 PP11	HC12 PP12	HC13 PP13
Pipe Size (inches)	Insulation Thickness (inches)												
	Single Layer			Multiple Layer									
0.5	1	1	1.5	2	2	2	2	2.5	2.5	2.5	2.5	3	3
0.75	1	1.5	1.5	2	2	2	2.5	2.5	2.5	2.5	3	3	3
1	1	1.5	1.5	2	2	2	2.5	2.5	2.5	3	3	3.5	3.5
1.25	1	1.5	1.5	2	2	2	2.5	2.5	3	3	3	3.5	3.5
1.5	1	1.5	1.5	2	2	2	2.5	2.5	3	3	3	3.5	3.5
2	1	1.5	1.5	2	2.5	2.5	2.5	3	3	3.5	3.5	4	4
2.5	1	1.5	1.5	2	2.5	2.5	2.5	3	3	3.5	3.5	4	4
3	1	1.5	2	2.5	2.5	3	3	3	3.5	3.5	4	4	4.5
3.5	1	1.5	2	2.5	2.5	3	3	3	3.5	3.5	4	4	4.5
4	1	1.5	2	2.5	2.5	3	3	3.5	3.5	4	4	4.5	4.5
4.5	1	1.5	2	2.5	2.5	3	3	3.5	3.5	4	4	4.5	4.5
5	1	1.5	2	2.5	2.5	3	3	3.5	4	4	4	4.5	5
6	1	1.5	2	2.5	3	3	3.5	3.5	4	4	4.5	4.5	5
7	1.5	1.5	2	3	3	3	3.5	3.5	4	4	4.5	5	5
8	1.5	1.5	2	3	3	3	3.5	3.5	4	4.5	4.5	5	5.5
9	1.5	1.5	2	3	3	3	3.5	4	4	4.5	4.5	5	5.5
10	1.5	1.5	2	3	3	3.5	3.5	4	4	4.5	5	5	5.5
11	1.5	1.5	2	3	3	3.5	3.5	4	4.5	4.5	5	5.5	5.5
12	1.5	1.5	2	3	3	3.5	3.5	4	4.5	4.5	5	5.5	5.5
14	1.5	1.5	2	3	3	3.5	4	4	4.5	5	5	5.5	6
16	1.5	1.5	2.5	3	3	3.5	4	4	4.5	5	5.5	5.5	6
18	1.5	1.5	2.5	3.5	3.5	3.5	4	4.5	4.5	5	5.5	6	6
20	2	2	2.5	4	4	4	4	4.5	4.5	5	5.5	6	6
24	2	2	2.5	4	4	4	4	4.5	5	5	5.5	6	6.5
30	2	2	2.5	4	4	4	4	4.5	5	5.5	5.5	6	6.5
Over 30	2	2	2.5	4	4	4	4.5	5	5.5	5.5	6	6.5	7
Operating Temperature °C	0 thru 121	122 thru 204	205 thru 260	261 thru 315	316 thru 343	344 thru 371	372 thru 398	399 thru 427	428 thru 454	455 thru 482	483 thru 510	511 thru 538	539 thru 566

NOTE: A maximum of 15 dBA (3 inches insulation) may be deducted from the calculated SPL when using thermal insulation. For acoustic insulation, the SPL reduction depends upon the “R” value of the insulation used.

