Primary characteristics

NAF-Trimsector Z-trim has a new approach for solving the problem of cavitation and high noise level. The design is based on our well-established NAF-Setball ball sector valve. The NAF Setball with Z-trim combines the benefits of an advanced control valve with the simplicity of a ball sector valve.

The valve has

- A ball sector with trim splits the flow into many other flow paths and the pressure drop in 3 steps. This unique design offer substantial control benefits.
- A ball sector with top and bottom bearings, trunion design, require very low operating torques, this enables the use of lower torque actuators.
- A V-shaped sector that provides accurate control over a wide operating range, even at low flow rates.
- The NAF-standard for actuator mounting utilizes a ”direct mounting method.” This method results in superior control and a compact valve/actuator assembly.

CE-marked according to Pressure Equipment Directive (PED 97/23/EG) module H, category III.
For module H1, category IV contact NAF

Design

The design of NAF-Trimsector with Z-trim makes it possible to use the valve for media with some solid media, i.e. wood pulp, without a risk to plug the valve.

Applications

NAF-Trimsector with the Z-trim is a control valve which is intended for operation cases in which pressure conditions give rise to cavitation and noise. The valve represents a concrete results of our product philosopy, which is focused on functionality, high quality and low life cycle costs, and is based on concentrating our range to a limited number of valve types, but all of them suitable for a wide variety of applications.

NAF-Trimsector is recommended for applications in the following branches:

- Pulp and Paper
- Chemical and Petro Chemical
- Oil and gas
- Power stations
- Steel works

Technical specification for standard design

Material:	EN 1.4408
Size range:	DN 40-500, 1.5-20”
Pressure ratings:	PN 10-40 ANSI Class 150-300
Face-to-face lengths:	IEC 534-3-2
Valve design:	ANSI B 16.34 and EN 12516
Connections:	Wafer type (DN 50-200) Flanged (DN 50-500)
Temperature range:	-30 - 250°C
Test pressure:	1.5xPN with valve open IEC 534-4 Class IV-S1 with valve closed
Sealing class:	Testing medium is water. PTFE-seat: EN 12266-1, Rate A Metallic seat: IEC534-4 Class IV-S1

At requests for test fluid Air, contact NAF for more information.

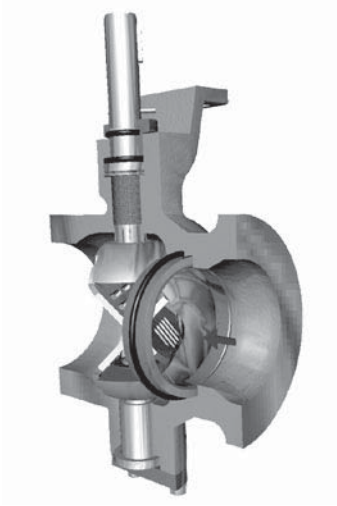


Fig. 2. The NAF-Trimsector with Z-trim in partial open position

Cavitation and noise in liquids

If the static pressure of liquid should drop below the vapor pressure, vapor bubbles will form and the liquid will flash. If the pressure should rise again, the vapor bubbles will collapse – implode – which will give rise to energy conversion. This energy conversion results in noise, vibration and, above all, erosion damage to materials. This process is known as cavitation and often occurs in control valves. Fig1 shows the pressure drop in an ordinary control valve and that in a NAF-Trimsector with Z-trim, where P1 is the pressure before the valve, P_{VC} the lowest pressure in an ordinary control valve and P_2 the pressure after the valve. In NAF-Setball with Z-trim the built-in trim plates cause the pressure drop in 3 stages. The lowest pressure never drops below the vapour pressure $P_{V,}$ and cavitation is thus avoided.

Noise incompressible media

Noise is a serious problem in the control of compressible media, such as air, gas and steam. When the pressure is throttled in a conventional control valve, i.e. a valve with only one restriction the velocity will increase very much. As a result, very high sound levels occur in conventional valves. In NAF-Trimsector with Z-trim the pressure drop is taken in 3 stages and therefor is the velocity and noise level constantly low. The flow is furthermore split in several partial flows giving noise with higher frequency, which is damped much quicker.

