



Raca International B.V.

Your Spray Drying Nozzle Specialist



Spray nozzles & bodies
Specialty components
Catalog 2021

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About us

For more than 30 years Raca International BV has been supplying nozzles for spray dryers with high pressure nozzle atomization.

All our nozzles are compatible with the well-known major brands. The type, size and service life are identical, which means you will not notice any difference in your drying process or end product when using our nozzles.

We manufacture our nozzles in our factory in The Netherlands using the best grades of tungsten carbide. You can be assured of top quality at a competitive price.

Fyrtex® is our registered trademark which stands for excellent quality, flexibility and reliability. Since our establishment in 1989, we have expanded to become a specialist in the field of spray drying nozzles. The product range includes different types of spray nozzles needed for the production of all kind of powders produced with high pressure nozzle atomization. As a player on the world market, our logistics are oriented towards service and speed.

A selection from our range:

- Swirl chambers
- Orifice discs
- End plates
- Cores
- Inserts
- Bodies and adapters
- O-rings
- Measuring devices
- Ultrasonic cleaning devices

Fyrtex 1 Nozzle

Fyrtex 1 Nozzle is the oldest in this series of nozzles. The nozzle consists of two, or at most three, tungsten carbide wear parts. The orifice disc can be used with a combined swirl chamber or alternatively with a swirl chamber without end plate together with a round end plate. The tungsten carbide wear parts are interchangeable with the wear parts for Fyrtex 3 Nozzle. The only difference is that the nozzles in series 3 use a square end plate instead of a round one.



Fyrtex 1 Nozzle

Part numbers and description

| Fyrtex part # | Description | Material |
|---|----------------------------------|------------------|
| A297760017 | Body (Original) | Stainless steel |
| G00018081 | O-Ring, Orifice disc | Gylon |
| x x x * | Fyrtex orifice disc | Tungsten carbide |
| Swirl chamber | See Swirl chamber charts | |
| ENDRO | Fyrtex round endplate | Tungsten carbide |
| A297770016 | Screw pin (Original) | Stainless steel |
| G00036291 | O-Ring, Adapter | Gylon |
| A297750091 | 1/4 Adapter BSPT (Original) | Stainless steel |
| A297750117 | 3/8 Adapter BSPT (Original) | Stainless steel |
| A297750133 | 1/2 Adapter BSPT (Original) | Stainless steel |
| A297750158 | 3/4 Adapter BSPT (Original) | Stainless steel |
| W153070005 | Removal/Assembly tool (Original) | Aluminium |
| * Fyrtex orifice disc available types 025 (0,64 mm) through 275 (6,99 mm) Example article number Fyrtex: 070 (1,78 mm) | | |

Fyrtex 1 & 3 Swirl chamber without endplate part numbers

| Fyrtex part # | Description | Material |
|---------------|---|------------------|
| SB | Fyrtex Swirl Chamber SB / P2 without endplate | Tungsten carbide |
| SC | Fyrtex Swirl Chamber SC / P3 without endplate | Tungsten carbide |
| SD | Fyrtex Swirl Chamber SD / P4 without endplate | Tungsten carbide |
| SE | Fyrtex Swirl Chamber SE / P5 without endplate | Tungsten carbide |
| SF | Fyrtex Swirl Chamber SF / P6 without endplate | Tungsten carbide |
| SG | Fyrtex Swirl Chamber SG / P7 without endplate | Tungsten carbide |
| SH | Fyrtex Swirl Chamber SH / P8 without endplate | Tungsten carbide |

Fyrtex 1 & 3 Swirl chamber/endplate combined part numbers

| Fyrtex part # | Description | Material |
|---------------|--|------------------|
| TCSA | Fyrtex Swirl Chamber combined TCSA / P1 | Tungsten carbide |
| TCSB | Fyrtex Swirl Chamber combined TCSB / P2 | Tungsten carbide |
| TCSC | Fyrtex Swirl Chamber combined TCSC / P3 | Tungsten carbide |
| TCSD | Fyrtex Swirl Chamber combined TCSD / P4 | Tungsten carbide |
| TCSE | Fyrtex Swirl Chamber combined TCSE / P5 | Tungsten carbide |
| TCSF | Fyrtex Swirl Chamber combined TCSF / P6 | Tungsten carbide |
| TCSG | Fyrtex Swirl Chamber combined TCSG / P7 | Tungsten carbide |
| TCSH | Fyrtex Swirl Chamber combined TCSH / P8 | Tungsten carbide |
| TCSI | Fyrtex Swirl Chamber combined TCSI / P9 | Tungsten carbide |
| TCSJ | Fyrtex Swirl Chamber combined TCSJ / P10 | Tungsten carbide |
| TCSK | Fyrtex Swirl Chamber combined TCSK / P11 | Tungsten carbide |
| TCSM | Fyrtex Swirl Chamber combined TCSM / P13 | Tungsten carbide |

Tungsten Carbide Wear Parts



Orifice disc



Swirl chamber combined



Swirl chamber without end plate

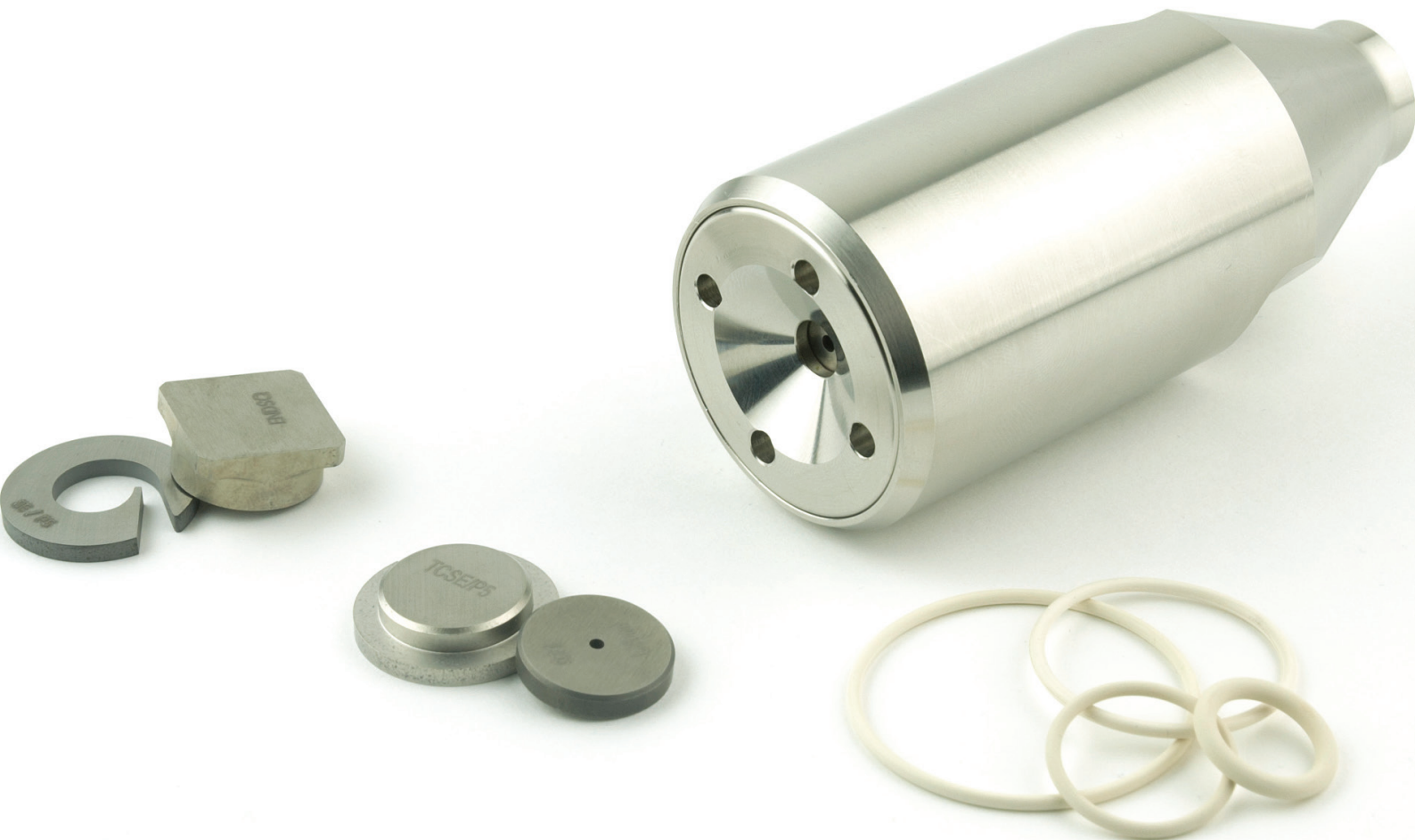


Round end plate

Fyrtex 3 Nozzle

Fyrtex 3 Nozzle is a simplified version of Fyrtex 1 Nozzle. The nozzle consists of two, or at most three, tungsten carbide wear parts. The orifice disc can be used with a combined swirl chamber or alternatively with a swirl chamber without end plate together with a square end plate. The tungsten carbide wear parts are interchangeable with the wear parts for Fyrtex 1 Nozzle. The only difference is that the nozzles in series 1 use a round end plate instead of a square one.

This nozzle series can be used with our Fire Safety Atomizing Nozzle.



Fyrtex 3 Nozzle

Part numbers and description

| Fyrtex part # | Description | Material |
|---------------|---|------------------|
| 001-090-008 | Body Fyrtex 3 (FSA Nozzle) | Nitronic |
| W113000001 | Body (Original) | Stainless steel |
| 11269381 | O-Ring, Orifice disc (original) | Viton, EC/FDA |
| x x x * | Fyrtex orifice disc | Tungsten carbide |
| Swirl chamber | See Fyrtex 3 Swirl Chamber charts | |
| ENDSQ | Fyrtex 3 square endplate | Tungsten carbide |
| 008-060-029 | O-ring 698, Spacer (FSA Nozzle) | Viton, FDA |
| 001-090-010 | Spacer Fyrtex 3, type SB/P2 & SC/P3 ** | Stainless steel |
| 001-090-011 | Spacer Fyrtex 3, type SD/P4 ** | Stainless steel |
| 001-090-012 | Spacer Fyrtex 3, type SE/P5 ** | Stainless steel |
| 001-090-013 | Spacer Fyrtex 3, type SF/P6 & SG/P7 ** | Stainless steel |
| 001-090-014 | Spacer Fyrtex 3, type SH/P8 ** | Stainless steel |
| 001-090-015 | Spacer Fyrtex 3, type SI/P9 & SJ/P10 ** | Stainless steel |
| 001-090-109 | Spacer Fyrtex 3, type TCSA/P1 ** | Stainless steel |
| 001-090-110 | Spacer Fyrtex 3, type TCSB/P2 ** | Stainless steel |
| 001-090-111 | Spacer Fyrtex 3, type TCSC/P3 & TCSD/P4 ** | Stainless steel |
| 001-090-112 | Spacer Fyrtex 3, type TCSE/P5 ** | Stainless steel |
| 001-090-113 | Spacer Fyrtex 3, type TCSF/P6 & TCSG/P7 ** | Stainless steel |
| 001-090-114 | Spacer Fyrtex 3, type TCSH/P8 ** | Stainless steel |
| 001-090-115 | Spacer Fyrtex 3, type TCSI/P9 & TCSJ/P10 ** | Stainless steel |
| 008-060-016 | O-ring 698, Inner (FSA Nozzle) | Viton, FDA |
| 008-060-017 | O-ring 698, Outer (FSA Nozzle) | Viton, FDA |
| 12193517 | O-Ring, Adapter (original) | Viton, EC/FDA |
| 000-090-001 | Fyrtex B/W adapter 698, (round) Ø mm (FSA Nozzle) | Nitronic |
| W113011339 | 1/4 Adapter BSPT (Original) | Stainless steel |
| W113012337 | 3/8 Adapter BSPT (Original) | Stainless steel |
| W113013335 | 1/2 Adapter BSPT (Original) | Stainless steel |
| W113014333 | 3/4 Adapter BSPT (Original) | Stainless steel |
| 009-090-018 | Fyrtex Wrench 698 large (FSA Nozzle) | Stainless steel |
| 011-090-701 | Nozzle press assembly 698 (FSA Nozzle) | Stainless steel |
| W153070005 | Removal/Assembly tool (Original) | Aluminium |

* Fyrtex orifice disc available types 025 (0,64 mm) through 275 (6,99 mm). Example article number Fyrtex: 070 (1,78 mm)

** Spacers are needed for the "FSA Nozzle"

Fyrtex 1 & 3 Swirl chamber without endplate part numbers

| Fyrtex part # | Description | Material |
|---------------|---|------------------|
| SB | Fyrtex Swirl Chamber SB / P2 without endplate | Tungsten carbide |
| SC | Fyrtex Swirl Chamber SC / P3 without endplate | Tungsten carbide |
| SD | Fyrtex Swirl Chamber SD / P4 without endplate | Tungsten carbide |
| SE | Fyrtex Swirl Chamber SE / P5 without endplate | Tungsten carbide |
| SF | Fyrtex Swirl Chamber SF / P6 without endplate | Tungsten carbide |
| SG | Fyrtex Swirl Chamber SG / P7 without endplate | Tungsten carbide |
| SH | Fyrtex Swirl Chamber SH / P8 without endplate | Tungsten carbide |