TABLE 15-02 CAVITATION REGIMES

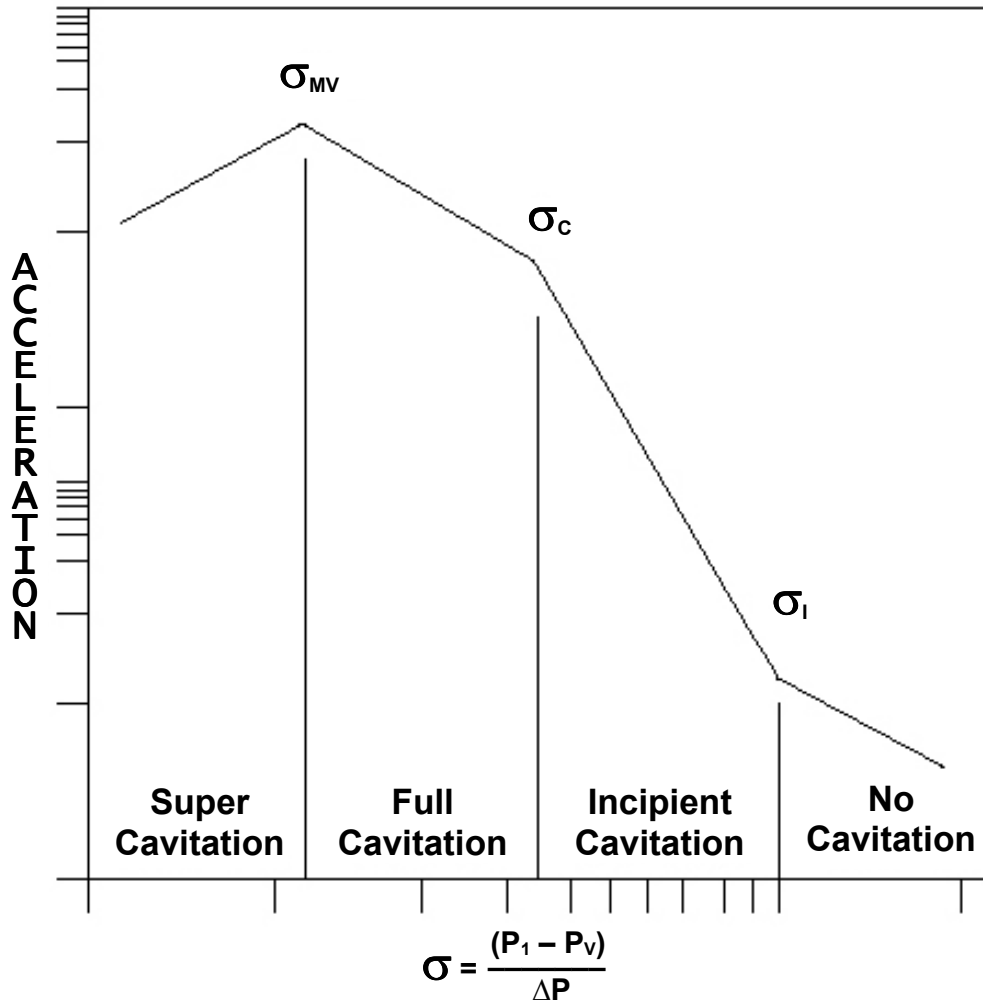


TABLE 15-03: ACOUSTIC POWER RATIO, r_w

Valve	r_w	Valve	r_w
Globe	0.25	Butterfly	0.50
Segmented ball 90°	0.25	Eccentric rotary plug	0.25
Expanders	1.00		

