



NAVAL Ball Valves

NAVALTRIM Control valve



Experience In Motion



NAVALTRIM CONTROL VALVES

NAVALTRIM control valves are designed for control of liquid flows in heating, cooling and air-conditioning systems. NAVALTRIM control valves can also be used as shut-off valves.

CONSTRUCTION

NAVALTRIM is a patented control valve, where two cross linked specially designed trim plates decrease the turbulence of the flow, improve the measuring accuracy and practically eliminate the cavitation and noise. This construction is used in sizes from DN40 up to DN300. The valve has an all-welded body and it is fitted with reinforced Teflon seals which are durable even if the valve is frequently operated, and are resistant to impurities and chemicals. The polished stainless steel ball is easy to turn and is designed to provide many years of reliable service. The blow-out proof stem is sealed with 2 O-rings. In smaller sizes the up-per one can be changed and in sizes DN65-400 both can be changed. The valve is equipped with fittings for measuring of pressure difference. Naval ball valves are manufactured in accordance with European Pressure

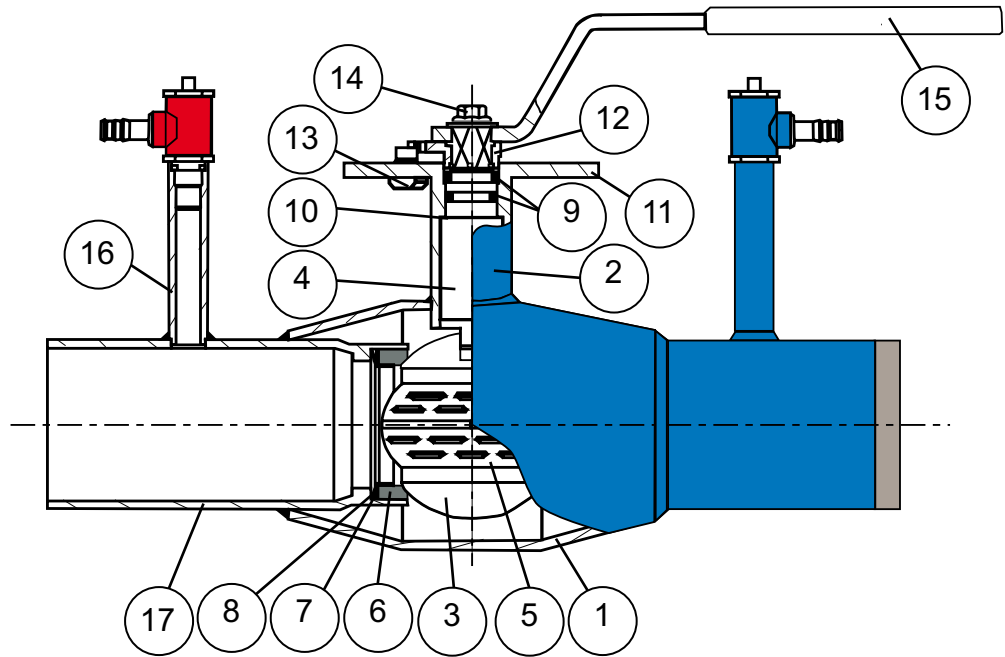
Equipment Directive 97/23/EY. Naval Oy applies Module H as conformity assessment procedure (=full quality assurance) controlled by Det Norske Veritas as notified body. Naval Oy has a certified quality system ISO 9001 and certified environmental management system ISO 14001.

CHARACTERISTICS

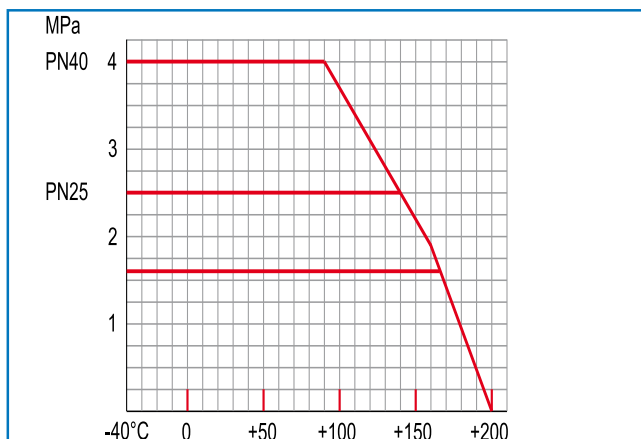
The unique Navaltrim construction provides a broad linear and exact control range. The flow resistance is very low in fully open position and

the control plates inside the ball allow exact flow control without disturbing turbulence or cavitation. There fore the information obtained from the measuring outlet is reliable.

The valve needs no servicing or lubrication and is easy to install. These features combined guarantee a long and reliable life time with low running costs. The long and circular stem housing makes the valve easy to insulate. The operating lever can be dismantled, turned 180° and reinstalled to a new position.



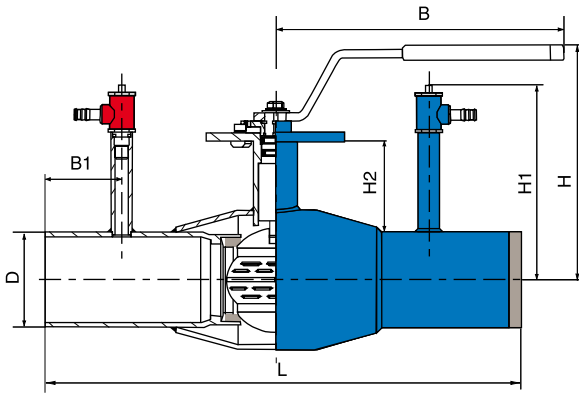
PRESSURE/TEMPERATURE CURVES
(do not use for steam)



For temperatures below -20°C, please mention separately when ordering.