Fyrtex 1 & 3 Swirl chamber/endplate combined part numbers

| Fyrtex part # | Description | Material |
|---------------|--|------------------|
| TCSA | Fyrtex Swirl Chamber combined TCSA / P1 | Tungsten carbide |
| TCSB | Fyrtex Swirl Chamber combined TCSB / P2 | Tungsten carbide |
| TCSC | Fyrtex Swirl Chamber combined TCSC / P3 | Tungsten carbide |
| TCSD | Fyrtex Swirl Chamber combined TCSD / P4 | Tungsten carbide |
| TCSE | Fyrtex Swirl Chamber combined TCSE / P5 | Tungsten carbide |
| TCSF | Fyrtex Swirl Chamber combined TCSF / P6 | Tungsten carbide |
| TCSG | Fyrtex Swirl Chamber combined TCSG / P7 | Tungsten carbide |
| TCSH | Fyrtex Swirl Chamber combined TCSH / P8 | Tungsten carbide |
| TCSI | Fyrtex Swirl Chamber combined TCSI / P9 | Tungsten carbide |
| TCSJ | Fyrtex Swirl Chamber combined TCSJ / P10 | Tungsten carbide |
| TCSK | Fyrtex Swirl Chamber combined TCSK / P11 | Tungsten carbide |
| TCSM | Fyrtex Swirl Chamber combined TCSM / P13 | Tungsten carbide |

Tungsten Carbide Wear Parts



Orifice disc



Swirl chamber combined



Swirl chamber without end plate

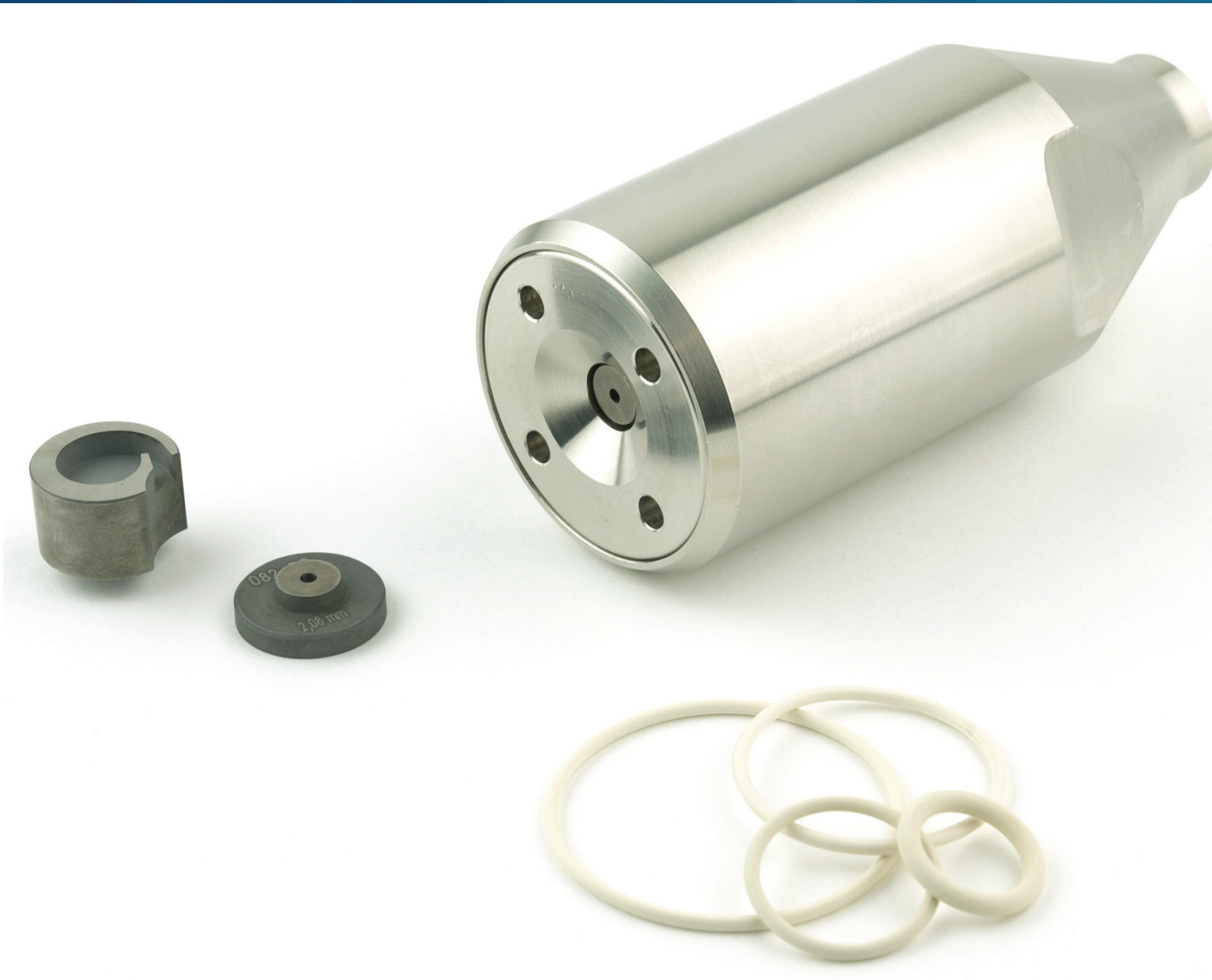


Square end plate

Fyrtex 5 Nozzle

Fyrtex 5 Nozzle is one of the latest nozzle models. The nozzle consists of two tungsten carbide wear parts. The orifice disc can be used with a standard swirl chamber or with a flat back swirl chamber (depending on the retainer disc).

This nozzle series can be used with our Fire Safety Atomizing Nozzle.



Fyrtex 5 Nozzle

Part numbers and description

| Fyrtex part # | Description | Material |
|---|--|--|
| 002-090-027 W194990013 | Body Fyrtex 5 (FSA Nozzle) Body (Original) | Nitronic Stainless steel |
| 11269381 | O-Ring, Orifice disc (original) | Viton, EC/FDA |
| x x x -RS * | Fyrtex 5 orifice disc | Tungsten carbide |
| Swirl chamber | See Fyrtex 5 Swirl chamber charts | |
| 008-060-029 11416637 | O-Ring 698, Spacer (FSA Nozzle) O-Ring, Retaining Disc (original) | Viton, FDA Viton, EC/FDA |
| 002-090-028 W195490013 W198300003 | Spacer Fyrtex 5 ** Standard ret. (Original) Cross-Milled ret. (Original) | Stainless steel Stainless steel Stainless steel |
| 008-060-016 008-060-017 12193518 | O-ring 698, Inner (FSA Nozzle) O-ring 698, Outer (FSA Nozzle) O-Ring, Adapter (original) | Viton, FDA Viton, FDA Viton, EC/FDA |
| 000-090-001 W195000010 W195000028 W195000036 W195000044 | Fyrtex B/W adapter 698, (round) Ø ...mm (FSA Nozzle) 1/4 Adapter BSPT (Original) 3/8 Adapter BSPT (Original) 1/2 Adapter BSPT (Original) 3/4 Adapter BSPT (Original) | Nitronic Stainless steel Stainless steel Stainless steel Stainless steel |
| 009-090-018 011-090-701 W196440025 | Fyrtex Wrench 698 large (FSA Nozzle) Fyrtex Nozzle press assembly 698 (FSA nozzle) Removal tool (Original) | Stainless steel Stainless steel Aluminium |

* Fyrtex 5 orifice disc available types 025 (0,64 mm) through 140 (3,55 mm).
Example article number Fyrtex: 070-RS (1,78 mm)

** Spacer is needed for the "FSA Nozzle"

Fyrtex 5 Swirl chamber Standard part numbers

| Fyrtex part # | Description | Material |
|---------------|--------------------------------------|------------------|
| TCSB-R | Fyrtex 5 Swirl Chamber SB / standard | Tungsten carbide |
| TCSC-R | Fyrtex 5 Swirl Chamber SC / standard | Tungsten carbide |
| TCSD-R | Fyrtex 5 Swirl Chamber SD / standard | Tungsten carbide |
| TCSE-R | Fyrtex 5 Swirl Chamber SE / standard | Tungsten carbide |
| TCSF-R | Fyrtex 5 Swirl Chamber SF / standard | Tungsten carbide |
| TCSG-R | Fyrtex 5 Swirl Chamber SG / standard | Tungsten carbide |
| TCSH-R | Fyrtex 5 Swirl Chamber SH / standard | Tungsten carbide |
| TCSI-R | Fyrtex 5 Swirl Chamber SI / standard | Tungsten carbide |

Fyrtex 5 Swirl chamber Flat Back part numbers

| Fyrtex part # | Description | Material |
|---------------|---------------------------------------|------------------|
| TCSB-R-T | Fyrtex 5 Swirl Chamber SB / Flat Back | Tungsten carbide |
| TCSC-R-T | Fyrtex 5 Swirl Chamber SC / Flat Back | Tungsten carbide |
| TCSD-R-T | Fyrtex 5 Swirl Chamber SD / Flat Back | Tungsten carbide |
| TCSE-R-T | Fyrtex 5 Swirl Chamber SE / Flat Back | Tungsten carbide |
| TCSF-R-T | Fyrtex 5 Swirl Chamber SF / Flat Back | Tungsten carbide |
| TCSG-R-T | Fyrtex 5 Swirl Chamber SG / Flat Back | Tungsten carbide |
| TCSH-R-T | Fyrtex 5 Swirl Chamber SH / Flat Back | Tungsten carbide |
| TCSI-R-T | Fyrtex 5 Swirl Chamber SI / Flat Back | Tungsten carbide |

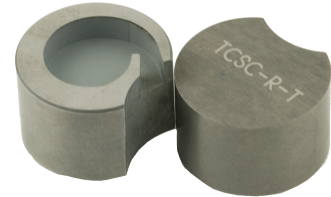
Tungsten Carbide Wear Parts



Orifice disc



Swirl chamber standard



Swirl chamber flat back

Fyrtex Mini Nozzle

Fyrtex Mini is one of the smallest of its kind. The yield is relatively low compared to the other nozzle series. The nozzle consists of two wear parts. The orifice disc can be used with either a tungsten carbide or a ceramic swirl chamber.

This nozzle series can be used with our Fire Safety Atomizing Nozzle.



Fyrtex Mini Nozzle

Part numbers and description

| Fyrtex part # | Description | Material |
|---|--|------------------|
| 003-090-303 | Body (FSA Nozzle) | Nitronic |
| A329320020 | Body (Original) | Stainless steel |
| xxx-MINI * | Orifice disc Mini | Tungsten carbide |
| Swirl chamber | See Swirl chamber charts | |
| 008-060-305 | O-ring 697, Outer (FSA Nozzle) | Viton, FDA |
| 008-060-306 | O-ring 697, Inner (FSA Nozzle) | Viton, FDA |
| 11416634 | O-Ring (original) | Viton, EC/FDA |
| 003-090-304 | Retainer (FSA Nozzle) | Stainless steel |
| 003-090-109 | Plunger (FSA Nozzle) | Stainless steel |
| 003-090-110 | Spring (FSA Nozzle) | Stainless steel |
| 000-090-100 | Butt weld adapter 697, (round) Ø mm (FSA Nozzle) | Nitronic |
| A329310013 | 1/4 NPTF adapter (Original) | Stainless steel |
| A329310021 | 3/8 NPTF adapter (Original) | Stainless steel |
| 010-090-018 | Wrench 697 small (FSA Nozzle) | Stainless steel |
| 011-090-710 | Nozzle press assembly 697 (FSA Nozzle) | Stainless steel |
| A36360006 | Assembly tool (Original) | Aluminium |
| * Orifice disc Mini available types 025 (0,64 mm) through 090 (2,29 mm) | | |

Fyrtex Mini Swirl chamber part numbers

| Fyrtex part # | Description | Material |
|---------------|---|------------------|
| MINI-TC1 | Fyrtex Mini Swirl Chamber Tungsten Carbide type 1 | Tungsten Carbide |
| MINI-TC2 | Fyrtex Mini Swirl Chamber Tungsten Carbide type 2 | Tungsten Carbide |
| MINI-TC3 | Fyrtex Mini Swirl Chamber Tungsten Carbide type 3 | Tungsten Carbide |

Fyrtex Mini Swirl chamber part numbers

| Fyrtex part # | Description | Material |
|---------------|--|----------|
| MINI-CE1 | Fyrtex Mini Swirl Chamber Ceramic type 1 | Ceramic |
| MINI-CE2 | Fyrtex Mini Swirl Chamber Ceramic type 2 | Ceramic |
| MINI-CE3 | Fyrtex Mini Swirl Chamber Ceramic type 3 | Ceramic |