TABLE 15-04 NOISE ATTENUATION VS. P_1/P_2 RATIO FOR MEGASTREAM TRIM

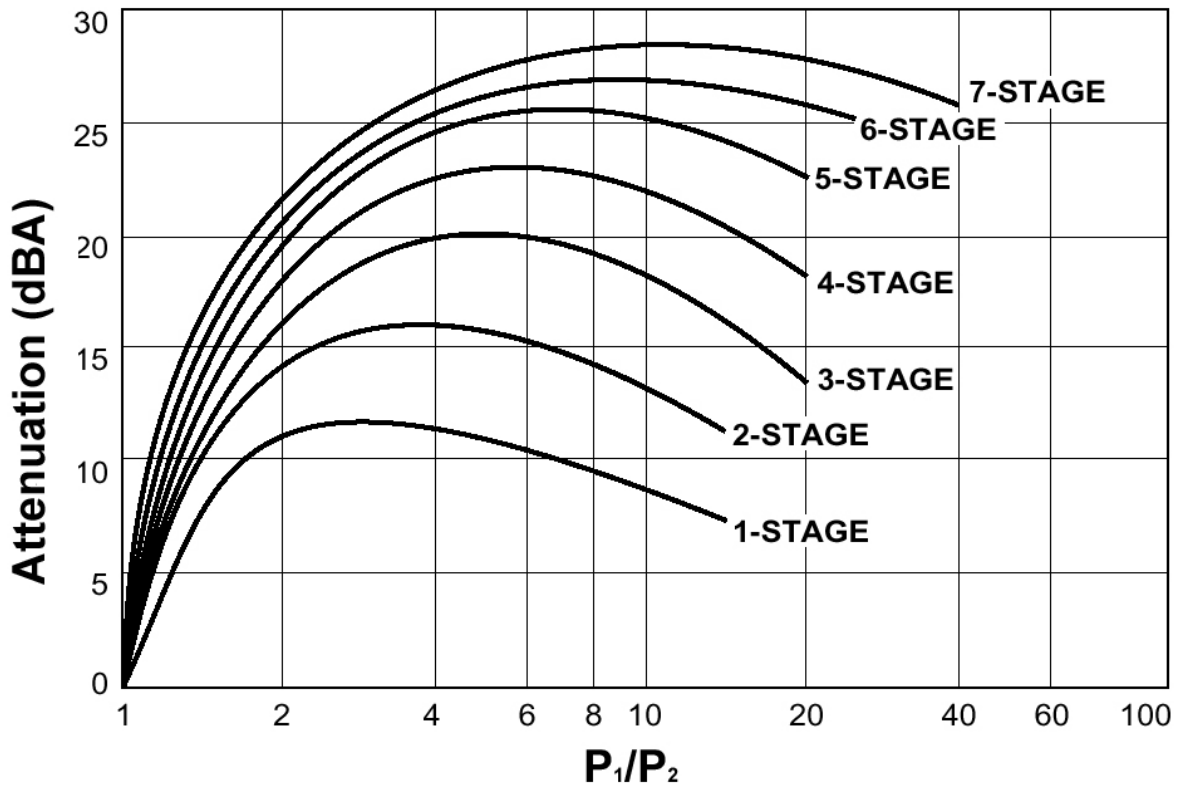


TABLE 15-05 NOISE ATTENUATION VS. P_1/P_2 RATIO FOR MEGASTREAM SMALL HOLE TRIM

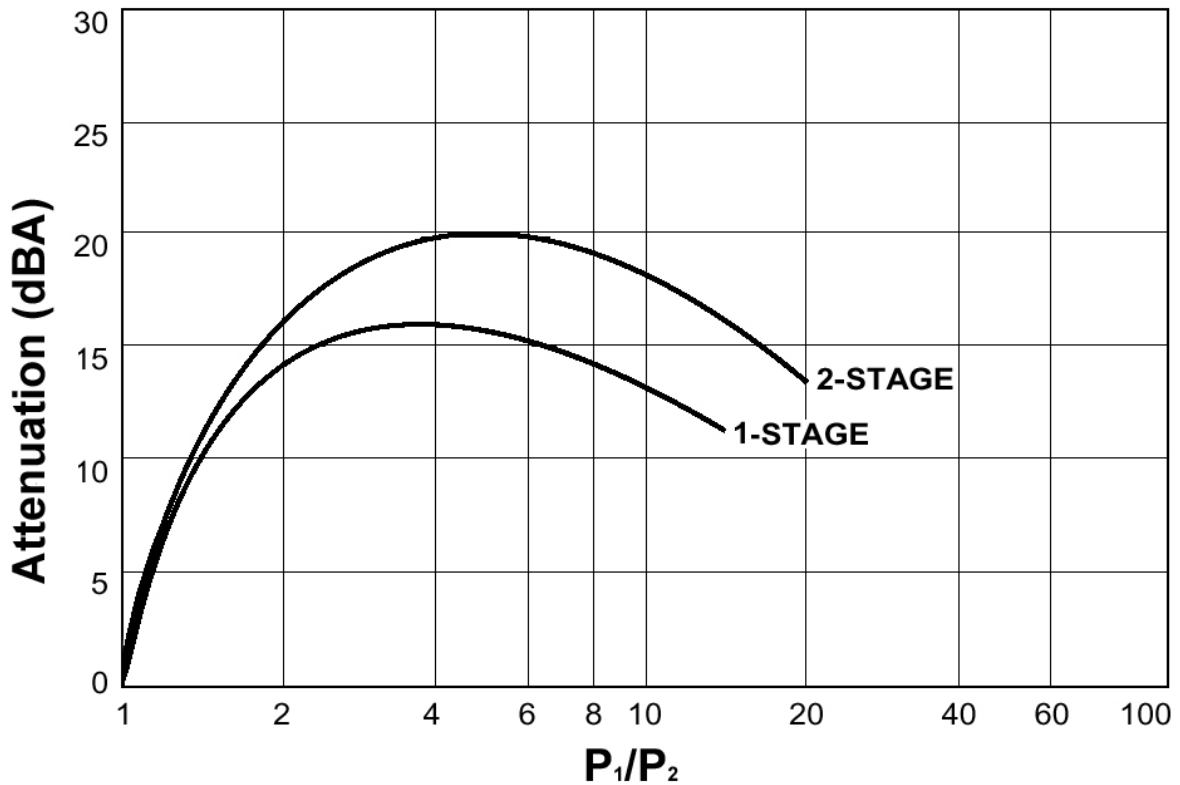


TABLE 15-06 MEGASTREAM ATTENUATION ADJUSTMENT FACTOR

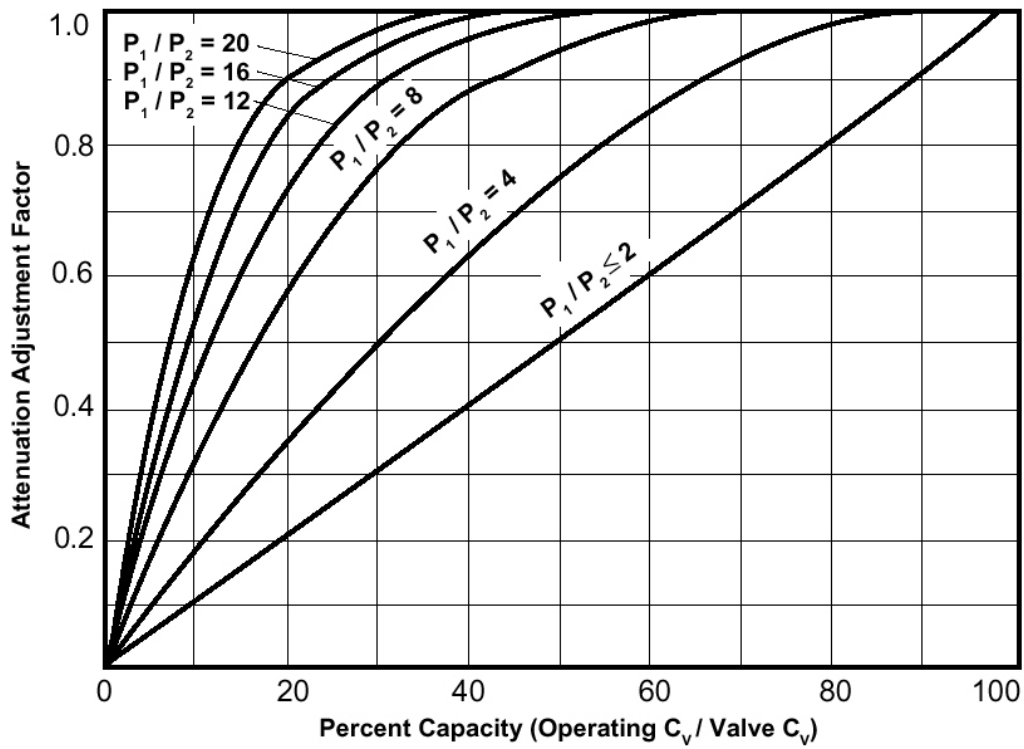


TABLE 15-07 NOISE REDUCTION VS. P_1/P_2 RATIO FOR TIGERTOOTH TRIM

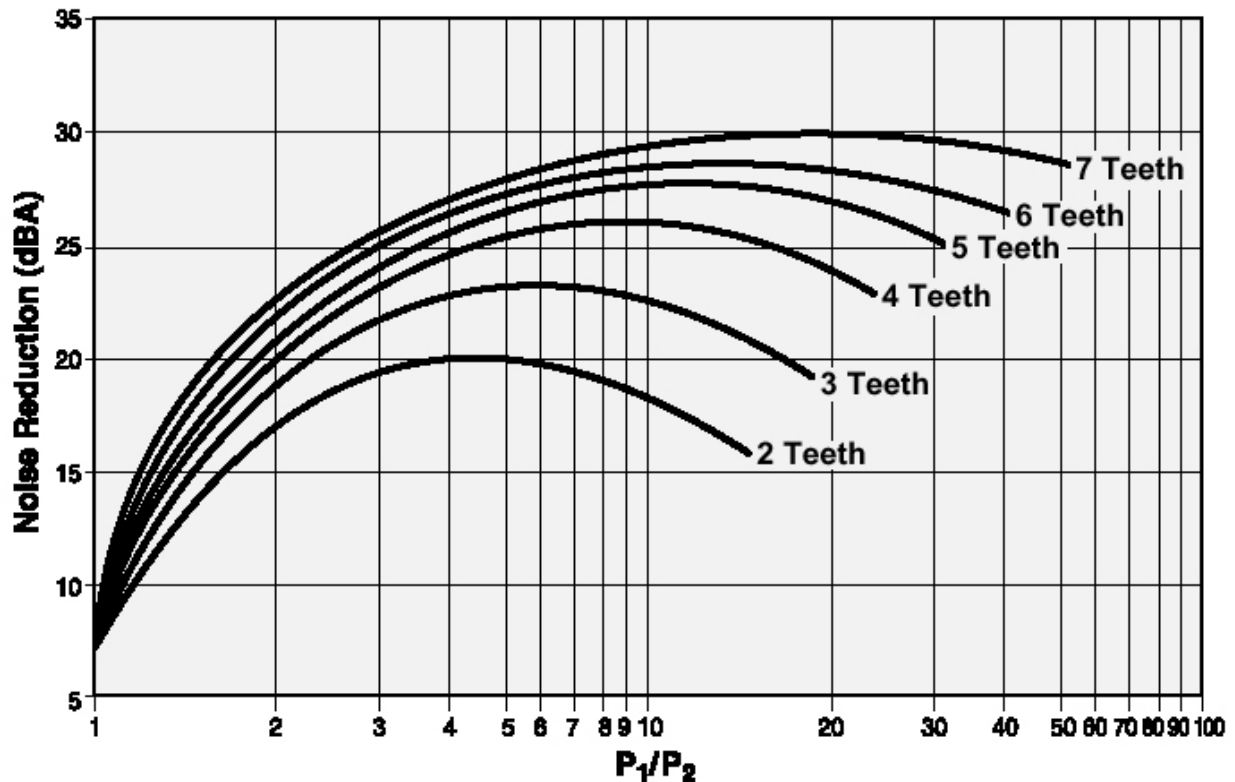


TABLE 15-08 CAVCONTROL STANDARD MATERIALS OF CONSTRUCTION

Seat Retainer	316 SS or 416 Hardened SS
