UTC Aerospace Systems

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## Spray Drying Products

# SDX® V Spray Dry Nozzles

Product Guide




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THE WORLD'S MOST USER FRIENDLY SPRAY DRY NOZZLE • THE SDX® V ORIGINAL PATENTED DESIGN

# SDX® V Spray Dry Nozzles

## The Delavan Difference

- **Versatility**
  13 swirl chamber sizes with orifice discs from 0.4mm (0.016") - 6.4mm (0.252"). The large number of swirl chamber and orifice sizes provide customers with more options and can be paired in a variety of combinations to create the droplet size, flow rate, spray angle and exact product quality.

- **Customisation**
  Custom spray characteristics to meet a variety of application needs; such as droplet and particle size, spray angle, flow variation and liquid properties.

- **Durability and Wear Resistance**
  Our nozzles are available in materials that will resist chemical attack such as ceramics, sintered carbides and various grades of stainless steel.

- **Technical Expertise**
  Almost every dryer requires a unique solution depending on feed material, capacity, and operating conditions. **Delavan** understands the issues inherent in spray drying and will recommend the right nozzle for the best possible performance.

# Delavan Spray Technologies

## Continually meeting the challenges of new industries and markets

**Delavan Spray Technologies**, part of United Technologies Corporation, is a world leader in the design and manufacture of high quality spray nozzles and fluid handling systems. Since the company was founded back in 1935, the **Delavan** name has always stood for quality, flexibility and reliability.

### High Performance, Rugged Durability

The **Delavan SDX®** range of spray drying nozzles set the standard by which other nozzles are judged. We were the first to hold a patent on the revolutionary swirl chamber design, with a single inlet, which minimises plugging and maximises particle uniformity. This design has improved dry product quality because the spiral configuration conforms to the natural path of liquid as it progresses toward the orifice.

**Delavan** is continually evaluating the critical design features of the various models of nozzle that comprise the **SDX®** range. This engineering work, combined with feedback from thousands of users around the world, generates opportunities to improve the performance of the product as well as lowering the cost of ownership and simplifying maintenance. Significant recent enhancements to the **SDX®** range can be found within this updated product brochure.

### An Investment in Quality and Performance

The substantial investment that **Delavan** has made in the last few years in state-of-the-art machining centres has borne fruit in the improvements in quality and lead time reduction that have taken place since manufacturing was transferred to the centre of excellence for spray dry products at Widnes, in the UK. Combined with high technology laser marking and premium quality packaging this ensures that all genuine **Delavan SDX®** components reach customers in a timely fashion and in pristine condition.

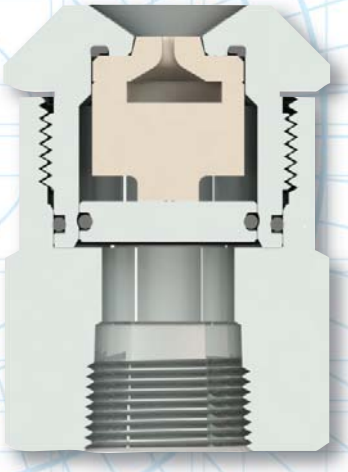
**Delavan** remains committed to providing all customers with the reliable delivery of premium quality products, which offer the kind of performance and benefits expected from the nozzle technology leader.

# SDX® V NOZZLE BENEFITS

**With the introduction of the original SDX range of spray drying nozzles, Delavan established itself as the technology leader in this specialist field. Over the years several attempts have been made to improve upon the principals embodied in the unique single vortex swirl chamber but, thus far, no better design has been introduced into the market.**

Each of the five nozzles in the SDX range is built on **Delavan's** unique single inlet spiral swirl chamber design and highly polished orifice disc. This combination of swirl chamber and orifice produces a wider range of flow rates and spray angles. This means the nozzle can be 'Fine Tuned' to almost any dryer or application.