Tungsten Carbide Wear Parts



Orifice disc



Swirl chamber tungsten carbide

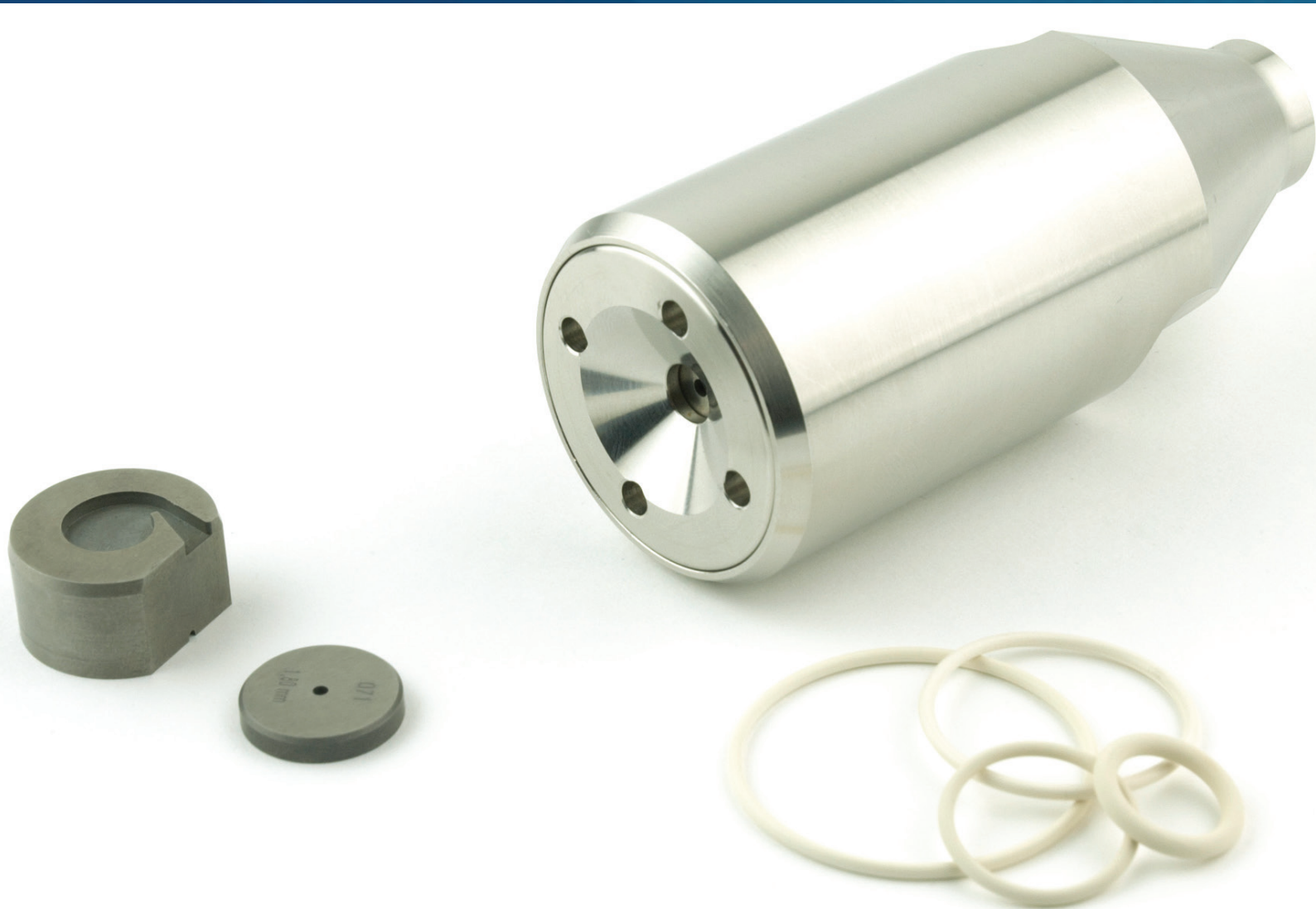


Swirl chamber ceramic

Fyrtex TD Nozzle

Fyrtex TD Nozzle consists of two tungsten carbide wear parts and is similar to Fyrtex 1, 3 and 5. Only the shape of the swirl chamber is different; the implementation is the same. The orifice disc is interchangeable with the orifice disc from Fyrtex 1 and 3.

This nozzle series can be used with our Fire Safety Atomizing Nozzle.



Fyrtex TD Nozzle

Part numbers and description

| Fyrtex part # | Description | Material |
|---------------|---|------------------|
| 004-090-007 | Body Fyrtex TD (FSA Nozzle) | Nitronic |
| XXX* | Fyrtex orifice disc | Tungsten carbide |
| Swirl chamber | See Fyrtex TD Swirl chamber chart | |
| 008-060-029 | O-ring 698, Spacer (FSA Nozzle) | Viton, FDA |
| 004-090-019 | Spacer Fyrtex TD | Stainless Steel |
| 008-060-016 | O-ring 698, Inner (FSA Nozzle) | Viton, FDA |
| 008-060-017 | O-ring 698, Outer (FSA Nozzle) | Viton, FDA |
| 000-090-001 | Fyrtex B/W adapter 698, (round) Ø mm (FSA Nozzle) | Nitronic |
| 009-090-018 | Fyrtex Wrench 698 large (FSA Nozzle) | Stainless steel |
| 011-090-701 | Nozzle press assembly 698 (FSA Nozzle) | Stainless steel |

Fyrtex TD Swirl chamber part numbers

| Fyrtex part # | Description | Material |
|---------------|---------------------------------|------------------|
| TCSC-V | Fyrtex TD Swirl Chamber SC / 03 | Tungsten carbide |
| TCSD-V | Fyrtex TD Swirl Chamber SD / 04 | Tungsten carbide |
| TCSE-V | Fyrtex TD Swirl Chamber SE / 05 | Tungsten carbide |
| TCSF-V | Fyrtex TD Swirl Chamber SF / 06 | Tungsten carbide |
| TCSG-V | Fyrtex TD Swirl Chamber SG / 07 | Tungsten carbide |
| TCSH-V | Fyrtex TD Swirl Chamber SH / 08 | Tungsten carbide |

Tungsten Carbide Wear Parts



Orifice disc

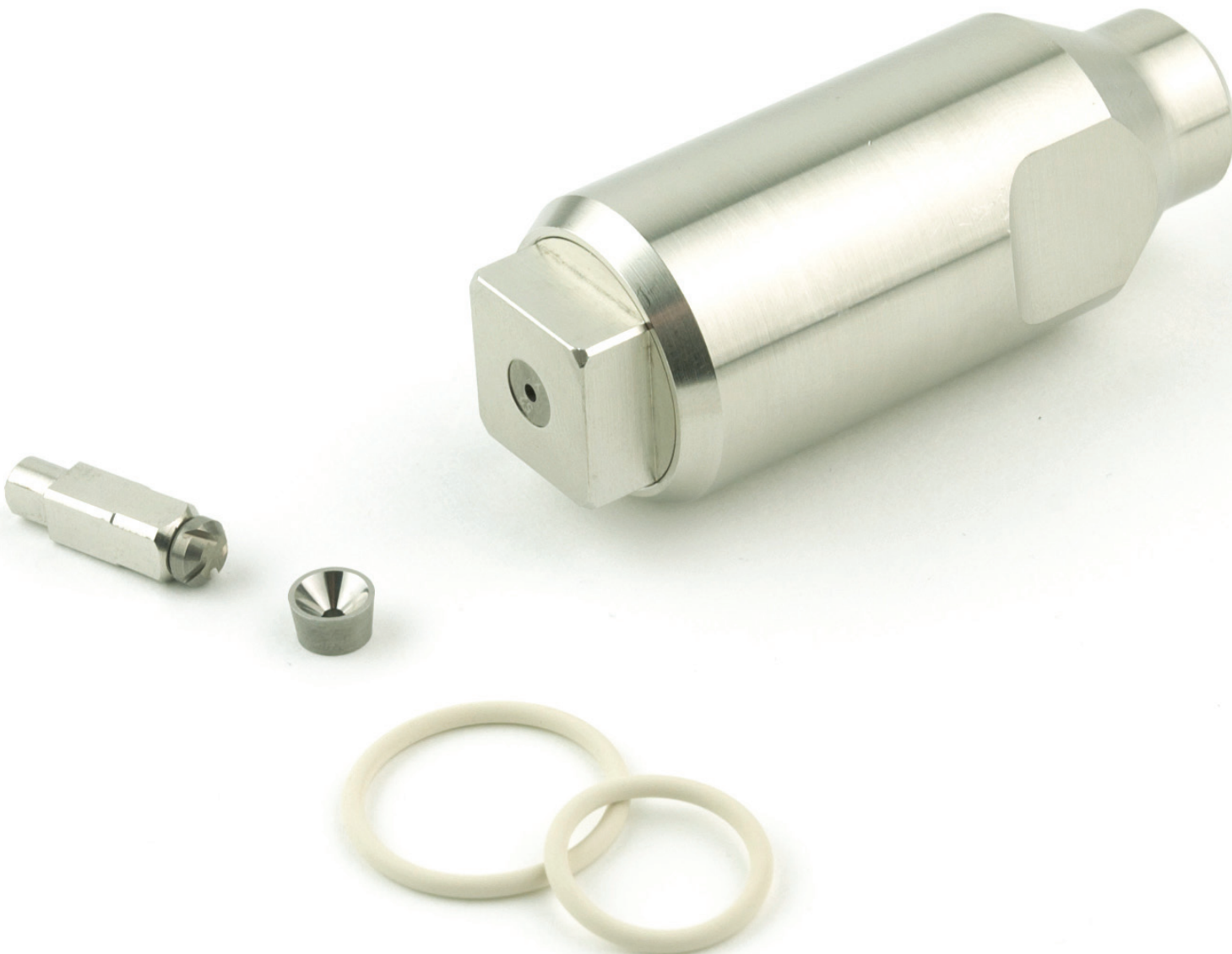


Swirl chamber

Fyrtex SK Nozzle

Fyrtex SK Nozzle is a smaller version of Fyrtex SB and one of the smallest of its kind. The yield is relatively low compared to the other nozzle series. The SK nozzles are available in four body and adapter models, each with different design features. The nozzle consists of two tungsten carbide wear parts (core and insert). The cores and inserts are available in a variety of types and sizes. Each part is available in different types of tungsten carbide. The stainless steel part is made of SS 316.

This nozzle series can be used with our Fire Safety Atomizing Nozzle.



Fyrtex SK Nozzle

Part numbers and description

| Fyrtex part # | Description | Material |
|---|---|-----------------|
| 006-090-401 | Body Fyrtex SK (FSA Nozzle) | Nitronic |
| RKI-xx * | Fyrtex SK Insert | "Y" carbide |
| RKIM-xx * | Fyrtex SK Insert | "M" carbide |
| RKIZ-xxzz* | Fyrtex SK Insert | "Z" carbide |
| Core | See Core charts | |
| 006-090-109 | Plunger Fyrtex SK (FSA Nozzle) | Stainless steel |
| 006-090-110 | Spring Fyrtex SK (FSA Nozzle) | Stainless steel |
| 000-090-100 | Fyrtex B/W adapter 697, (round) Ø mm (FSA Nozzle) | Nitronic |
| 010-090-018 | Fyrtex Wrench 697 small (FSA Nozzle) | Stainless steel |
| 011-090-710 | Fyrtex Nozzle press assembly 697 (FSA Nozzle) | Stainless steel |
| W153070005 | Removal/Assembly tool (Original) | Aluminium |
| <p>* Fyrtex SK Inserts available types 36 (2,72 mm) through 76 (0,50 mm) Example article number Fyrtex: RKI-52 (1,61 mm) y-car Example article number Fyrtex: RKIM-44 (2,18 mm) m-car</p> | | |

Fyrtext SK Core part numbers

| Fyrtext part # | Description | Material |
|----------------|---------------------------------------|-----------------|
| 16-2 | Fyrtext SK Core 16 square, 2 slides | "Y / M" carbide |
| 17-4 | Fyrtext SK Core 17 square, 4 slides | "Y / M" carbide |
| 20-2 | Fyrtext SK Core 20 square, 2 slides | "Y / M" carbide |
| 21-4 | Fyrtext SK Core 21 square, 4 slides | "Y / M" carbide |
| 27-4 | Fyrtext SK Core 27 square, 4 slides | "Y / M" carbide |
| 28-6 | Fyrtext SK Core 28 square, 6 slides | "Y / M" carbide |
| 28-6 | Fyrtext SK Core 28 square, 6 slides | "Y / M" carbide |
| 16-2 | Fyrtext SK Core 16 triangle, 2 slides | "M / Z" carbide |
| 17-2 | Fyrtext SK Core 17 triangle, 2 slides | "M / Z" carbide |
| 21-2 | Fyrtext SK Core 21 triangle, 2 slides | "M / Z" carbide |
| 28-4 | Fyrtext SK Core 28 triangle, 4 slides | "M / Z" carbide |