Plug	316 SS with Alloy 6 Facing
Seat Ring	316 SS with Alloy 6 Facing

TABLE 15-09 MICROCAV STANDARD MATERIALS OF CONSTRUCTION

Valve Sizes	½", ¾", 1", 1-½", 2" (Larger Sizes Available)
Body Styles	Angle and Globe
Pressure Ratings	ANSI 150#, 300#, 600#, 900#, 1500#, 2500#
Seat Materials	316 SS / Alloy 6, 400 SS
Plug Materials	316 SS / Alloy 6, 17-4 PH, 400 SS
Rangeability	40:1
Characteristic	Modified Equal Percentage

TABLE 15-10 CAVSTREAM STANDARD MATERIALS OF CONSTRUCTION

Valve Sizes	0.5", 0.75", 1.0", 1-1.5", 2" (Larger Sizes Available)
Body Styles	Angle & Globe
Pressure Ratings	ANSI 150#, 300#, 600#, 900#, 1500#, 2500#
Seat Materials	316 SS / Alloy 6, 400 SS
Plug Materials	Outer Stage: 17-4 PH, 400 SS Inner Stages: 316 SS
Rangeability	30:1
Characteristic	Linear, Bi-Linear

TABLE 15-11 CHANNELSTREAM STANDARD MATERIALS OF CONSTRUCTION

Trim Part	Available Materials
Cartridge	316 SS, 400 SS, Ni-Al-bronze, Inconel, Monel
Plug	316 SS with Alloy 6 overlay, 400 SS, other alloys as required
Cartridge/Plug	416 SS
Seat Ring	316 SS with Alloy 6 overlay, 400 SS, other alloys as required