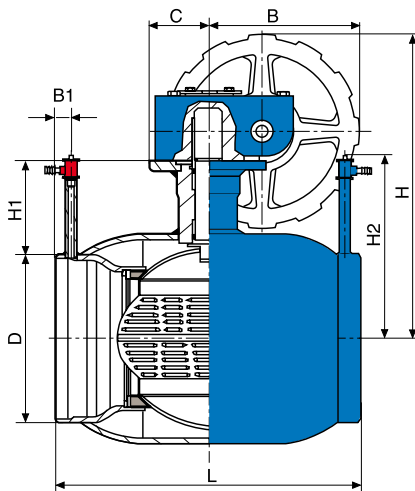
| POS | DESCRIPTION | MATERIAL | |
|-----|--------------------|-------------------|---------|
| 1 | BODY | CARBON STEEL | P235GH |
| 2 | STEM HOUSING | CARBON STEEL | P355NH |
| 3 | BALL | STAINLESS STEEL | 1.4301 |
| 4 | STEM | STAINLESS STEEL | 1.4305 |
| 5 | TRIM PLATES | STAINLESS STEEL | 1.4404 |
| 6 | SEAT RING | REINFORCED TEFLON | PTFE+GF |
| 7 | SUPPORT RING | STAINLESS STEEL | 1.4305 |
| 8 | BEVEL WASHER | SPRING STEEL | |
| 9 | O-RING | VITON | FPM |
| 10 | THRUST WASHER | TEFLON | PTFE |
| 11 | FACE PLATE | CARBON STEEL | |
| 12 | INDICATOR/END STOP | CAST STEEL | 1.4301 |
| 13 | LOCKING SCREW | STEEL | |
| 14 | SCREW | STEEL | |
| 15 | HANDLE | GALVANIZED STEEL | |
| 16 | MEASURING OUTLET | | |
| 17 | END PIPE | CARBON STEEL | P235GH |

WITH BUTT WELD CONNECTION

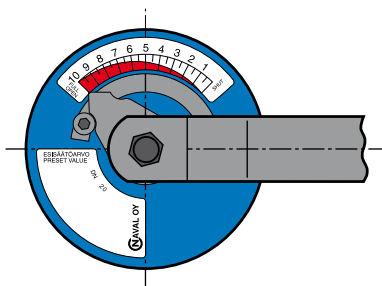


| DN | PN | NAVAL no | L | D | H | H1 | H2 | B | B1 | KG |
|-----|----|----------|-----|-------|-----|-----|-------|------|----|------|
| 15 | 40 | 264 403 | 230 | 21,3 | 133 | 106 | 48,0 | 145 | 50 | 1,2 |
| 20 | 40 | 264 405 | 230 | 26,9 | 133 | 106 | 48,0 | 145 | 50 | 1,2 |
| 25 | 40 | 264 406 | 260 | 33,7 | 142 | 114 | 49,0 | 145 | 50 | 1,9 |
| 32 | 40 | 264 407 | 260 | 42,4 | 142 | 114 | 49,0 | 145 | 50 | 1,9 |
| 40 | 40 | 264 408 | 260 | 48,3 | 140 | 117 | 57,5 | 188 | 50 | 2,5 |
| 50 | 40 | 264 409 | 300 | 60,3 | 146 | 123 | 58,0 | 188 | 50 | 3,6 |
| 65 | 25 | 264 410 | 300 | 76,1 | 175 | 146 | 63,0 | 278 | 40 | 4,9 |
| 80 | 25 | 264 411 | 300 | 88,9 | 187 | 152 | 69,0 | 278 | 40 | 6,3 |
| 100 | 25 | 264 412 | 325 | 114,3 | 223 | 189 | 92,5 | 279 | 40 | 9,4 |
| 125 | 16 | 264 413 | 325 | 139,7 | 256 | 202 | 91,5 | 400 | 25 | 15,7 |
| 150 | 16 | 264 414 | 350 | 168,3 | 277 | 216 | 97,5 | 600 | 25 | 20,8 |
| 200 | 16 | 264 416 | 390 | 219,1 | 300 | 239 | 123,0 | 900 | 20 | 42,0 |
| 250 | 16 | 264 417 | 520 | 273,0 | 345 | 266 | 122,0 | 1200 | 20 | 82,0 |
| 125 | 25 | 264 453 | 325 | 139,7 | 256 | 202 | 91,5 | 400 | 25 | 15,7 |
| 150 | 25 | 264 454 | 350 | 168,3 | 277 | 216 | 97,5 | 600 | 25 | 20,8 |
| 200 | 25 | 264 456 | 390 | 219,1 | 300 | 239 | 123,0 | 900 | 20 | 42,0 |
| 250 | 25 | 264 457 | 520 | 273,0 | 345 | 266 | 122,0 | 1200 | 20 | 82,0 |