Tungsten Carbide Wear Parts



Insert

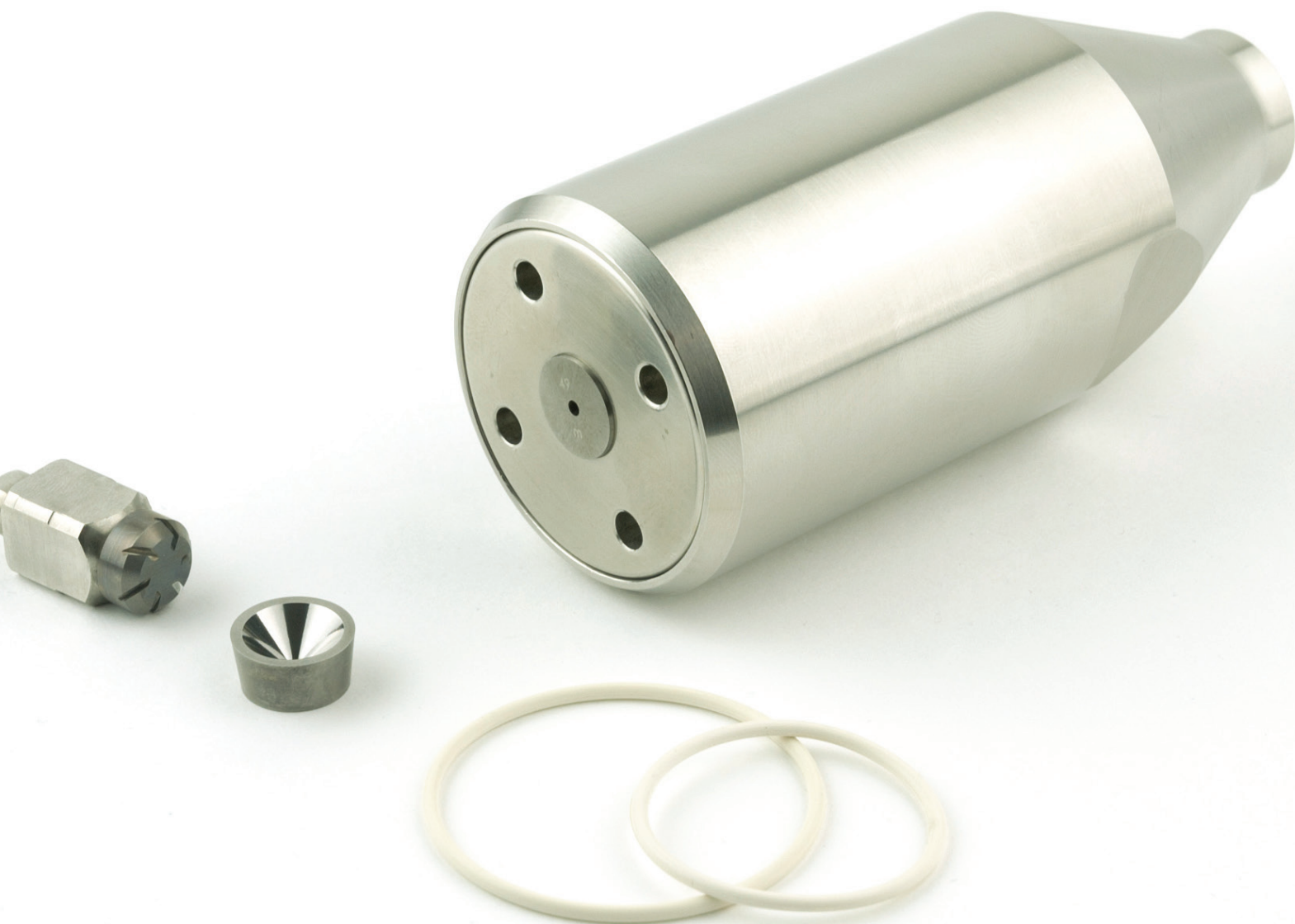


Core

Fyrtex SB Nozzle

Fyrtex SB Nozzle is a larger version of Fyrtex SK and is a reliable, basic spray drying nozzle. The yield is average compared to the other nozzle series. The SB nozzles are available in different body and adapter models, each with different design features. The nozzle consists of two tungsten carbide wear parts (core and insert). The cores and inserts are available in a variety of types and sizes. Each part is available in different types of tungsten carbide. The stainless steel part is made of SS 316.

This nozzle series can be used with our Fire Safety Atomizing Nozzle.



Fyrtex SB Nozzle

Part numbers and description

| Fyrtex part # | Description | Material |
|---------------|---|-----------------|
| 005-090-008 | Body Fyrtex SB (FSA Nozzle) | Nitronic |
| RI-xx * | Fyrtex SB Insert | "Y" carbide |
| RIM-xx * | Fyrtex SB Insert | "M" carbide |
| RIZ-xx* | Fyrtex SB Insert | "Z" carbide |
| Core | See Core charts | |
| 008-060-016 | O-ring 698, Inner (FSA Nozzle) | Viton, FDA |
| 008-060-017 | O-ring 698, Outer (FSA Nozzle) | Viton, FDA |
| 000-090-001 | Fyrtex B/W adapter 698, (round) Ø mm (FSA Nozzle) | Nitronic |
| 009-090-018 | Fyrtex Wrench 698 large (FSA Nozzle) | Stainless steel |
| 011-090-701 | Fyrtex Nozzle press assembly 698 (FSA Nozzle) | Stainless steel |

* Fyrtex SB Inserts available types 20 (4,08 mm) through 60 (1,01 mm)

Example article number Fyrtex: RI-52 (1,61 mm) y-car

Example article number Fyrtex: RIM-44 (2,18 mm) m-car

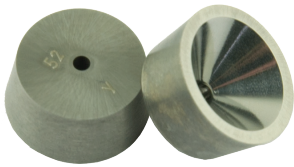
Fyrtex SB Core part numbers

| Fyrtex part # | Description | Material |
|---------------|-------------------------------------|---------------------|
| 27-4 | Fyrtex SB Core Flat 27, 4 slides | "Y / M / Z" carbide |
| 28-3 | Fyrtex SB Core Flat 28, 3 slides | "Y / M / Z" carbide |
| 28-6 | Fyrtex SB Core Flat 28, 6 slides | "Y / M / Z" carbide |
| 32-6 | Fyrtex SB Core Flat 32, 6 slides | "Y / M / Z" carbide |
| 40-6 | Fyrtex SB Core Flat 40, 6 slides | "Y / M / Z" carbide |
| 45-6 | Fyrtex SB Core Flat 45, 6 slides | "Y / M / Z" carbide |
| 50-6 | Fyrtex SB Core Flat 50, 6 slides | "Y / M / Z" carbide |
| 425-4 | Fyrtex SB Core Hollow 425, 4 slides | "Y / M / Z" carbide |
| 625-6 | Fyrtex SB Core Hollow 625, 6 slides | "Y / M / Z" carbide |
| 632-6 | Fyrtex SB Core Hollow 632, 6 slides | "Y / M / Z" carbide |
| 640-6 | Fyrtex SB Core Hollow 640, 6 slides | "Y / M / Z" carbide |
| 645-6 | Fyrtex SB Core Hollow 645, 6 slides | "Y / M / Z" carbide |
| 650-6 | Fyrtex SB Core Hollow 650, 6 slides | "Y / M / Z" carbide |

Fyrtex SB Core part numbers

| Fyrtex part # | Description | Material |
|---------------|-------------------------------------|-----------------|
| 27-2 | Fyrtex SB Core Flat 27, 2 slides | "M / Z" carbide |
| 28-3 | Fyrtex SB Core Flat 28, 3 slides | "M / Z" carbide |
| 32-3 | Fyrtex SB Core Flat 32, 3 slides | "M / Z" carbide |
| 40-3 | Fyrtex SB Core Flat 40, 3 slides | "M / Z" carbide |
| 45-3 | Fyrtex SB Core Flat 45, 3 slides | "M / Z" carbide |
| 50-3 | Fyrtex SB Core Flat 50, 3 slides | "M / Z" carbide |
| 425-2 | Fyrtex SB Core Hollow 425, 2 slides | "M / Z" carbide |
| 625-3 | Fyrtex SB Core Hollow 625, 3 slides | "M / Z" carbide |
| 632-3 | Fyrtex SB Core Hollow 632, 3 slides | "M / Z" carbide |
| 640-3 | Fyrtex SB Core Hollow 640, 3 slides | "M / Z" carbide |
| 645-3 | Fyrtex SB Core Hollow 645, 3 slides | "M / Z" carbide |
| 650-3 | Fyrtex SB Core Hollow 650, 3 slides | "M / Z" carbide |

Tungsten Carbide Wear Parts



Insert



Core

Fire Safety Atomizing Nozzle

Fire Safety Atomizing Nozzle increases safety within your spray dryer!

We supply a specially designed pressure atomizing nozzle that withstands pressures up to 700 bar. The atomizing nozzle is specifically designed to address concerns about fire or explosion in a spray drying system. The housing design prevents the product from dripping into the air disperser or chamber of the dryer and thus reduces the risk of fire.

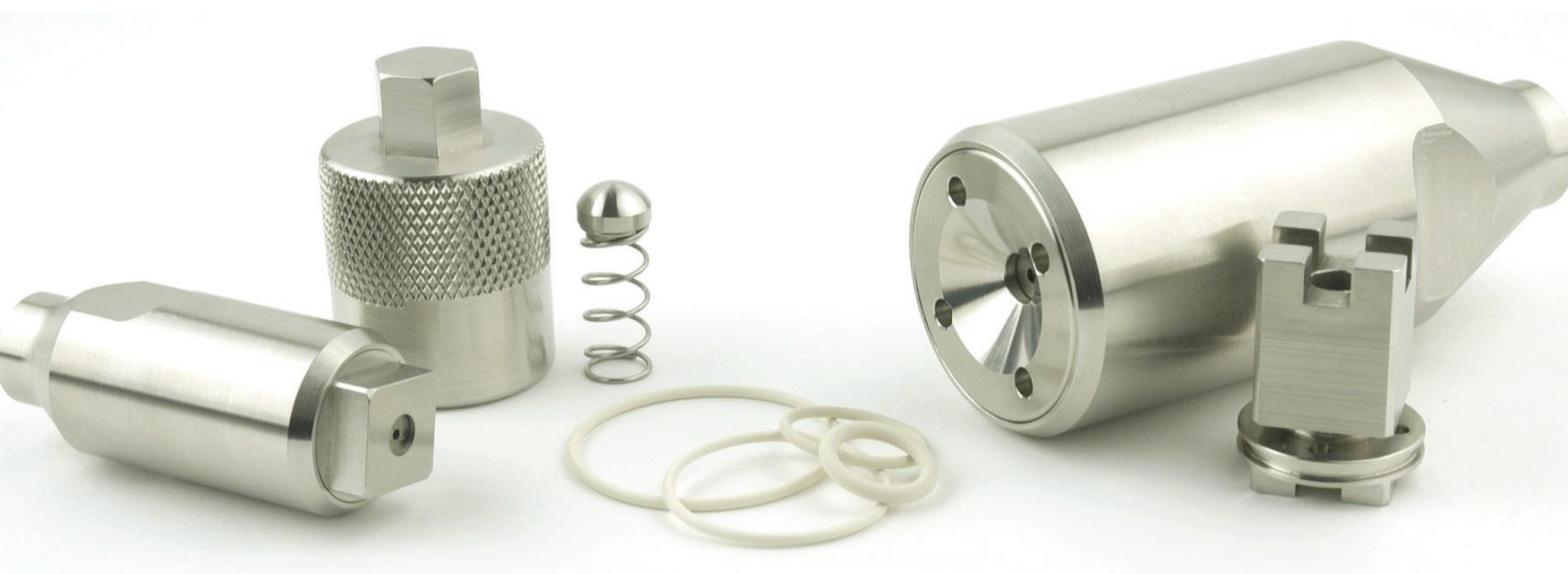
This atomizing nozzle fits any spray dryer and is suitable for all nozzle series. Compared to the existing housings, you will not notice any difference in your drying process or end product using the Fire Safety Atomizing Nozzle.

Features and Benefits:

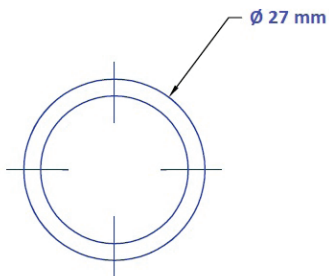
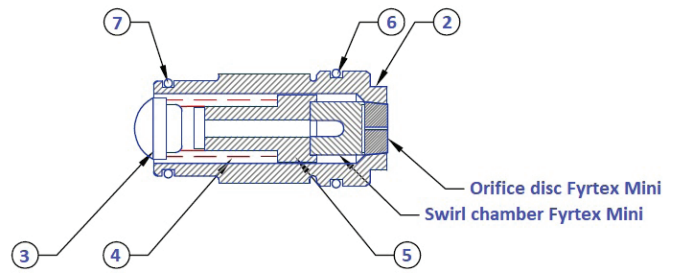
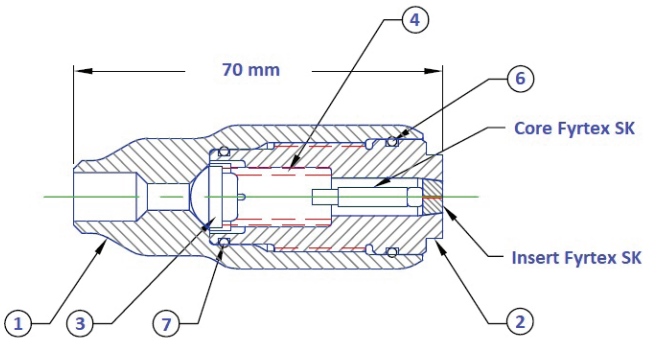
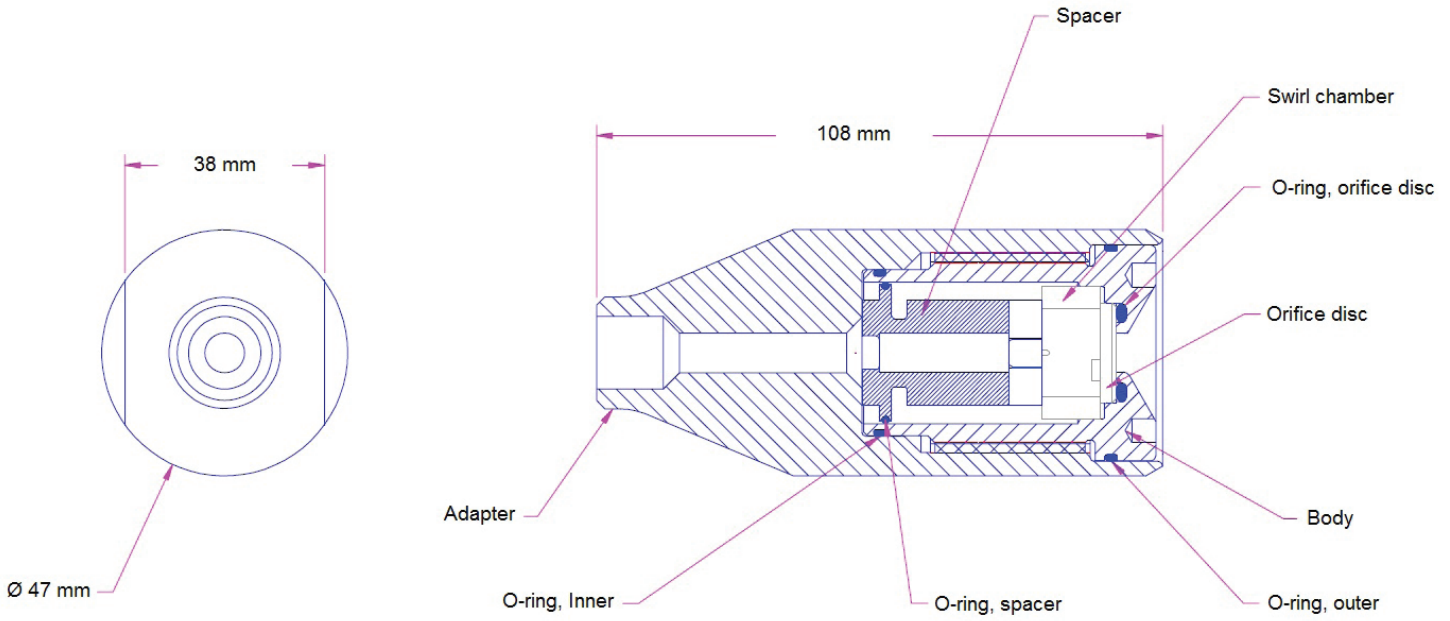
- Fire safety housing design, reduces risk of fire or explosion;
- Significantly reduces the chance of leakage and clogging (build-up);
- Flexible design housing, one unique part fits all major nozzle types;
- Fits any spray dryer;
- High pressure, up to 700 bar;
- Easy assembly and disassembly, hand tight;
- Designed in accordance with USDA sanitary guidelines;
- Quality construction, special anti-seize stainless steel, longer wear;
- All connections are welded, no threaded pipe connections;
- Gasket material is FDA approved and resists high temperatures.

The atomizing nozzle is available in two different models:

- Model 698 is suitable for Fyrtex 3, 5, TD and SB Nozzles.
- Model 697 is suitable for Fyrtex Mini and SK Nozzles.



Fire Safety Atomizing Nozzle overview drawing



- 1 = Adapter
- 2 = Body
- 3 = Plunger
- 4 = Spring
- 5 = Retainer
- 6 = O-Ring Outer
- 7 = O-Ring Inner

Capacity chart nozzle series 1, 3, 5 & TD

| Swirl Chamber | Orifice disc | Spray Angle at 69 BAR | Flow rate in Litres/Hour at BAR | | | | |
|---------------|--------------|--------------------------|---------------------------------|-----|-----|-----|-----|
| | | | 75 | 100 | 150 | 200 | 300 |
| SB | 033 | 70° | 80 | 90 | 108 | 123 | 149 |
| SA | 038 | 80° | | | | | |
| SC | 034 | 60° | 98 | 112 | 135 | 156 | 187 |
| SB | 040 | 75° | | | | | |
| SA | 048 | 85° | | | | | |
| SD | 035 | 60° | 118 | 135 | 164 | 189 | 228 |
| SC | 039 | 70° | | | | | |
| SA | 059 | 85° | | | | | |
| SE | 035 | 50° | 136 | 159 | 193 | 225 | 271 |
| SD | 039 | 65° | | | | | |
| SB | 054 | 80° | | | | | |
| SA | 069 | 90° | | | | | |
| SE | 038 | 55° | 158 | 181 | 220 | 253 | 307 |
| SD | 048 | 65° | | | | | |
| SC | 050 | 75° | | | | | |
| SB | 062 | 85° | | | | | |
| SF | 038 | 50° | 178 | 205 | 248 | 285 | 347 |
| SE | 041 | 60° | | | | | |
| SC | 054 | 75° | | | | | |
| SB | 069 | 85° | | | | | |
| SF | 040 | 50° | 199 | 229 | 279 | 321 | 390 |
| SE | 044 | 60° | | | | | |
| SD | 052 | 70° | | | | | |
| SC | 060 | 80° | | | | | |
| SB | 077 | 90° | | | | | |
| SF | 043 | 50° | 216 | 248 | 303 | 351 | 428 |
| SE | 048 | 60° | | | | | |
| SD | 056 | 70° | | | | | |
| SC | 066 | 80° | | | | | |
| SG | 040 | 45° | 237 | 275 | 332 | 384 | 474 |
| SF | 045 | 55° | | | | | |
| SE | 051 | 65° | | | | | |
| SC | 071 | 80° | | | | | |
| SG | 045 | 45° | 277 | 321 | 390 | 451 | 559 |
| SF | 051 | 55° | | | | | |
| SE | 058 | 65° | | | | | |
| SD | 069 | 75° | | | | | |
| SC | 083 | 85° | | | | | |
| SG | 049 | 50° | 315 | 364 | 439 | 512 | 627 |
| SF | 056 | 60° | | | | | |
| SE | 064 | 70° | | | | | |
| SD | 076 | 80° | | | | | |
| SC | 094 | 90° | | | | | |
| SG | 053 | 50° | 356 | 409 | 505 | 585 | 711 |
| SF | 060 | 60° | | | | | |
| SE | 070 | 70° | | | | | |
| SD | 083 | 80° | | | | | |
| SC | 107 | 90° | | | | | |
| SG | 057 | 55° | 394 | 454 | 559 | 646 | 795 |
| SF | 065 | 65° | | | | | |
| SD | 092 | 80° | | | | | |

* +/- 5% tolerance on flow

** Capacity chart based on water

Capacity chart nozzle series 1, 3, 5 & TD

| Swirl Chamber | Orifice disc | Spray Angle at 69 BAR | Flow rate in Litres/Hour at BAR | | | | |
|---------------|--------------|--------------------------|---------------------------------|------|------|------|------|
| | | | 75 | 100 | 150 | 200 | 300 |
| SH | 054 | 45° | | | | | |
| SG | 060 | 55° | | | | | |
| SF | 070 | 65° | 436 | 501 | 615 | 715 | 895 |
| SE | 083 | 75° | | | | | |
| SD | 100 | 85° | | | | | |
| SH | 057 | 45° | | | | | |
| SG | 063 | 55° | | | | | |
| SF | 075 | 65° | 474 | 550 | 669 | 776 | 955 |
| SE | 089 | 75° | | | | | |
| SD | 108 | 85° | | | | | |
| SH | 066 | 50° | | | | | |
| SG | 075 | 60° | | | | | |
| SF | 089 | 70° | 593 | 681 | 833 | 968 | 1170 |
| SE | 108 | 80° | | | | | |
| SD | 133 | 90° | | | | | |
| SH | 075 | 50° | | | | | |
| SG | 086 | 65° | | | | | |
| SF | 102 | 75° | 715 | 826 | 1013 | 1174 | 1449 |
| SE | 125 | 85° | | | | | |
| SI | 076 | 45° | | | | | |
| SH | 083 | 55° | | | | | |
| SG | 097 | 65° | 829 | 955 | 1182 | 1365 | 1690 |
| SF | 114 | 75° | | | | | |
| SE | 141 | 85° | | | | | |
| SI | 083 | 50° | | | | | |
| SH | 090 | 60° | | | | | |
| SG | 106 | 70° | 946 | 1097 | 1338 | 1544 | 1912 |
| SF | 127 | 80° | | | | | |
| SI | 088 | 50° | | | | | |
| SH | 099 | 60° | | | | | |
| SG | 119 | 70° | 1087 | 1238 | 1518 | 1771 | 2180 |
| SF | 141 | 80° | | | | | |
| SJ | 085 | 45° | | | | | |
| SI | 095 | 55° | | | | | |
| SH | 106 | 65° | 1185 | 1369 | 1683 | 1950 | 2409 |
| SG | 128 | 75° | | | | | |
| SF | 155 | 85° | | | | | |
| SJ | 094 | 45° | | | | | |
| SI | 106 | 55° | | | | | |
| SH | 120 | 65° | 1384 | 1606 | 1968 | 2275 | 2875 |
| SG | 144 | 75° | | | | | |
| SJ | 103 | 50° | | | | | |
| SI | 115 | 60° | | | | | |
| SH | 133 | 70° | 1579 | 1827 | 2236 | 2581 | 3193 |
| SJ | 110 | 50° | | | | | |
| SI | 128 | 60° | | | | | |
| SH | 145 | 70° | 1790 | 2064 | 2523 | 2925 | 3613 |
| SJ | 118 | 55° | | | | | |
| SI | 135 | 65° | | | | | |
| SH | 156 | 75° | 1988 | 2294 | 2810 | 3250 | 4015 |
| SJ | 127 | 55° | | | | | |
| SI | 149 | 65° | 2176 | 2514 | 3058 | 3555 | 4392 |

* +/- 5% tolerance on flow

** Capacity chart based on water

Capacity chart nozzle series 1, 3, 5 & TD

| Swirl Chamber | Orifice disc | Spray Angle at 69 BAR | Flow rate in Litres/Hour at BAR | | | | |
|---------------|--------------|--------------------------|---------------------------------|------|------|------|------|
| | | | 75 | 100 | 150 | 200 | 300 |
| SJ | 127 | 55° | 2176 | 2514 | 3058 | 3555 | 4392 |
| SI | 149 | 65° | | | | | |
| SJ | 135 | 60° | 2370 | 2745 | 3326 | 3861 | 4760 |
| SI | 155 | 70° | | | | | |
| SJ | 151 | 60° | 2561 | 2963 | 3594 | 4167 | 5085 |

* +/- 5% tolerance on flow

** Capacity chart based on water

Capacity chart nozzle series Mini

Swirl chamber series Mini type 1

| Orifice disc | Flow rate in Litres/Hour at BAR | | | | | | |
|--------------|---------------------------------|------|-------|-------|-------|-------|-------|
| | 14 | 34,5 | 69 | 138 | 207 | 276 | 345 |
| 027 | 24,6 | 39,0 | 54,9 | 77,6 | 95,0 | 109,8 | 122,6 |
| 030 | 28,0 | 44,3 | 62,5 | 88,2 | 108,3 | 124,9 | 139,7 |
| 033 | 29,5 | 46,6 | 65,9 | 93,1 | 117,3 | 131,7 | 147,3 |
| 036 | 31,8 | 50,3 | 71,2 | 100,7 | 123,4 | 142,3 | 159,0 |
| 038 | 33,7 | 53,4 | 75,7 | 107,1 | 131,0 | 151,4 | 169,2 |
| 040 | 35,6 | 56,4 | 79,9 | 112,8 | 138,2 | 159,7 | 178,7 |
| 042 | 37,9 | 59,8 | 84,8 | 120,0 | 146,9 | 169,6 | 189,6 |
| 044 | 39,7 | 62,8 | 89,0 | 125,7 | 154,1 | 177,9 | 198,7 |
| 046 | 41,6 | 66,2 | 93,5 | 132,1 | 162,0 | 187,0 | 209,0 |
| 048 | 43,9 | 69,7 | 98,4 | 139,3 | 170,3 | 196,8 | 219,9 |
| 050 | 45,8 | 72,3 | 102,2 | 144,6 | 177,2 | 204,4 | 228,6 |

Swirl chamber series Mini type 2

| Orifice disc | Flow rate in Litres/Hour at BAR | | | | | | |
|--------------|---------------------------------|------|-------|-------|-------|-------|-------|
| | 14 | 34,5 | 69 | 138 | 207 | 276 | 345 |
| 027 | 29,5 | 46,9 | 66,2 | 93,5 | 114,7 | 132,5 | 148,0 |
| 030 | 33,7 | 53,4 | 75,7 | 107,1 | 131,0 | 151,4 | 169,2 |
| 033 | 37,5 | 59,4 | 84,0 | 118,9 | 145,7 | 168,1 | 187,8 |
| 036 | 42,4 | 67,0 | 94,6 | 134,0 | 163,9 | 189,3 | 211,6 |
| 038 | 45,0 | 70,8 | 100,3 | 142,0 | 177,5 | 200,6 | 224,5 |
| 040 | 49,2 | 77,6 | 109,8 | 155,2 | 190,0 | 219,6 | 238,9 |
| 042 | 50,7 | 80,3 | 113,6 | 160,5 | 196,8 | 227,1 | 254,0 |
| 044 | 53,4 | 84,4 | 119,2 | 168,5 | 206,7 | 238,5 | 266,5 |

* All Spray Angles are between 70° and 75°.