TABLE 15-12 KÄMMER 11000 SERIES STANDARD MATERIALS OF CONSTRUCTION

Valve Sizes	0.125 to 0.5-inch: up to 60,000 psig; 4 – 15 DN: up to 4,140 bar
Body Styles	Angle
Pressure Ratings	60,000 psig; up to 4,140 bar
Body Materials	316 and 316 LN stainless steels, Hastelloy C, other castable materials according to pressure rating
Trim Materials	316 SS, cobalt 6, Hastelloy B/C, nickel alloys, titanium, tungsten carbide (plug tip and seat insert), ceramic (plug tip and seat insert), PTFE (seat insert only)
Packing Materials	PTFE, graphite
Gasket Materials	PTFE, stainless steel
Bonnet Styles	Standard, extended with normalizing fins, metal bellows seal
End Connections	Integral flange (ANSI and DIN), screwed flanges, screwed internal
Actuators	Kämmer 30/30-IP Series diaphragm actuator, 50 Series electric actuator
Rangeability	25:1 for micro-flow services; 50:1 for low-flow services
Trim Characteristics	Equal percentage, linear, on-off

TABLE 15-13 KÄMMER 15000 SERIES STANDARD MATERIALS OF CONSTRUCTION	
Valve Sizes	0.5 – 2-inch: ANSI Class 1500 – 2500; 15 – 50 DN: PN 250 – 400
Body Styles	Angle
Pressure Ratings	ANSI Class 1500 – 2500; PN 250 – 400
Body Materials	316 and 316 LN stainless steels, Hastelloy C, other castable materials according to pressure rating
Trim Materials	316 stainless steel, cobalt 6, Hastelloy B/C, nickel alloys, titanium, tungsten carbide (plug tip and seat insert), ceramic (plug tip and seat insert), PTFE (seat insert only)
Packing Materials	PTFE, graphite
Gasket Materials	PTFE, stainless steel
Bonnet Styles	Standard, extended with normalizing fins, metal bellows seal
End Connections	Integral flange (ANSI and DIN), screwed flanges
Actuators	Kämmer 30/30-IP Series diaphragm actuator, 50 Series electric actuator
Rangeability	50:1
Trim Characteristics	Equal percentage, linear, on-off

TABLE 15-14 MEGASTREAM STANDARD MATERIALS OF CONSTRUCTION	
Plug and Seat Ring	316 SS or 316 SS with Alloy 6, Inconel, other alloys as required
Retainer	Nickel-plated carbon steel, 316 SS, Inconel
Guides	Bronze, Grafoil lined SS Alloy 6, Teflon-lined SS
Packing	Teflon, Teflon AFP, Glass filled Teflon, Graphite/AFP w/Inconel wire, Grafoil
Packing Spacer	316 SS or same as alloy body
Gaskets	SS and asbestos spiral-wound Teflon, AFG

TABLE 15-15 TIGERTOOTH STANDARD MATERIALS OF CONSTRUCTION	
Stack	Bronze, 400 SS, Inconel, 316 SS, 316 SS with Alloy 6 overlay, and other alloys as required
Plug	316 SS steel, 400 SS, Inconel, 316 SS with Alloy 6 overlay, and other alloys as required
Seat Ring	316 SS steel, 400 SS, Inconel, 316 SS steel with Alloy 6 overlay, and other alloys as required

TABLE 15-16 STEALTH STANDARD MATERIALS OF CONSTRUCTION	
Stack	Bronze, 400 SS, Inconel, 316 SS, 316 SS with Alloy 6 overlay, and other alloys as required
Plug	316 SS steel, 400 SS, Inconel, 316 SS with Alloy 6 overlay, and other alloys as required
Seat Ring	316 SS steel, 400 SS, Inconel, 316 SS steel with Alloy 6 overlay, and other alloys as required