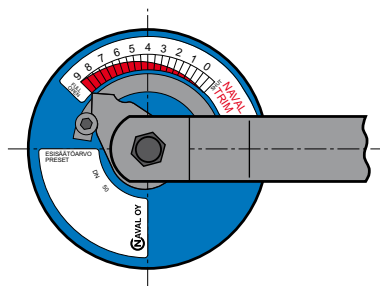
WITH BUTT WELD CONNECTION AND WITH GEAR



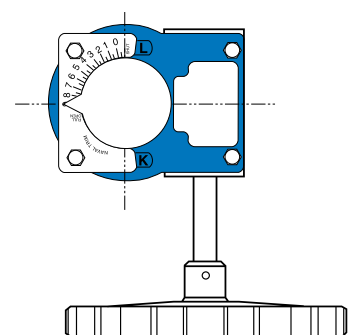
| DN | PN | NAVAL no | L | D | H | H1 | H2 | B | B1 | C | KG |
|-----|----|----------|-----|-------|-----|-----|-----|-----|----|-----|-----|
| 150 | 16 | 264 434 | 350 | 168,3 | 330 | 107 | 216 | 145 | 25 | 50 | 25 |
| 200 | 16 | 264 436 | 390 | 219,1 | 398 | 123 | 239 | 196 | 20 | 75 | 50 |
| 250 | 16 | 264 437 | 520 | 273,0 | 451 | 122 | 266 | 236 | 20 | 100 | 90 |
| 300 | 16 | 264 438 | 635 | 323,9 | 572 | 155 | 345 | 280 | 24 | 193 | 150 |
| 400 | 16 | 264 439 | 762 | 406,4 | 795 | 155 | 358 | 480 | 24 | 170 | 322 |
| 150 | 25 | 264 474 | 350 | 168,3 | 330 | 107 | 216 | 145 | 25 | 50 | 25 |
| 200 | 25 | 264 476 | 390 | 219,1 | 398 | 123 | 239 | 196 | 20 | 75 | 50 |
| 250 | 25 | 264 477 | 520 | 273,0 | 451 | 122 | 266 | 236 | 20 | 100 | 90 |
| 300 | 25 | 264 478 | 635 | 323,9 | 572 | 155 | 345 | 280 | 24 | 193 | 150 |
| 400 | 25 | 264 479 | 762 | 406,4 | 795 | 155 | 358 | 480 | 24 | 170 | 322 |



**CONTROL SCALE
(WITH HANDLE)
DN15-32**

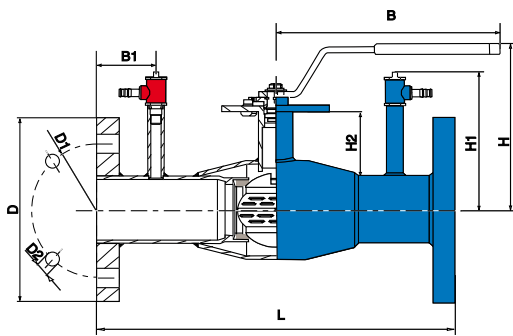


**CONTROL SCALE
(WITH HANDLE)
DN40-250**



**CONTROL SCALE
(WITH GEARBOX)
DN150-400**

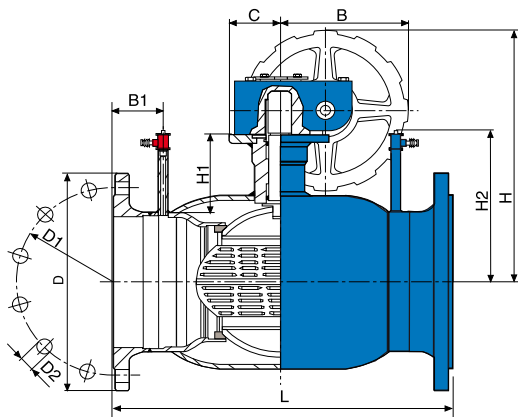
WITH FLANGES



| DN | PN | NAVAL no | L | D | D1 | D2 | H | H1 | H2 | B | B1 | KG |
|-----|----|----------|-----|-----|-----|----|-----|-----|------|------|----|-------|
| 15 | 40 | 265 503 | 250 | 95 | 65 | 14 | 133 | 106 | 48,0 | 145 | 60 | 2,0 |
| 20 | 40 | 265 505 | 250 | 105 | 75 | 14 | 133 | 106 | 48,0 | 145 | 60 | 2,2 |
| 25 | 40 | 265 506 | 280 | 115 | 85 | 14 | 142 | 114 | 49,0 | 145 | 60 | 4,5 |
| 32 | 40 | 265 507 | 280 | 140 | 100 | 18 | 142 | 114 | 49,0 | 145 | 60 | 5,3 |
| 40 | 40 | 265 508 | 270 | 150 | 110 | 18 | 140 | 117 | 57,5 | 188 | 55 | 8,3 |
| 50 | 40 | 265 509 | 310 | 165 | 125 | 18 | 146 | 123 | 58,0 | 188 | 55 | 10,5 |
| 65 | 16 | 265 510 | 310 | 185 | 145 | 18 | 175 | 146 | 63,0 | 278 | 45 | 13,0 |
| 80 | 16 | 265 511 | 310 | 200 | 160 | 18 | 187 | 152 | 69,0 | 278 | 45 | 16,0 |
| 100 | 16 | 265 512 | 350 | 220 | 180 | 18 | 213 | 189 | 92,5 | 279 | 52 | 18,0 |
| 125 | 16 | 265 513 | 360 | 250 | 210 | 18 | 256 | 202 | 91,5 | 400 | 42 | 26,0 |
| 150 | 16 | 265 514 | 390 | 285 | 240 | 22 | 277 | 216 | 97,5 | 600 | 45 | 33,0 |
| 200 | 16 | 265 516 | 500 | 340 | 295 | 22 | 300 | 239 | 123 | 900 | 75 | 50,0 |
| 250 | 16 | 265 517 | 650 | 405 | 355 | 26 | 345 | 266 | 122 | 1200 | 85 | 100,0 |
| 65 | 25 | 265 570 | 310 | 185 | 145 | 18 | 175 | 146 | 63,0 | 278 | 45 | 15,0 |
| 80 | 25 | 265 571 | 310 | 200 | 160 | 18 | 187 | 152 | 69,0 | 278 | 45 | 18,0 |
| 100 | 25 | 265 572 | 350 | 235 | 190 | 22 | 213 | 189 | 92,5 | 279 | 52 | 20,0 |
| 125 | 25 | 265 573 | 360 | 270 | 220 | 26 | 256 | 202 | 91,5 | 400 | 42 | 28,0 |
| 150 | 25 | 265 574 | 390 | 300 | 250 | 26 | 277 | 216 | 97,5 | 600 | 45 | 35,0 |
| 200 | 25 | 265 576 | 500 | 360 | 310 | 26 | 300 | 239 | 123 | 900 | 75 | 55,0 |
| 250 | 25 | 265 577 | 650 | 425 | 370 | 30 | 345 | 266 | 122 | 1200 | 85 | 110,0 |