** +/- 5% tolerance on flow

*** Capacity chart based on water

Capacity chart nozzle series Mini

Swirl chamber series Mini type 2

| Orifice disc | Flow rate in Litres/Hour at BAR | | | | | | |
|--------------|---------------------------------|-------|-------|-------|-------|-------|-------|
| | 14 | 34,5 | 69 | 138 | 207 | 276 | 345 |
| 046 | 56,0 | 88,2 | 124,9 | 176,8 | 216,5 | 249,8 | 279,4 |
| 048 | 59,4 | 93,5 | 132,5 | 187,4 | 227,9 | 265,0 | 296,4 |
| 050 | 62,5 | 99,2 | 140,1 | 198,0 | 242,6 | 280,1 | 313,1 |
| 052 | 67,8 | 107,1 | 151,4 | 176,4 | 262,3 | 302,8 | 338,4 |
| 054 | 70,4 | 110,9 | 157,1 | 222,2 | 272,2 | 314,2 | 351,3 |
| 056 | 72,7 | 115,1 | 162,8 | 230,2 | 282,0 | 325,5 | 363,8 |
| 058 | 78,0 | 123,0 | 174,1 | 246,4 | 301,7 | 348,3 | 389,9 |
| 060 | 81,4 | 128,3 | 181,7 | 257,0 | 314,6 | 363,4 | 406,2 |

Swirl chamber series Mini type 3

| Orifice disc | Flow rate in Litres/Hour at BAR | | | | | | |
|--------------|---------------------------------|-------|-------|-------|-------|-------|-------|
| | 14 | 34,5 | 69 | 138 | 207 | 276 | 345 |
| 027 | 33,7 | 53,4 | 75,7 | 107,1 | 131,0 | 151,4 | 169,2 |
| 030 | 39,0 | 61,7 | 87,1 | 123,0 | 150,7 | 174,1 | 194,6 |
| 033 | 43,9 | 69,7 | 98,4 | 146,9 | 170,3 | 196,8 | 220,3 |
| 036 | 48,8 | 77,6 | 109,8 | 155,2 | 190,0 | 219,6 | 245,3 |
| 038 | 54,1 | 85,6 | 121,1 | 171,5 | 209,7 | 242,3 | 271,0 |
| 040 | 57,5 | 90,8 | 128,7 | 182,1 | 223,0 | 257,4 | 287,7 |
| 042 | 61,7 | 97,7 | 138,2 | 195,3 | 239,2 | 295,3 | 308,9 |
| 044 | 65,9 | 104,5 | 147,6 | 208,6 | 255,5 | 309,6 | 330,1 |
| 046 | 70,4 | 110,9 | 157,1 | 222,2 | 272,2 | 325,5 | 351,3 |
| 048 | 72,7 | 115,1 | 162,8 | 230,2 | 282,0 | 340,7 | 364,2 |
| 050 | 76,1 | 120,4 | 170,3 | 240,8 | 294,9 | 351,3 | 380,8 |
| 052 | 81,4 | 128,3 | 181,7 | 257,0 | 314,6 | 363,4 | 389,5 |
| 054 | 85,6 | 135,1 | 191,2 | 270,3 | 331,2 | 382,3 | 406,2 |
| 056 | 90,5 | 143,1 | 202,5 | 286,6 | 350,9 | 405,0 | 452,7 |
| 058 | 93,1 | 147,3 | 208,2 | 294,5 | 360,4 | 416,4 | 465,6 |
| 060 | 96,5 | 155,2 | 219,6 | 310,4 | 380,1 | 439,1 | 491,0 |
| 062 | 103,3 | 163,2 | 230,9 | 326,7 | 400,1 | 461,8 | 516,3 |

* All Spray Angles are between 70° and 75°.

** +/- 5% tolerance on flow

*** Capacity chart based on water

Capacity chart nozzle series SB

| Insert | | Core type | | Spray Angle at 70 BAR | Flow rate in Litres/Hour at BAR | | | | | | |
|--------|---------|-----------|--------|--------------------------|---------------------------------|------|------|------|------|------|------|
| Type | Dia. mm | Flat | Hollow | | 70 | 100 | 150 | 200 | 250 | 300 | 400 |
| 54 | 1,39 | 27 | 425 | 64° | 210 | 251 | 307 | 355 | 396 | 434 | 501 |
| 52 | 1,61 | 27 | 425 | 73° | 251 | 300 | 367 | 424 | 474 | 520 | 600 |
| 50 | 1,77 | 27 | 425 | 81° | 284 | 340 | 416 | 480 | 537 | 588 | 679 |
| 54 | 1,39 | 28 | 625 | 58° | 287 | 343 | 420 | 485 | 542 | 594 | 686 |
| 48 | 1,93 | 27 | 425 | 84° | 317 | 379 | 465 | 536 | 600 | 657 | 759 |
| 54 | 1,39 | 32 | 632 | 50° | 338 | 404 | 495 | 571 | 639 | 700 | 808 |
| 52 | 1,61 | 28 | 625 | 66° | 340 | 406 | 497 | 574 | 642 | 704 | 812 |
| 54 | 1,39 | 40 | 640 | 43° | 362 | 433 | 530 | 612 | 685 | 750 | 866 |
| 44 | 2,18 | 27 | 425 | 88° | 371 | 443 | 543 | 627 | 701 | 768 | 886 |
| 49 | 1,85 | 28 | 625 | 75° | 404 | 483 | 592 | 683 | 764 | 837 | 966 |
| 54 | 1,39 | 45 | 645 | 37° | 408 | 488 | 597 | 690 | 771 | 845 | 976 |
| 52 | 1,61 | 32 | 632 | 58° | 408 | 488 | 597 | 690 | 771 | 845 | 976 |
| 40 | 2,48 | 27 | 425 | 92° | 435 | 520 | 637 | 735 | 822 | 900 | 1030 |
| 54 | 1,39 | 50 | 650 | 34° | 442 | 529 | 648 | 748 | 836 | 916 | 1050 |
| 52 | 1,61 | 40 | 640 | 52° | 442 | 529 | 648 | 748 | 836 | 916 | 1050 |
| 46 | 2,05 | 28 | 625 | 78° | 458 | 547 | 670 | 774 | 865 | 948 | 1090 |
| 32 | 2,94 | 27 | 425 | 98° | 477 | 570 | 698 | 806 | 901 | 987 | 1130 |
| 44 | 2,18 | 28 | 625 | 80° | 492 | 588 | 720 | 832 | 930 | 1010 | 1170 |
| 48 | 1,93 | 32 | 632 | 58° | 523 | 625 | 765 | 883 | 988 | 1080 | 1240 |
| 49 | 1,85 | 40 | 640 | 61° | 542 | 647 | 793 | 915 | 1020 | 1120 | 1290 |
| 40 | 2,48 | 28 | 625 | 84° | 580 | 693 | 849 | 980 | 1090 | 1200 | 1380 |
| 50 | 1,77 | 45 | 645 | 53° | 599 | 716 | 877 | 1010 | 1130 | 1230 | 1430 |
| 37 | 2,64 | 28 | 625 | 86° | 603 | 720 | 882 | 1010 | 1130 | 1240 | 1440 |
| 51 | 1,70 | 50 | 650 | 44° | 614 | 734 | 899 | 1030 | 1160 | 1270 | 1460 |
| 44 | 2,18 | 32 | 632 | 73° | 614 | 734 | 899 | 1030 | 1160 | 1270 | 1460 |
| 27 | 3,65 | 27 | 425 | 105° | 622 | 743 | 910 | 1050 | 1170 | 1280 | 1480 |
| 46 | 2,05 | 40 | 640 | 65° | 626 | 748 | 916 | 1050 | 1180 | 1290 | 1490 |
| 50 | 1,77 | 50 | 650 | 46° | 648 | 775 | 949 | 1090 | 1220 | 1340 | 1550 |
| 32 | 2,94 | 28 | 625 | 90° | 656 | 784 | 960 | 1100 | 1230 | 1350 | 1560 |
| 48 | 1,93 | 45 | 645 | 56° | 683 | 816 | 999 | 1150 | 1290 | 1410 | 1630 |
| 31 | 3,04 | 28 | 625 | 90° | 683 | 816 | 999 | 1150 | 1290 | 1410 | 1630 |
| 42 | 2,38 | 32 | 632 | 75° | 687 | 821 | 1000 | 1160 | 1290 | 1420 | 1640 |
| 48 | 1,93 | 50 | 650 | 49° | 736 | 880 | 1070 | 1240 | 1390 | 1520 | 1750 |
| 42 | 2,38 | 40 | 640 | 70° | 759 | 907 | 1110 | 1280 | 1430 | 1570 | 1810 |
| 37 | 2,64 | 32 | 632 | 79° | 770 | 921 | 1120 | 1300 | 1450 | 1590 | 1840 |
| 29 | 3,45 | 28 | 625 | 96° | 786 | 939 | 1150 | 1320 | 1480 | 1620 | 1870 |
| 40 | 2,48 | 40 | 640 | 72° | 820 | 980 | 1200 | 1380 | 1540 | 1690 | 1960 |
| 44 | 2,18 | 45 | 645 | 61° | 831 | 994 | 1210 | 1400 | 1570 | 1720 | 1980 |
| 32 | 2,94 | 32 | 632 | 82° | 831 | 994 | 1210 | 1400 | 1570 | 1720 | 1980 |
| 37 | 2,64 | 40 | 640 | 74° | 881 | 1050 | 1280 | 1480 | 1660 | 1820 | 2100 |
| 44 | 2,18 | 50 | 650 | 54° | 900 | 1070 | 1310 | 1520 | 1700 | 1650 | 2150 |

* +/- 5% tolerance on flow

** Capacity chart based on water

Capacity chart nozzle series SB

| Insert | | Core type | | Spray Angle | Flow rate in Litres/Hour at BAR | | | | | | |
|--------|---------|-----------|--------|-------------|---------------------------------|------|------|------|------|------|------|
| Type | Dia. mm | Flat | Hollow | at 70 BAR | 70 | 100 | 150 | 200 | 250 | 300 | 400 |
| 24 | 3,86 | 28 | 625 | 99° | 915 | 1090 | 1340 | 1540 | 1720 | 1890 | 2180 |
| 32 | 2,94 | 40 | 640 | 76° | 992 | 1180 | 1450 | 1670 | 1870 | 2050 | 2370 |
| 42 | 2,38 | 50 | 650 | 56° | 1010 | 1210 | 1480 | 1710 | 1910 | 2100 | 2420 |
| 40 | 2,48 | 45 | 645 | 66° | 1020 | 1220 | 1500 | 1730 | 1930 | 2120 | 2450 |
| 29 | 3,45 | 32 | 632 | 87° | 1040 | 1250 | 1530 | 1770 | 1980 | 2170 | 2500 |
| 40 | 2,48 | 50 | 650 | 58° | 1090 | 1310 | 1600 | 1850 | 2070 | 2270 | 2620 |
| 35 | 2,79 | 45 | 645 | 70° | 1150 | 1380 | 1690 | 1950 | 2190 | 2400 | 2770 |
| 30 | 3,27 | 40 | 640 | 80° | 1150 | 1380 | 1690 | 1950 | 2190 | 2400 | 2770 |
| 37 | 2,64 | 50 | 650 | 60° | 1160 | 1390 | 1700 | 1970 | 2200 | 2410 | 2790 |
| 32 | 2,94 | 45 | 645 | 71° | 1220 | 1480 | 1790 | 2070 | 2320 | 2540 | 2930 |
| 35 | 2,79 | 50 | 650 | 75° | 1230 | 1470 | 1800 | 2080 | 2330 | 2550 | 2950 |
| 29 | 3,45 | 40 | 640 | 81° | 1260 | 1510 | 1850 | 2140 | 2390 | 2620 | 3020 |
| 31 | 3,04 | 45 | 645 | 72° | 1300 | 1550 | 1900 | 2200 | 2460 | 2700 | 3110 |
| 32 | 2,94 | 50 | 650 | 63° | 1330 | 1590 | 1940 | 2250 | 2510 | 2750 | 3180 |
| 27 | 3,65 | 40 | 640 | 83° | 1360 | 1620 | 1990 | 2300 | 2570 | 2810 | 3250 |
| 29 | 3,45 | 45 | 645 | 75° | 1550 | 1860 | 2270 | 2630 | 2940 | 3220 | 3720 |
| 29 | 3,45 | 50 | 650 | 67° | 1680 | 2010 | 2460 | 2840 | 3170 | 3480 | 4020 |
| 27 | 3,65 | 45 | 645 | 76° | 1700 | 2030 | 2490 | 2870 | 3210 | 3520 | 4060 |
| 27 | 3,65 | 50 | 650 | 68° | 1830 | 2180 | 2680 | 3090 | 3450 | 3790 | 4370 |

