

### Primary characteristics

NAF-Trimsector Z-trim has a new approach for solving the problem of cavitation and high noise level. The applied 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 philosophy, 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.

### Technical specification

Material:	Stainless steel
Size range:	DN 50-500, 2-20"
Pressure ratings:	PN 10-40 ANSI Class 150-300
Face-to-face lengths:	IEC 534-3-2
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:	PTFE-seat: ISO 5208-2, Rate A DIN 3230 BN, Leckrate 1 Metallic seat: IEC534-4 Class IV-S1



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  $P_1$  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.g. 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 therefore 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 Windows based calculation program which is advanced but very easy to use. This program can be ordered through your NAF representative. The program is based on calculation formula according to the Standards IEC 534, ISA 575.01 and VDMA 24422.

### Static Pressure

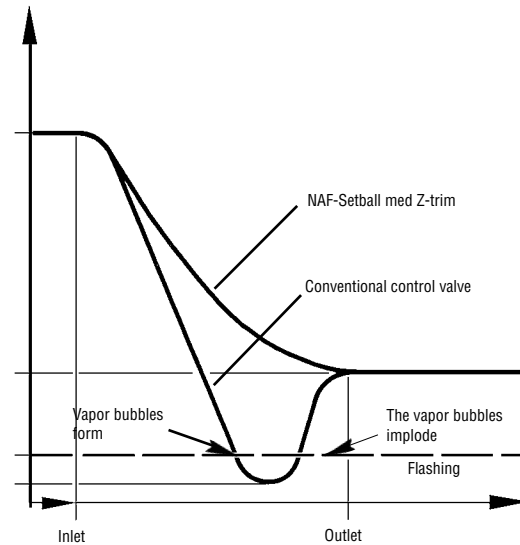


Figure 1. Static pressure drop in conventional control valves and in the NAF-Setball med Z-trim

### Flow capacity (Table 1)

DN	KV at fully open valve (90°)
50	80
65	119
80	227
100	352
150	804
200	1116
250	2020
300	3225
350	4647
400	6325
500	1)

1) Contact NAF

## 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).

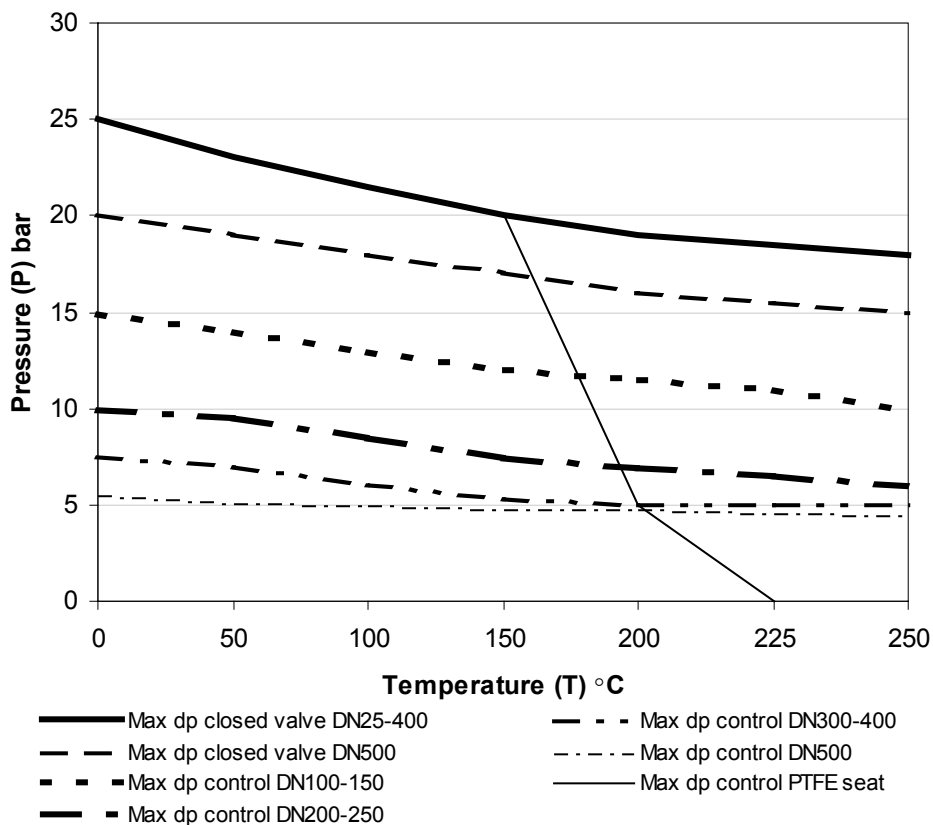
Consult NAF for further particulars.