Sizing

We have a user friendly valve calculation program which can be ordered through your NAF representative. The program is based on calculating formula according to the standards IEC 60534 and ISA S75.01.

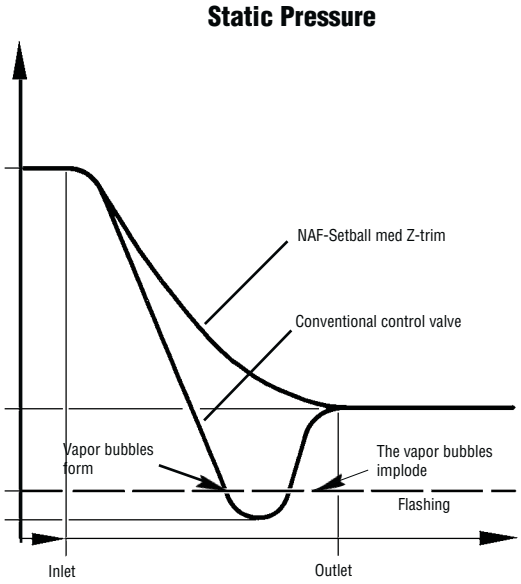


Figure 1. Static pressure drop in conventional control valves and in the NAF-Setball med Z-trim

Flow capacity (Table 1)

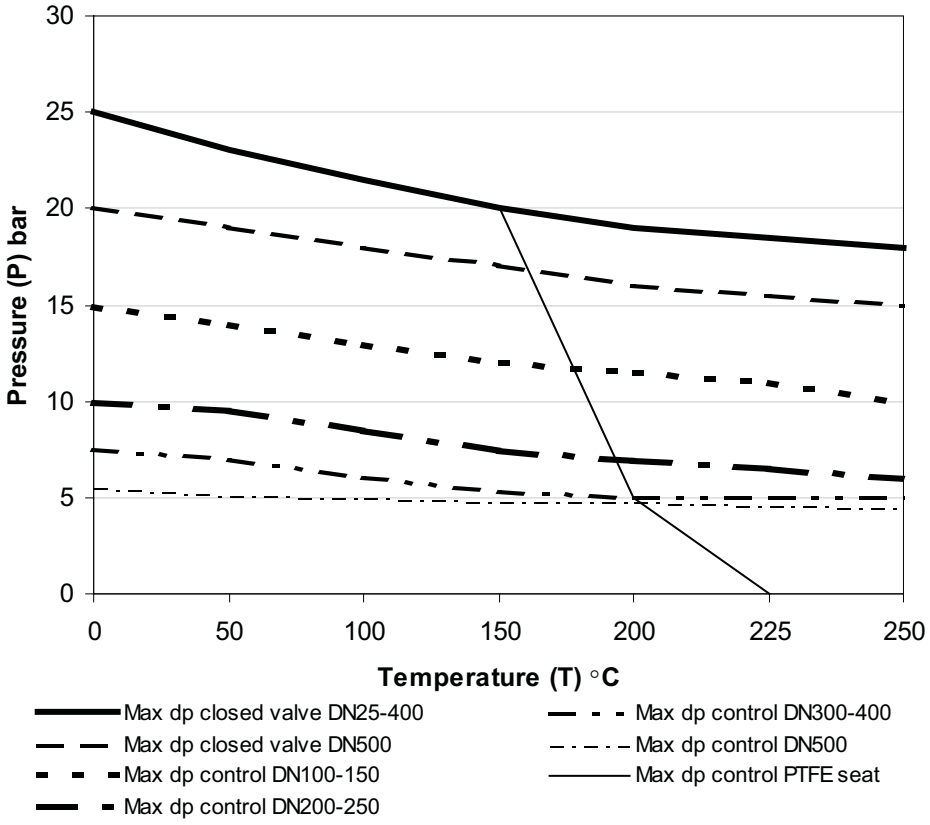
DN	KV at fully open valve (90º)
40	40
50	80
65	119
80	227
100	352
150	804
200	1116
250	2020
300	3225
350	4647
400	6325
500	9700

Torque and selection of actuator
Specified by NAF for each individual application.