Capacity chart nozzle series SK

| Insert | | Core type | Spray Angle | Flow rate in Litres/Hour at BAR | | | | | | | |
|--------|---------|-----------|-------------|---------------------------------|------|------|------|------|------|------|------|
| Type | Dia. mm | | at 70 BAR | 35 | 70 | 100 | 150 | 200 | 250 | 300 | 400 |
| 76 | 0,50 | 17 | 59° | 22,8 | 31,6 | 37,4 | 45,4 | 52,0 | 57,7 | 62,9 | 72,1 |
| 74 | 0,57 | 17 | 63° | 27,4 | 38,1 | 45,2 | 54,7 | 62,7 | 69,7 | 76,0 | 87,1 |
| 76 | 0,50 | 21 | 48° | 29,7 | 41,2 | 48,7 | 59,0 | 67,6 | 75,1 | 81,9 | 93,8 |
| 72 | 0,63 | 17 | 66° | 32,1 | 44,6 | 52,9 | 64,1 | 73,5 | 81,8 | 89,2 | 102 |
| 74 | 0,57 | 21 | 52° | 35,7 | 49,6 | 58,7 | 71,1 | 81,5 | 90,6 | 98,8 | 113 |
| 72 | 0,63 | 21 | 55° | 41,1 | 57,2 | 57,8 | 82,2 | 94,3 | 105 | 114 | 131 |
| 71 | 0,66 | 21 | 56° | 43,3 | 60,2 | 71,4 | 86,6 | 99,4 | 111 | 121 | 138 |
| 68 | 0,78 | 17 | 73° | 43,2 | 60,2 | 71,5 | 86,9 | 99,8 | 111 | 121 | 139 |
| 67 | 0,81 | 17 | 74° | 45,1 | 62,9 | 74,7 | 90,8 | 104 | 116 | 127 | 146 |
| 65 | 0,88 | 17 | 77° | 49,6 | 69,4 | 82,5 | 100 | 115 | 128 | 140 | 161 |
| 71 | 0,66 | 21 | 56° | 43,3 | 60,2 | 71,4 | 87 | 99 | 111 | 121 | 138 |
| 68 | 0,78 | 17 | 73° | 43,2 | 60,2 | 71,5 | 87 | 100 | 110 | 121 | 139 |
| 67 | 0,81 | 17 | 74° | 45,1 | 62,9 | 74,7 | 90,8 | 104 | 116 | 127 | 146 |

* +/- 5% tolerance on flow

** Capacity chart based on water

Capacity chart nozzle series SK

| Insert | | Core type | Spray Angle | Flow rate in Litres/Hour at BAR | | | | | | | |
|--------|---------|-----------|-------------|---------------------------------|------|------|-----|-----|-----|-----|-----|
| Type | Dia. mm | | | at 70 BAR | 35 | 70 | 100 | 150 | 200 | 250 | 300 |
| 65 | 0,88 | 17 | 77° | 49,6 | 69,4 | 82,5 | 100 | 115 | 128 | 140 | 161 |
| 71 | 0,66 | 21 | 56° | 43,3 | 60,2 | 71,4 | 87 | 99 | 111 | 121 | 138 |
| 68 | 0,78 | 17 | 73° | 43,2 | 60,2 | 71,5 | 87 | 100 | 110 | 121 | 139 |
| 70 | 0,71 | 21 | 59° | 50,4 | 70,2 | 83,2 | 101 | 116 | 129 | 141 | 161 |
| 63 | 0,93 | 17 | 79° | 52,0 | 72,8 | 86,6 | 105 | 121 | 135 | 148 | 170 |
| 72 | 0,63 | 27 | 46° | 55,4 | 77,0 | 91,3 | 111 | 127 | 141 | 154 | 177 |
| 61 | 0,99 | 17 | 81° | 55,5 | 77,8 | 92,5 | 113 | 130 | 145 | 158 | 182 |
| 71 | 0,66 | 27 | 47° | 58,1 | 80,8 | 85,8 | 116 | 133 | 148 | 162 | 186 |
| 68 | 0,78 | 21 | 62° | 59,0 | 82,4 | 97,8 | 119 | 136 | 152 | 166 | 190 |
| 58 | 1,06 | 17 | 82° | 60,1 | 84,3 | 100 | 122 | 141 | 157 | 172 | 198 |
| 65 | 0,88 | 21 | 66° | 65,7 | 91,9 | 109 | 133 | 153 | 170 | 186 | 213 |
| 70 | 0,71 | 27 | 49° | 66,2 | 92,3 | 109 | 133 | 152 | 170 | 185 | 212 |
| 64 | 0,91 | 21 | 67° | 69,2 | 96,9 | 115 | 140 | 161 | 179 | 196 | 225 |
| 63 | 0,93 | 21 | 68° | 71,1 | 99,5 | 118 | 144 | 166 | 185 | 202 | 232 |
| 55 | 1,32 | 17 | 90° | 74,9 | 106 | 126 | 154 | 178 | 199 | 218 | 251 |
| 67 | 0,81 | 27 | 54° | 78,4 | 109 | 130 | 158 | 181 | 202 | 220 | 253 |
| 61 | 0,99 | 21 | 70° | 78,1 | 109 | 130 | 159 | 182 | 203 | 222 | 256 |
| 59 | 1,04 | 21 | 72° | 82,7 | 116 | 138 | 168 | 194 | 216 | 236 | 271 |
| 58 | 1,06 | 21 | 73° | 85,3 | 120 | 143 | 174 | 200 | 223 | 244 | 281 |
| 65 | 0,88 | 27 | 57° | 86,2 | 120 | 143 | 174 | 200 | 223 | 244 | 280 |
| 63 | 0,93 | 27 | 59° | 94,3 | 132 | 157 | 191 | 220 | 245 | 267 | 307 |
| 66 | 0,83 | 28 | 45° | 102 | 142 | 169 | 205 | 236 | 263 | 287 | 330 |
| 59 | 1,04 | 27 | 63° | 106 | 148 | 177 | 215 | 248 | 276 | 302 | 347 |
| 57 | 1,09 | 27 | 64° | 112 | 158 | 188 | 229 | 264 | 294 | 322 | 371 |
| 55 | 1,32 | 21 | 80° | 112 | 158 | 188 | 231 | 266 | 297 | 325 | 375 |
| 64 | 0,91 | 28 | 47 | 115 | 161 | 191 | 232 | 267 | 297 | 325 | 373 |
| 62 | 0,96 | 28 | 49° | 125 | 175 | 209 | 254 | 292 | 326 | 356 | 409 |
| 56 | 1,19 | 27 | 67° | 126 | 177 | 211 | 258 | 297 | 332 | 363 | 419 |
| 53 | 1,52 | 21 | 84° | 130 | 184 | 220 | 270 | 311 | 348 | 381 | 440 |
| 58 | 1,06 | 28 | 52° | 143 | 201 | 239 | 292 | 336 | 374 | 409 | 471 |
| 51 | 1,70 | 21 | 87° | 154 | 218 | 261 | 319 | 369 | 412 | 452 | 522 |
| 54 | 1,39 | 27 | 73° | 156 | 221 | 264 | 323 | 373 | 417 | 457 | 528 |
| 50 | 1,77 | 21 | 88° | 159 | 224 | 268 | 328 | 379 | 424 | 464 | 536 |
| 48 | 1,93 | 21 | 90° | 174 | 246 | 294 | 360 | 416 | 465 | 509 | 588 |
| 52 | 1,62 | 27 | 78° | 183 | 259 | 309 | 379 | 437 | 489 | 535 | 618 |
| 55 | 1,32 | 28 | 60° | 194 | 274 | 327 | 400 | 462 | 516 | 565 | 562 |
| 51 | 1,70 | 27 | 80° | 197 | 278 | 333 | 408 | 471 | 526 | 576 | 666 |
| 49 | 1,85 | 27 | 82° | 222 | 314 | 375 | 459 | 530 | 593 | 649 | 749 |
| 53 | 1,52 | 28 | 65° | 231 | 326 | 390 | 477 | 551 | 616 | 675 | 780 |

* +/- 5% tolerance on flow

** Capacity chart based on water

Capacity chart nozzle series SK

| Insert | | Core type | Spray Angle | Flow rate in Litres/Hour at BAR | | | | | | | |
|--------|---------|-----------|-------------|---------------------------------|-----|-----|-----|-----|------|------|------|
| Type | Dia. mm | | | at 70 BAR | 35 | 70 | 100 | 150 | 200 | 250 | 300 |
| 48 | 1,93 | 27 | 83° | 232 | 329 | 393 | 481 | 556 | 621 | 681 | 786 |
| 52 | 1,62 | 28 | 67° | 254 | 359 | 429 | 525 | 607 | 678 | 743 | 858 |
| 44 | 2,18 | 27 | 85° | 270 | 381 | 456 | 558 | 645 | 721 | 790 | 912 |
| 51 | 1,70 | 28 | 69° | 278 | 393 | 470 | 575 | 664 | 742 | 813 | 939 |
| 50 | 1,77 | 28 | 70° | 289 | 408 | 488 | 597 | 690 | 771 | 845 | 976 |
| 42 | 2,38 | 27 | 87° | 289 | 408 | 488 | 597 | 690 | 771 | 845 | 976 |
| 40 | 2,48 | 27 | 87° | 305 | 431 | 515 | 631 | 729 | 815 | 892 | 1030 |
| 48 | 1,93 | 28 | 72° | 324 | 458 | 547 | 670 | 774 | 865 | 948 | 1094 |
| 46 | 2,05 | 28 | 74° | 348 | 492 | 588 | 720 | 832 | 930 | 1010 | 1170 |
| 44 | 2,18 | 28 | 75° | 369 | 523 | 625 | 765 | 883 | 988 | 1080 | 1240 |
| 42 | 2,38 | 28 | 77° | 396 | 561 | 670 | 821 | 948 | 1050 | 1160 | 1340 |
| 40 | 2,48 | 28 | 77° | 407 | 576 | 688 | 843 | 974 | 1080 | 1190 | 1370 |

* +/- 5% tolerance on flow

** Capacity chart based on water

Overview standard sizes inserts*

Insert SIBY

| Type | Gat Ø |
|------|-------|
| 27 | 3,65 |
| 29 | 3,45 |
| 30 | 3,27 |
| 31 | 3,04 |
| 32 | 2,94 |
| 35 | 2,79 |
| 37 | 2,64 |
| 40 | 2,48 |
| 42 | 2,38 |
| 43 | 2,26 |
| 44 | 2,18 |
| 45 | 2,08 |
| 46 | 2,05 |
| 47 | 2,00 |
| 48 | 1,93 |
| 49 | 1,85 |
| 50 | 1,77 |
| 51 | 1,70 |
| 52 | 1,62 |
| 53 | 1,52 |
| 54 | 1,39 |
| 55 | 1,32 |
| 56 | 1,19 |
| 57 | 1,09 |
| 58 | 1,06 |
| 59 | 1,04 |
| 60 | 1,01 |

Insert SIY

| Type | Gat Ø |
|------|-------|
| 36 | 2,72 |
| 40 | 2,48 |
| 42 | 2,38 |
| 43 | 2,26 |
| 44 | 2,18 |
| 45 | 2,08 |
| 46 | 2,05 |
| 47 | 2,00 |
| 48 | 1,93 |
| 49 | 1,85 |
| 50 | 1,77 |
| 51 | 1,70 |
| 52 | 1,62 |
| 53 | 1,52 |
| 54 | 1,39 |
| 55 | 1,32 |
| 56 | 1,19 |
| 57 | 1,09 |
| 58 | 1,06 |
| 59 | 1,04 |
| 60 | 1,01 |
| 61 | 0,99 |
| 62 | 0,96 |
| 63 | 0,93 |
| 64 | 0,91 |
| 65 | 0,88 |
| 66 | 0,83 |

| Type | Gat Ø |
|------|-------|
| 67 | 0,81 |
| 68 | 0,78 |
| 69 | 0,73 |
| 70 | 0,71 |
| 71 | 0,66 |
| 72 | 0,63 |
| 73 | 0,60 |
| 74 | 0,57 |
| 75 | 0,53 |
| 76 | 0,50 |