## Working pressure, differential pressure and temperature

The maximum working pressure and temperature in the valve body depends on pressure class according to the flange standard.

Maximum differential pressure, valve closed, depends on temperature as shown below.

The maximum 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<sup>1)</sup>**
- |          | <b>DIN</b> | <b>ANSI</b> |  |
|----------|------------|-------------|--|
| <b>0</b> | DN 150-200 | Size 6"-8"  | PN 10-16/<br>ANSI Class 150            |
|          | DN 80-100  | Size 3"-4"  | PN 10-25/<br>ANSI Class 150            |
|          | DN 50-65   | Size 1"-2"  | PN 10-40/<br>ANSI Class 150<br>and 300 |
- Flanged version**
- |          |                |   |
|----------|----------------|---|
| <b>2</b> | PN 10          | DN 200-500 <sup>2)</sup><br>(DN 80-150<br>choose PN 16) |
| <b>3</b> | PN16           | DN 80-500 <sup>2)</sup>                                 |
| <b>4</b> | ANSI Class 150 | Size 2"-20" <sup>3)</sup>                               |
| <b>5</b> | PN 25          | DN 200-400 <sup>2)</sup><br>(DN 80-150<br>choose PN 40) |
| <b>6</b> | PN 40          | DN 50-400   |
| <b>7</b> | ANSI Class 300 | Size 2"-16" <sup>3)</sup>                               |
- 4. Stem bearing**
- |          | <b>Body</b> | <b>Stem</b> |
|----------|-------------|-------------|
| <b>E</b> | Metaloplast | - bearing   |
- 5. Body type**
- |          |         |
|----------|---------|
| <b>B</b> | Wafer   |
| <b>F</b> | Flanged |

- 6. Size**
- |  | <b>DIN wafer and flanged version</b> | <b>ANSI wafer and flanged version</b> |
|--|--------------------------------------|---------------------------------------|
|  | <b>DN</b>                            | <b>Size</b>                           |
|  | <b>0050</b>                          | 50                                    |
|  | <b>0065</b>                          | 65                                    |
|  | <b>0080</b>                          | 80                                    |
|  | <b>0100</b>                          | 100                                   |
|  | <b>0150</b>                          | 150                                   |
|  | <b>0200</b>                          | 200                                   |
|  | <b>0250</b>                          | 250                                   |
|  | <b>0300</b>                          | 300                                   |
|  | <b>0350</b>                          | 350                                   |
|  | <b>0400</b>                          | 400                                   |
|  | <b>0500</b>                          | 500                                   |
|  | <b>0002</b>                          | 2"                                    |
|  | <b>02.5</b>                          | 2.5"                                  |
|  | <b>0003</b>                          | 3"                                    |
|  | <b>0004</b>                          | 4"                                    |
|  | <b>0006</b>                          | 6"                                    |
|  | <b>0008</b>                          | 8"                                    |
|  | <b>0010</b>                          | 10"                                   |
|  | <b>0012</b>                          | 12"                                   |
|  | <b>0014</b>                          | 14"                                   |
|  | <b>0016</b>                          | 16"                                   |
|  | <b>0020</b>                          | 20"                                   |
- 7. Seals**
- |           | <b>Seat</b> | <b>Seat seal</b> | <b>Stem seal</b> | <b>Max.temp.</b> |
|-----------|-------------|------------------|------------------|------------------|
| <b>01</b> | Alloy 6     | PTFE             | EPDM             | 200°C            |
| <b>02</b> | Alloy 6     | EPDM             | EPDM             | 150°C            |
| <b>04</b> | Alloy 6     | PTFE             | PTFE box         | 250°C            |
| <b>05</b> | Alloy 6     | PTFE             | FPM              | 200°C            |
| <b>06</b> | Alloy 6     | FPM              | FPM              | 150°C            |
| <b>07</b> | Alloy 6     | PTFE             | Graphite         | 250°C            |
| <b>11</b> | PTFE        | PTFE             | EPDM             | 200°C*           |
| <b>12</b> | PTFE        | EPDM             | EPDM             | 150°C*           |
| <b>14</b> | PTFE        | PTFE             | PTFE box         | 225°C*           |
| <b>15</b> | PTFE        | PTFE             | FPM              | 200°C*           |
| <b>16</b> | PTFE        | FPM              | FPM              | 150°C*           |
| <b>17</b> | PTFE        | PTFE             | Graphite         | 225°C*           |

\* See Pressure, temperature diagram, page 3

- 1) The valve can be mounted between all flanges mentioned for respectively sizes.  
The mark plate on the DIN 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".