FLANGES: EN1092-1

WITH FLANGES AND WITH GEAR



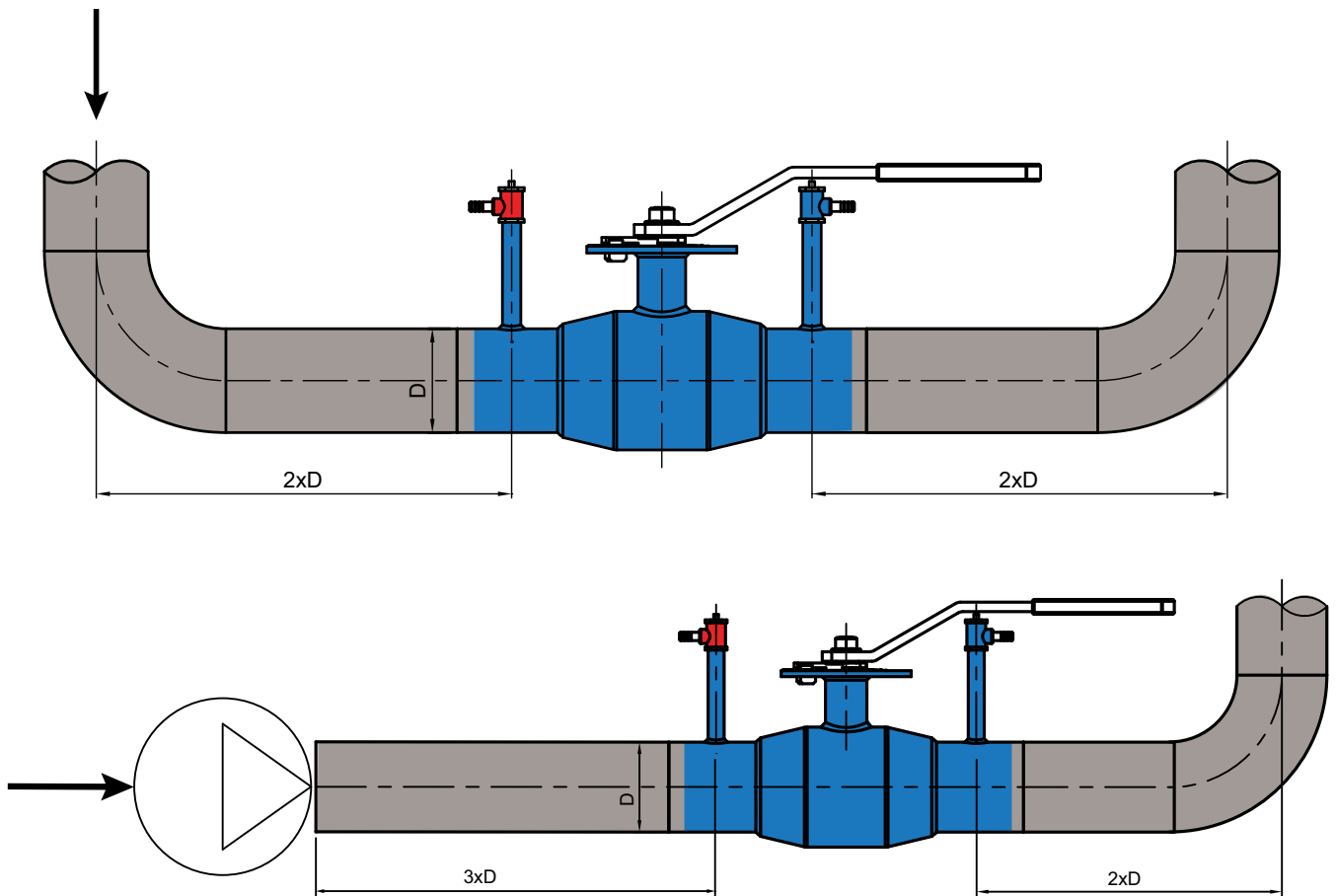
| DN | PN | NAVAL no | L | D | D1 | D2 | H | H1 | H2 | B | B1 | C | KG |
|-----|----|----------|-----|-----|-----|----|-----|-----|-----|-----|----|-----|-----|
| 150 | 16 | 265 534 | 390 | 285 | 240 | 22 | 330 | 107 | 216 | 145 | 25 | 50 | 38 |
| 200 | 16 | 265 536 | 500 | 340 | 295 | 22 | 298 | 123 | 239 | 196 | 75 | 75 | 65 |
| 250 | 16 | 265 537 | 650 | 405 | 355 | 26 | 451 | 122 | 266 | 236 | 85 | 100 | 115 |
| 300 | 16 | 265 538 | 750 | 460 | 410 | 26 | 572 | 155 | 345 | 280 | 85 | 193 | 190 |
| 400 | 16 | 265 539 | - | 580 | 525 | 30 | 795 | 228 | 358 | 480 | - | 170 | 464 |
| 150 | 25 | 265 594 | 390 | 300 | 250 | 26 | 330 | 107 | 216 | 145 | 25 | 50 | 40 |
| 200 | 25 | 265 596 | 500 | 360 | 310 | 26 | 298 | 123 | 239 | 196 | 75 | 75 | 65 |
| 250 | 25 | 265 597 | 650 | 425 | 370 | 30 | 451 | 122 | 266 | 236 | 85 | 100 | 120 |
| 300 | 25 | 265 598 | 750 | 485 | 430 | 30 | 572 | 155 | 345 | 280 | 85 | 193 | 200 |
| 400 | 25 | 265 599 | - | 620 | 550 | 36 | 795 | 228 | 358 | 480 | - | 170 | 464 |