TABLE 15-17 FEEDWATER MATERIAL SELECTION CHANNELSTREAM PRESSURE-BALANCED VALVES

Valve Size	Pressure Class	Number of Stages	Trim Size	Stem Diameter	Plug Mat'l Code	Stem Mat'l Code	Seat Ring Mat'l Code	Retainer Mat'l Code	Sleeve Mat'l Code	
6	150	2	5.25	1.125	685	201	156	156/CFC	230/140	
		3	4.75		201	1-pc				
		4	4.25							
		5	3.50							
		6	3.00							
	300-600	2	5.25	2	685	201	156	156/CFC	230/140	
		3	4.75		201	1-pc				
		4	4.25							
		5	3.50							
	900-1500	2	5.25	2	685	201	CGC	156/CFC	230/140	
		3	4.75			1-pc				
		4	4.25							
		5	3.25							
	2500	2	4.75	2	685	1-pc	CGC	156/CFC	230/140	
		3	4.25							
		4	3.50							
5		3.00								
8	150	2	6.50	1.5	685	201	156	156/CFC	230/140	
		3	6.00		201	1-pc				
		4	5.50							
		5	5.00							
		6	4.50							
	300-600	2	6.50	2	685	201	156	156/CFC	230/140	
		3	6.00		201	1-pc				
		4	5.50							
		5	5.00							
	900-1500	2	6.50	2.5	685	201	CGC	156/CFC	230/140	
		3	6.00			1-pc				
		4	5.50							
		5	5.00							
	10	150	2	8.75	2	685	201	156	156/CFC	230/140
			3	8.38						
			4	7.88						
5			7.38							
6			6.88							
300-600		2	8.75	2.5	685	201	156	156/CFC	230/140	
		3	8.38							
		4	7.88							
		5	7.38							
900-1500		2	7.75	3	685	201	CGC	156/CFC	230/140	
		3	7.25							
		4	6.75							
		5	6.25							
			6	5.75						

(Continued)

TABLE 15-17 FEEDWATER MATERIAL SELECTION CHANNELSTREAM PRESSURE-BALANCED VALVES

Valve Size	Pressure Class	Number of Stages	Trim Size	Stem Diameter	Plug Mat'l Code	Stem Mat'l Code	Seat Ring Mat'l Code	Retainer Mat'l Code	Sleeve Mat'l Code
12	150	2	9.75	2	685	201	156	156/CFC	140
		3	9.00						
		4	8.38						
		5	7.88						
		6	7.38						
	300-600	2	9.75	3	685	201	156	156/CFC	140
		3	9.00						
		4	8.38						
		5	7.88						
		6	7.38						
	900-1500	2	9.75	3	685	201	CGC	156/CFC	140
		3	9.00						
4		8.38							
5		7.88							
6		7.38							
14	150-600	2	11.00	3	685	201	156	156/CFC	140
		3	10.25						
		4	9.50						
		5	8.75						
		6	8.00						
	900-1500	2	10.25	3	685	201	CGC	156/CFC	140
		3	9.50						
		4	8.75						
		5	8.00						
		6	7.38						

TABLE 15-18 FEEDWATER MATERIAL SELECTION CAVCONTROL PRESSURE-BALANCED VALVES

Valve Size	Pressure Class	Trim Size	Stem Diameter	Plug Mat'l Code	Stem Mat'l Code	Seat Ring Mat'l Code	Retainer/Sleeve Mat'l Code
6	150	4.75A	1.125	201	1-pc	156	156/CFC
		4.75B					
		4.75C					
		3.25					
	300-600	4.75A	1.5	201	1-pc	156	156/CFC
		4.75B					
		4.75C					
		3.25					
	900-1500	4.75A	1.5	685	1-pc	CGC	156/CFC
		4.75B					
		3.25					
		3.00					
2500	4.75A	1.5	685	1-pc	CGC	156/CFC	
	4.75B						
	3.25						
	3.00						
8	150-600	6.50A	1.5	685	201	156	156/CFC
		6.50B					
		6.50C					
		6.50D					
	900-1500	6.50A	2	685	201	CGC	156/CFC
		6.50B					
		5.50A					
		5.50B					
10	150-600	8.38A	2	685	201	156	156/CFC
		8.38B					
		8.38C					
		8.38D					
	900-1500	8.38	2.5	685	201	CGC	156/CFC
		7.38A					
		7.38B					
		5.50					
12	150-600	9.75A	2.5	685/C83	201	156	156/CFC
		9.75B					
		9.75C					
		9.75D					
	900-1500	9.75A	2.5	685/C83	201	CGC	156/CFC
		9.75B					
		9.75C					
		9.75D					
14	150-600	11.50A	3	685/C83	201	156	156/CFC
		11.50B					
		11.50C					
		11.50D					
	900-1500	11.50A	3	685/C83	201	CGC	156/CFC
		11.50B					
		11.50C					
		11.50D					