Overview standard sizes orifice discs*

| Type | Gat Ø | Type | Gat Ø | Type | Gat Ø | Type | Gat Ø |
|------|-------|------|-------|------|-------|------|-------|
| 026 | 0,66 | 059 | 1,50 | 092 | 2,34 | 125 | 3,18 |
| 027 | 0,69 | 060 | 1,52 | 093 | 2,36 | 126 | 3,20 |
| 028 | 0,71 | 061 | 1,55 | 094 | 2,39 | 127 | 3,23 |
| 029 | 0,74 | 062 | 1,57 | 095 | 2,41 | 128 | 3,25 |
| 030 | 0,76 | 063 | 1,60 | 096 | 2,44 | 129 | 3,28 |
| 031 | 0,79 | 064 | 1,63 | 097 | 2,46 | 130 | 3,30 |
| 032 | 0,81 | 065 | 1,65 | 098 | 2,49 | 131 | 3,33 |
| 033 | 0,84 | 066 | 1,68 | 099 | 2,51 | 132 | 3,35 |
| 034 | 0,86 | 067 | 1,70 | 100 | 2,54 | 133 | 3,38 |
| 035 | 0,89 | 068 | 1,73 | 101 | 2,57 | 134 | 3,40 |
| 036 | 0,91 | 069 | 1,75 | 102 | 2,59 | 135 | 3,43 |
| 037 | 0,94 | 070 | 1,78 | 103 | 2,62 | 136 | 3,45 |
| 038 | 0,96 | 071 | 1,80 | 104 | 2,64 | 137 | 3,48 |
| 039 | 0,99 | 072 | 1,83 | 105 | 2,67 | 138 | 3,50 |
| 040 | 1,02 | 073 | 1,85 | 106 | 2,69 | 139 | 3,53 |
| 041 | 1,04 | 074 | 1,88 | 107 | 2,72 | 140 | 3,55 |
| 042 | 1,07 | 075 | 1,91 | 108 | 2,74 | 141 | 3,58 |
| 043 | 1,09 | 076 | 1,93 | 109 | 2,77 | 142 | 3,60 |
| 044 | 1,12 | 077 | 1,96 | 110 | 2,79 | 143 | 3,63 |
| 045 | 1,14 | 078 | 1,98 | 111 | 2,82 | 144 | 3,66 |
| 046 | 1,17 | 079 | 2,00 | 112 | 2,84 | 145 | 3,68 |
| 047 | 1,19 | 080 | 2,03 | 113 | 2,87 | | |
| 048 | 1,22 | 081 | 2,06 | 114 | 2,90 | | |
| 049 | 1,24 | 082 | 2,08 | 115 | 2,92 | | |
| 050 | 1,27 | 083 | 2,11 | 116 | 2,95 | | |
| 051 | 1,30 | 084 | 2,13 | 117 | 2,97 | | |
| 052 | 1,32 | 085 | 2,16 | 118 | 3,00 | | |
| 053 | 1,35 | 086 | 2,18 | 119 | 3,02 | | |
| 054 | 1,37 | 087 | 2,21 | 120 | 3,05 | | |
| 055 | 1,40 | 088 | 2,24 | 121 | 3,07 | | |
| 056 | 1,42 | 089 | 2,26 | 122 | 3,10 | | |
| 057 | 1,45 | 090 | 2,29 | 123 | 3,12 | | |
| 058 | 1,47 | 091 | 2,31 | 124 | 3,15 | | |

* More sizes are available on request

O rings

The O-Ring has become the world's most popular and versatile seal due to its simple shape, low space requirements, and its availability in a vast selection of sizes and compounds to meet every industrial requirement.

Within the Spray Drying process O-Rings are frequently used. All O-Rings are available at Raca for each nozzle type. Our standard program covers a large variety of rubber compounds for your specific purpose.

Description

- Chemical composition: Co-polymer of Hexafluoropropylene and vinylidene fluoride
- Physical form: O-rings and moulded parts
- Colour: Black
- Temperature resistance: -20°C to +200°C

Compliances

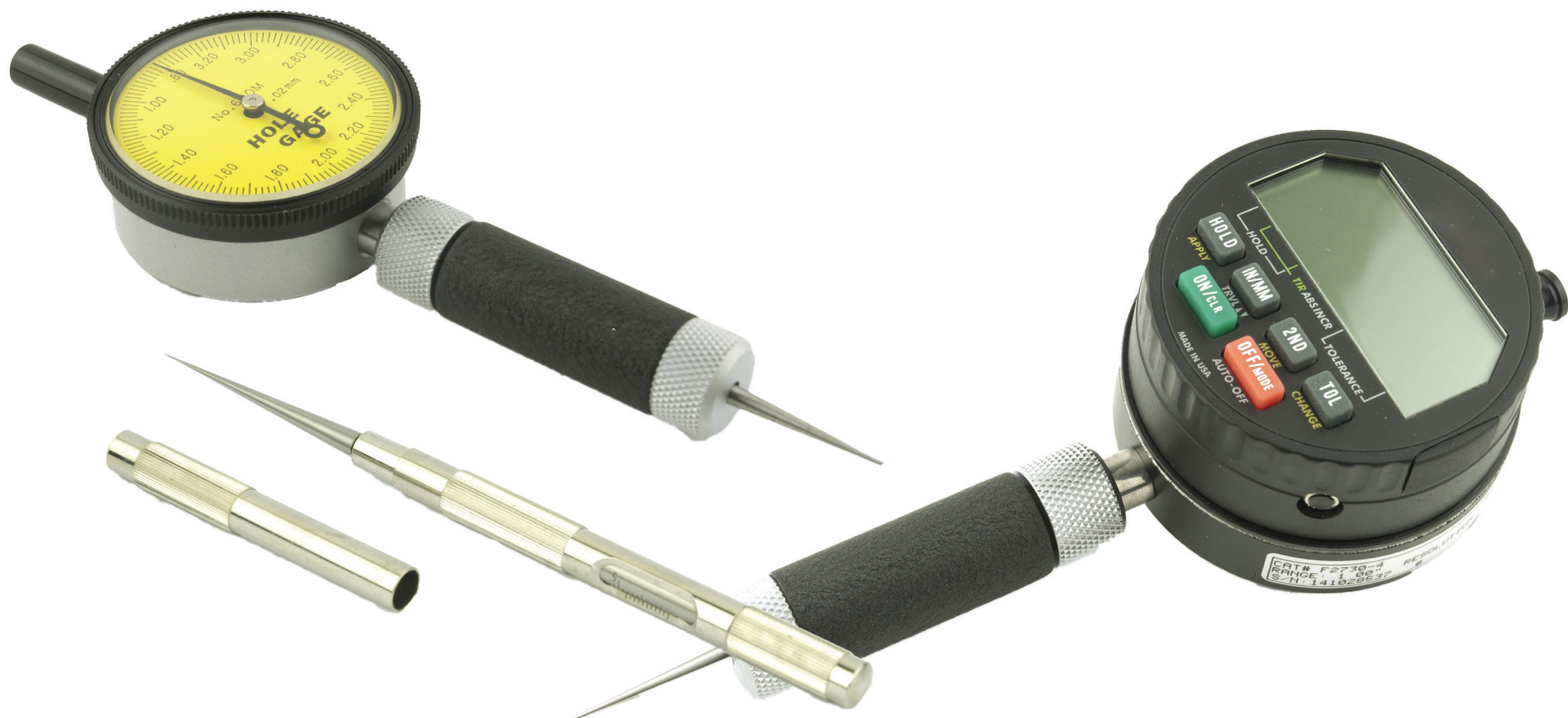
- FDA 21 CFR 177.2600
- EC1935:2004
- 3-A
- ADI
- REACH
- RoHS



Measuring devices

Measuring devices are useful for the maintenance people to double check the orifices before they install them in the spray dryer. We have three different tools to meet everybody's requirements.

- Standard
- Superior
- Digital



Standard

The standard hole gauge is a simple tool to quickly determine a diameter. It's useful for the maintenance people to have one available to double check the orifices before they install them in the spray dryer. The reading works basically the same as a caliper.

The standard measuring device is:

- Width range: 0 to 5 mm (mm only)
- Accurate
- Slightly more difficult to read compared with the superior and digital gauge
- Easy to use



Superior

The superior hole gauge is a precision instrument designed to instantly give you a diameter reading in less than two seconds. Merely insert the precision ground, hardened tool steel Gaging Plunger into the hole, press the base of the gage firmly against the part and read the dial directly in 0.001" or 0.02 mm diameter increments on the dial face.

The superior measuring device is:

- Very accurate (measuring accuracy 0.02 mm or 0.001 inch)
- Easy to read and use
- Optional Setting Masters available for greater accuracy
- Available in millimetre and Inch marking
- Supplied with a decent storage box



Digital

The digital hole gauge is one of the best gauges available on the market. The same as the superior gauge it instantly give you a diameter reading in less than two seconds. The gauge toggles between inches and millimetres and is extremely accurate. It has a calibrate function and many more.

The digital measuring device is:

- Very accurate (measuring accuracy 0.02 mm or 0.001 inch)
- Best reading possible
- Easy to use
- Multiple useful functions (see operating manual)
- Supplied with a luxury storage box



ISO 9001:2015



Current issue date: 6 June 2020
Expiry date: 5 June 2023
Certificate identity number: 10263740

Original approval(s):
ISO 9001 - 6 June 2017

Certificate of Approval

This is to certify that the Management System of:

Raca International B.V.

Arnoudstraat 22, 2182 DZ Hillegom, Netherlands

has been approved by Lloyd's Register to the following standards:

ISO 9001:2015

Approval number(s): ISO 9001 – 00009965-002

This certificate forms part of the approval identified by approval number: 00009965

The scope of this approval is applicable to:

Supply of nozzles (wear parts) for industrial applications worldwide.

Paul Graaf

Area Operations Manager North Europe

Issued by: Lloyd's Register Nederland B.V.

for and on behalf of: Lloyd's Register Quality Assurance Limited



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FDA No Obligation Letter

January, 2020

FDA No Obligation Letter Notification (PNC) 2452

Dear customer,

With this letter we would like to inform you that the department of Health and Human Resources, Food and Drug Administration (FDA) have no objection for the use of our tungsten carbide products within spray nozzle technology, specifically for the process of spray drying.

Our material is highly resistant to corrosion and abrasion, there is little or no likelihood that components of this material would migrate to food in significant amounts. In addition, because this alloy is intended for repeat-use and will contact large amounts of food over the service life of the equipment, FDA concluded that the consumer dietary exposure of any possible migrant would be extremely low.

Since our product range has developed over the past years it is important for our customers to know that all our products, with all the different tungsten carbide compositions are included in the FDA No Obligation Letter Notification. Our Pre-Notification Consultation (PNC) number is 2452.

For further information, also about the use of spray nozzle technology, please contact our office.

Sincerely,



Michiel van Ravenstein - Director
Raca International BV

Arnoudstraat 22, 2182 DZ, Hillegom, The Netherlands

T: +31 (0)252-22 70 70 F: +31 (0)252-53 39 22

michiel.van.ravenstein@raca.nl www.spraydryingnozzles.com

Declaration of compliance

DECLARATION OF COMPLIANCE

To FDA regulation CFR 21§177.2600
To European legislation EC 1935/2004 EU10/2011
Product/material **FKM 70 COMPOUND 514641**



Date of declaration 25-09-2017

We confirm that the above mentioned material is compliant to the above mentioned regulations and legislations. Products from this material are intended for repeated use in contact with the below listed type of foods.

This material has been evaluated according to the requirement of the of the Regulation EC 1935/2004, Annex I. Materials intended to come into contact, directly or indirectly, with food.

The safety of this material has been verified by testing against the migration requirements as described in EU10/2011 and in accordance with EN1186.

This material has been tested following the FDA regulation on extraction in hexane and boiling water as described in subparagraphs (e) and (f).

RACA guarantees that all products of this material are produced according the directive for GMP (Good Manufacturing Practice) 2023/2006/EC, which is part of the guideline EC1935/2004.

The traceability of the products derived from this material is secured and the regulations for documentation and labelling protocol have been fulfilled.

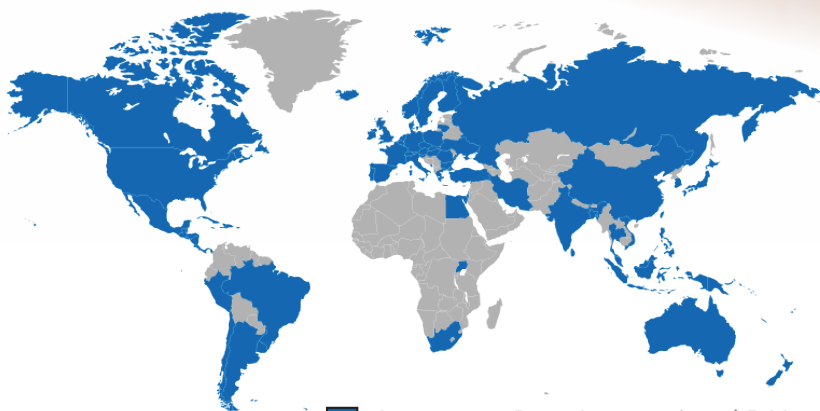
Extraction test results CFR 21§177.2600

| Test | Requirements | Result |
|--|-------------------------------|--------|
| Extraction Hexane 7 hours | Max. 175 mg/inch ² | PASS |
| Extraction Hexane 2 hours | Max. 4 mg/inch ² | PASS |
| Extraction in boiling water 7 hours | Max. 20 mg/inch ² | PASS |
| Extraction in boiling water 2 hour supplementary | Max. 1 mg/inch ² | PASS |

Migration test results EU10/2011 (EN1186)

| Simulant | Simulant media | Type of food | Time/Temperature | Ratio S/V | Result |
|----------|--------------------------------------|---|-------------------|-----------|--------|
| A | Ethanol 10% | Aqueous food | 24 hours at 90°C | 6 | PASS |
| B | Acetic Acid 3% | Foods with pH <4,5 | 24 hours at 100°C | 6 | PASS |
| C | Ethanol 20% | Alcoholic beverages <= 20% alcohol | 1 hour at 60°C | 6 | PASS |
| D1 | Ethanol 50% | Alcoholic beverages >20% alcohol and oil in water emulsions | 1 hour at 60°C | 6 | PASS |
| D2 | Olive Oil / Iso Octane / Ethanol 95% | Free fat on the surface | 1 hour at 60°C | 6 | PASS |
| F | Distilled water | Aqueous food | 24 hours at 100°C | 6 | PASS |

This declaration is not intended as technical documentation, the suitability of this product for a specific application should be verified with RACA. This declaration is valid without signature until revocation or renewal.



■ Customers Raca International B.V.



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