FLANGES: EN1092-1

TA-CMI measuring equipment can be used for accurate information on actual pressure and flow values (ask for full technical data).
NAVAL NO 264 100



INSTALLATION DISTANCE IN NAVALTRIM CONTROL VALVE



TRIM enables a shorter installation distance when compared to the traditional valves with V-port.

PRESSURE LOSS

Unless the precontrol value has been calculated, it can be estimated from the attached curves when the flow and the pressure loss caused by the valve are known. Or it can be calculated with the below given formula:

$$K_v = \frac{Q \left[\frac{m^3}{h} \right]}{\sqrt{\Delta p [bar]}}$$

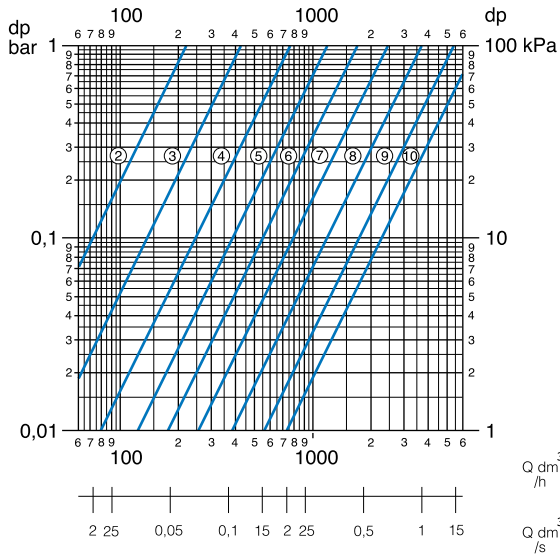
DIFFERENT MEDIUMS

The Kv-values given in the brochure have been calculated for water only. For other mediums (x) they can be calculated with the below given formula:

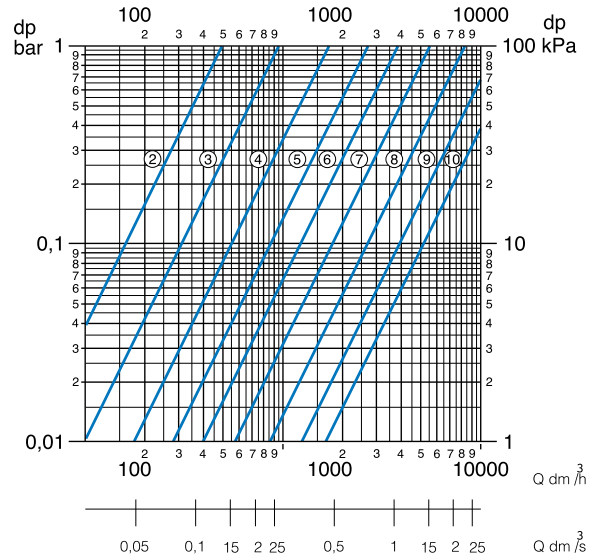
$$K_{vx} = \sqrt{\frac{\text{water density}}{x \text{ density}}} \times K_v$$