Dimension and mass*
See catalogue sheet Fk 41.51 for the NAF-Setball.
*Due to the special design of the ballsector, the weight of the NAF-Setball with Z-trim, excluding the actuator, is 10-20% higher than that of corresponding NAF-Setball.

Material specification
In its standard design, the NAF-Setball with Z-trim is made of the same materials as the NAF-Setball (see catalogue sheet Fk 41.51).
Consult NAF for further particulars.

Working pressure, differential pressure and temperature
The maxium working pressure and temperature in the valve body depends on pressure class according to the flange standard.
Maxium differential pressure, valve closed, depends on temperature as shown below.
The maxium differential pressure for control service depends on the size and temperature as shown below.



Product code NAF-Trimsector with Z-trim

Example:

	Z- 87	8	0	E	B	- 0100	-	02
Code	1	2	3	4	5	6		7

1. Valve type
   Z- 87 NAF-Trimsector with Z-trim

2. Material
   8 Stainless steel

3. Pressure rating
   Wafer version [1]

	EN	ANSI	
0	DN 150-200	Size 6”-8”	PN 10-16/ ANSI Class 150
	DN 80-100	Size 3”-4”	PN 10-25/ ANSI Class 150
	DN 40-65	Size 1.5”-2.5”	PN 10-40/ ANSI Class 150 and 300

Flanged version

2	PN 10	DN 200-500 [2] (DN 80-150 choose PN 16)
3	PN16	DN 80-500 [2]
4	ANSI Class 150	Size 1,5”-20” [3]
5	PN 25	DN 200-400 [2] (DN 80-150 choose PN 40)
6	PN 40	DN 40-400
7	ANSI Class 300	Size 1.5”-16” [3]

4. Stem bearing

	Body	Stem
E	PTFE lined bearing	-

5. Body type
   B Wafer
   F Flanged

6. Size

EN wafer and flanged version DN		ANSI wafer and flanged version Size	
0040	40	01.5	1,5”
0050	50	0002	2”
0065	65	02.5	2.5”
0080	80	0003	3”
0100	100	0004	4”
0150	150	0006	6”
0200	200	0008	8”
0250	250	0010	10”
0300	300	0012	12”
0350	350	0014	14”
0400	400	0016	16”
0500	500	0020	20”

7. Seals

	Seat	Seat seal	Stem seal	Max.temp.
01	Alloy 6	PTFE	EPDM	200ºC
02	Alloy 6	EPDM	EPDM	150ºC
04	Alloy 6	PTFE	PTFE box	250ºC
05	Alloy 6	PTFE	FPM	200ºC
06	Alloy 6	FPM	FPM	150ºC
07	Alloy 6	PTFE	Graphite	250ºC
11	PTFE	PTFE	EPDM	200ºC*
12	PTFE	EPDM	EPDM	150ºC*
14	PTFE	PTFE	PTFE box	225ºC*
15	PTFE	PTFE	FPM	200ºC*
16	PTFE	FPM	FPM	150ºC*
17	PTFE	PTFE	Graphite	225ºC*

*See Pressure, temperature diagram, page 3

1) The valve can be mounted between all flanges mentioned for respectively sizes.
The mark plate on the EN valves will include the highest pressure ratings in both PN and ANSI together with dimensions in both DN and size. Leakage test according to page 1.
The ANSI valves are marked with the ANSI pressure class and size and are leakage tested according to ISA-75.19.01.

2) Size DN 50 and 65 have the same flange dimensions in PN 10, 16 25 and 40. Choose PN 40 for these valves.

3) Not available in size 2,5”.

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