CONTROL GRAPHS *

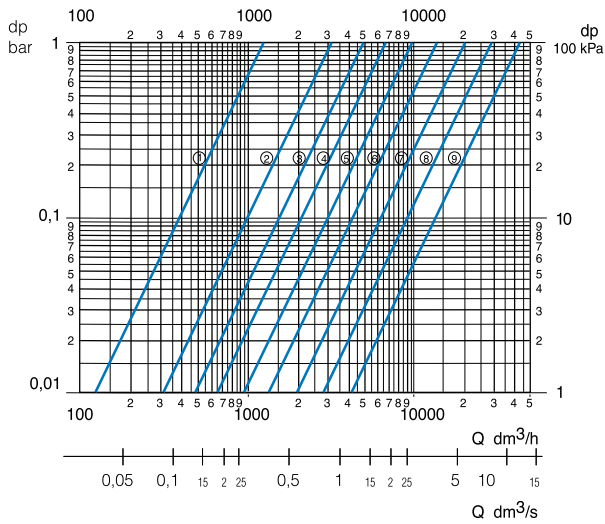
DN15 - DN20



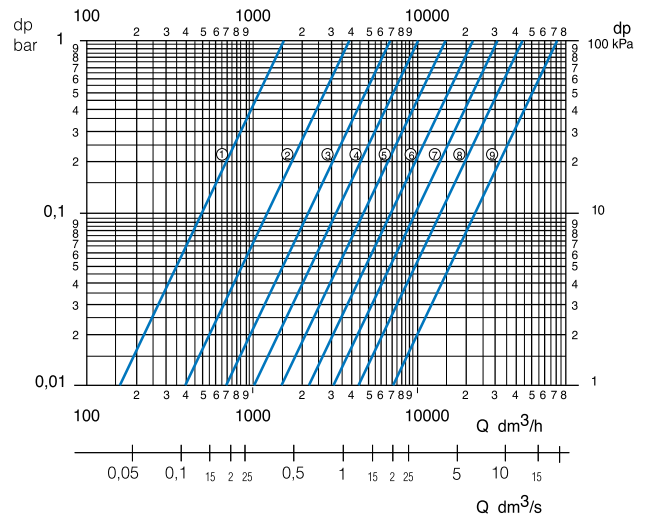
DN25 - DN32



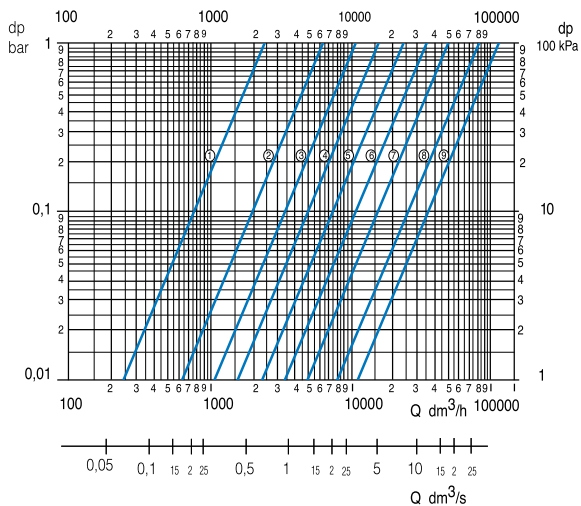
DN40



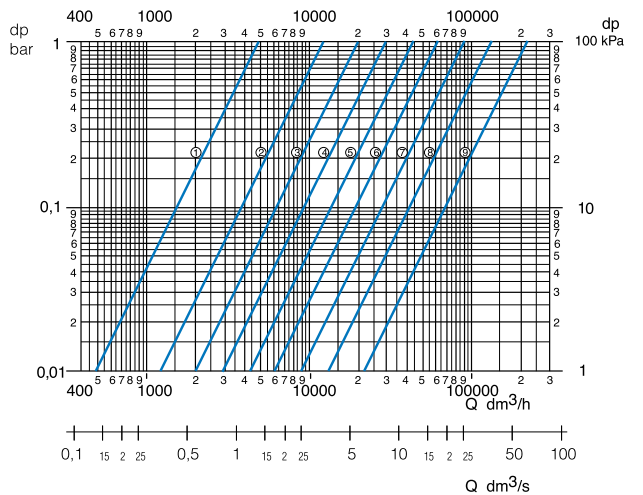
DN50



DN65

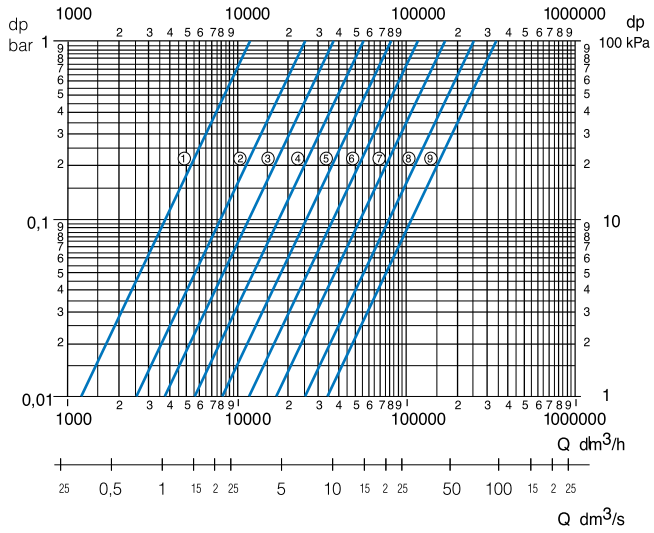


DN80

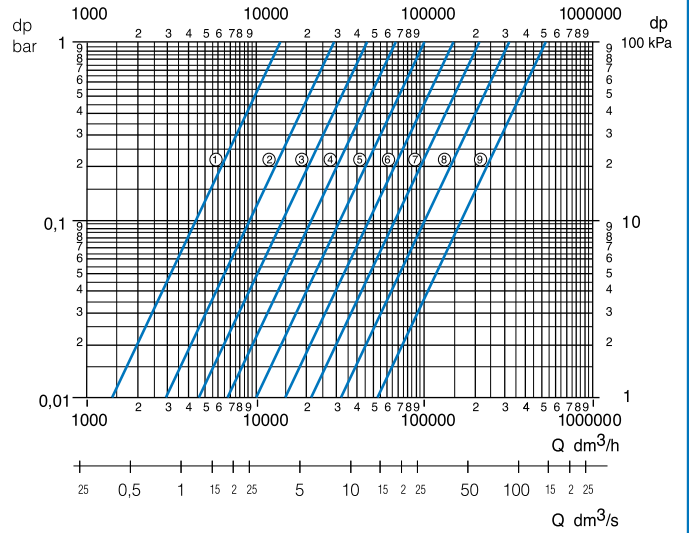


* ASK FOR NAVALTRIM OPERATING INSTRUCTIONS FOR MORE DETAILED INFORMATION

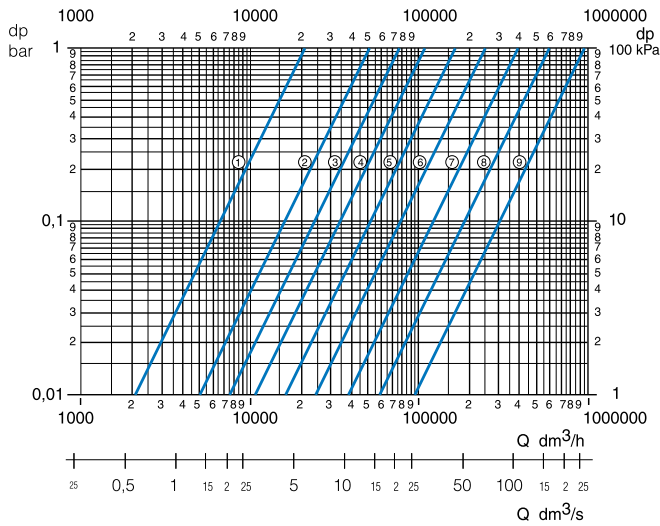
DN100



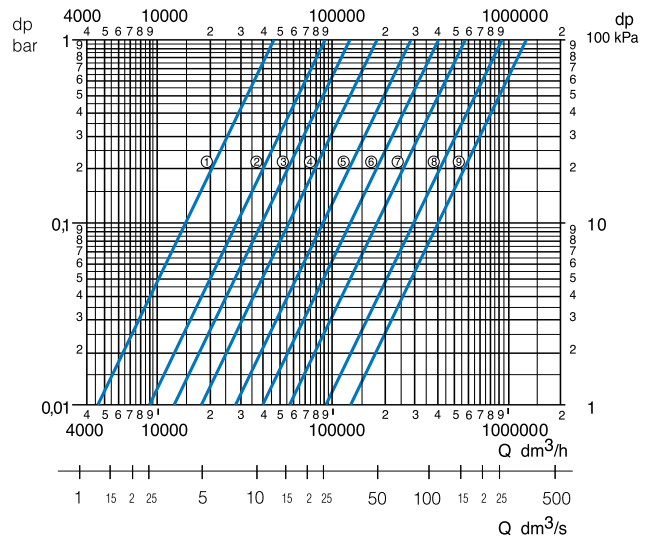
DN125



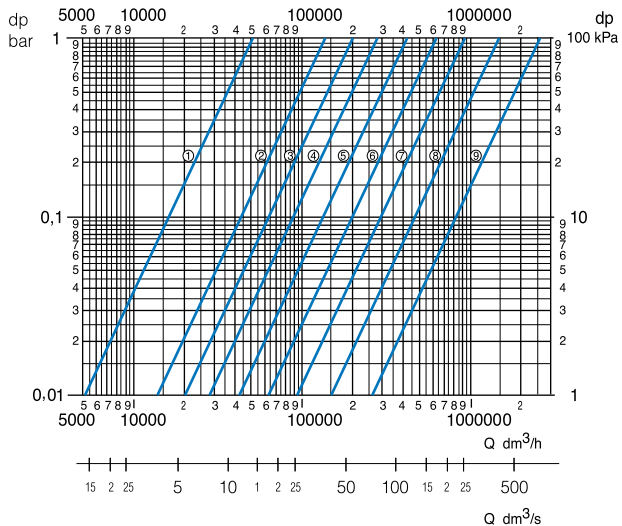
DN150



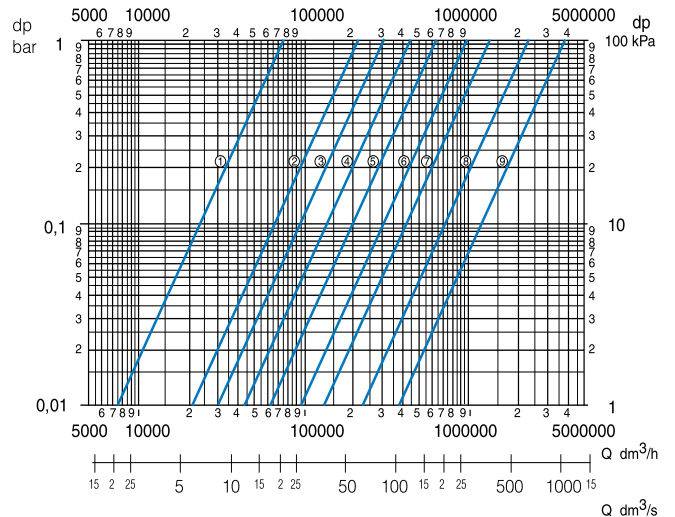
DN200



DN250



DN300



SELECTION TABLE OF ACTUATORS

| DN | PNEUMATIC, SPRING RETURN Rotork Sweden AB | PNEUMATIC, DOUBLE ACTING Rotork Sweden AB | ELECTRIC ACTUATOR AUMA | ELECTRIC ACTUATOR BERNARD |
|-----|---|---|------------------------------|---------------------------------|
| 10 | RC220-SR | RC210-DA | SA07.1-GS50.3 | OAP8 |
| 15 | RC220-SR | RC210-DA | SG07.1-GS50.3 | OAP8 |
| 20 | RC220-SR | RC210-DA | SG07.1-GS50.3 | OAP8 |
| 25 | RC230-SR | RC220-DA | SG07.1-GS50.3 | OAP8 |
| 32 | RC230-SR | RC220-DA | SG07.1-GS50.3 | OAP8 |
| 40 | RC240-SR | RC220-DA | SG07.1-GS50.3 | OAP8 |
| 50 | RC240-SR | RC230-DA | SG07.1-GS50.3 | OAP8 |
| 65 | RC240-SR | RC230-DA | SG07.1-GS50.3 | ASP25 |
| 80 | RC250-SR | RC240-DA | SG07.1-GS50.3 | ASP25 |
| 100 | RC260-SR | RC250-DA | SG07.1-GS50.3 | ASP25 |
| 125 | RC260-SR | RC250-DA | SG07.1-GS50.3 | AS50 |
| 150 | RC270-SR | RC260-DA | SG07.5-GS63.3 | AS50 |
| 200 | RC280-SR | RC265-DA | SG07.5-GS80.3 | BS100 |
| 250 | RC88-SR | RC280-DA | SA07.1-GS100.3/VZ4 | AS200 |
| 300 | RCG100-SR | RC88-DA | SA07.5-GS125.3/VZ4 | ASM1+RS600 |
| 400 | | | SA07.5-GZS200.3/GZ200.3 | |

ELECTRIC ACTUATORS ARE AVAILABLE WITH ONE OR THREE PHASE MOTORS.

Kv-VALUE TABLE

| SET VALUES | DN 15-20 | DN 25-32 | SET VALUES | DN40 | DN50 | DN65 | DN80 | DN100 | DN125 | DN150 | DN200 | DN250 | DN300 | DN400 |
|------------|----------|----------|------------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| 1 | | | 1 | 1,1 | 1,6 | 2,4 | 5,1 | 11,5 | 14,6 | 21,4 | 46,6 | 50,6 | 75,4 | 99,0 |
| 2 | 0,2 | 0,5 | 1,5 | 2,0 | 2,8 | 4,5 | 8,9 | 18,4 | 22,1 | 36,7 | 70,0 | 95,6 | 142 | 197 |
| 3 | 0,4 | 1,0 | 2 | 2,8 | 4,0 | 6,4 | 12,4 | 24,8 | 28,9 | 50,9 | 91,3 | 138 | 205 | 289 |
| 4 | 0,8 | 1,7 | 2,5 | 3,9 | 5,6 | 8,6 | 16,9 | 31,4 | 38,2 | 64,5 | 112 | 172 | 256 | 437 |
| 5 | 1,2 | 2,7 | 3 | 4,9 | 7,1 | 10,6 | 20,9 | 37,0 | 46,4 | 76,1 | 129 | 200 | 298 | 573 |
| 6 | 1,7 | 3,9 | 3,5 | 6,0 | 9,0 | 13,4 | 26,2 | 46,3 | 58,1 | 95,0 | 159 | 248 | 370 | 703 |
| 7 | 2,5 | 5,6 | 4 | 6,8 | 10,5 | 15,9 | 30,7 | 54,3 | 68,0 | 111 | 185 | 289 | 430 | 813 |
| 8 | 3,7 | 8,4 | 4,5 | 8,5 | 13,3 | 20,1 | 39,0 | 68,6 | 86,1 | 143 | 238 | 359 | 535 | 1010 |
| 9 | 5,4 | 12,2 | 5 | 9,9 | 15,6 | 23,7 | 46,2 | 80,8 | 102 | 171 | 284 | 419 | 624 | 1177 |
| 10 | 7,1 | 16,0 | 5,5 | 12,3 | 19,7 | 29,4 | 57,1 | 98,4 | 127 | 214 | 343 | 531 | 791 | 1560 |
| | | | 6 | 14,4 | 23,2 | 34,3 | 66,3 | 113 | 149 | 251 | 391 | 628 | 936 | 1897 |
| | | | 6,5 | 18,0 | 29,0 | 43,4 | 84,7 | 140 | 182 | 326 | 488 | 785 | 1160 | 2354 |
| | | | 7 | 21,0 | 33,9 | 51,3 | 101 | 162 | 211 | 392 | 571 | 918 | 1350 | 2742 |
| | | | 7,5 | 25,7 | 41,5 | 65,9 | 127 | 208 | 266 | 500 | 754 | 1220 | 1850 | 3445 |
| | | | 8 | 29,7 | 47,9 | 78,6 | 149 | 247 | 314 | 594 | 914 | 1480 | 2300 | 4046 |
| | | | 8,5 | 36,1 | 57,9 | 95,9 | 194 | 298 | 423 | 784 | 1120 | 2060 | 3110 | 5678 |
| | | | 9 | 41,4 | 66,2 | 110 | 233 | 341 | 519 | 952 | 1300 | 2580 | 3830 | 7143 |