## Delavan SDX®. Where we lead, others follow!

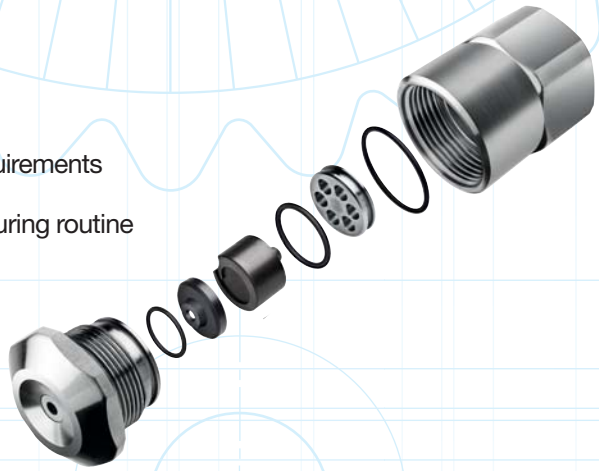


- **Delavan originally developed the single inlet Swirl Chamber with the SDX Nozzle**
- **Delavan originally developed the hand tighten assembly with the SDX III**
- **Delavan originally developed the retaining feature with the SDX and then simplified with the SDX V**
- **Delavan originally developed the use of sealing surfaces into carbide components with the SDX Compact**

***The list goes on…….***

### Nozzle Characteristics

- Wear parts positively retained during assembly, eliminating the possibility of component breakage and minimising the risk for misalignment during assembly.
- Patented orifice design with a proven increase in wear life over standard flat orifice discs
- Hand tight design for ease of assembly and reduced maintenance
- Metal to metal secondary sealing of the nozzle body and adaptor
- Swirl Chamber and retainer variations to suit customer specific requirements
- Female threaded adaptors minimising the risk of thread damage during routine lance change outs
- Widest range of Orifice Disc and Swirl Chambers on the market
- Multiple grades of carbide to maximise wear life



### Spray Characteristics

The SDX range of nozzles with the "original" single inlet swirl chamber produces a hollow cone spray pattern with a uniformed droplet distribution

With 10 sizes of swirl chamber and over 220 orifice sizes the ability to fine tune the flow rate and spray angle is almost limitless

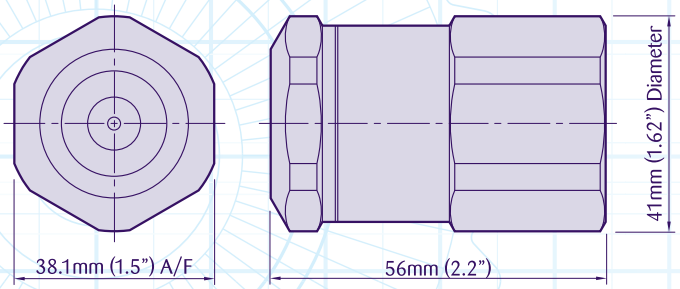
Flow rates range from 6 – 1400 gph @ 1000 psi (69 bar)

Proven pressure rating to 10,000psi (690 bar) without the need for expensive back up rings

# SDX® V Spray Dry Nozzles


## SDX® V Nozzle

The SDX® V features an 8 part construction and is the world's most user friendly spray drying nozzle,requiring only hand tight engagement of the nozzle body into the adaptor throughout the pressure range. The SDX® V also features an improved wear life / performance and effortless maintenance for the lowest cost of ownership.




### Removal Tool

Part number W196440025 for removal of **SDX®** V Swirl Chambers and Orifice Discs.

### SDX® V Assembly Description and Part Numbers

| Description | Part Number | | Material |
|---|---|---|---|
| (A) Body | W194990013 | | Stainless Steel |
| (B) Orifice O-Ring | W155100164 | | Silicone |
| | A313520163 | | Viton |
| (C) Orifice Disc | W19581-XXX* | | Tungsten Carbide |
| (D) Swirl Chamber | See Swirl Chamber Chart | | |
| (E) Retainer O-Ring | W155100180 | | Silicone |
| | A313520189 | | Viton |
| (F) Standard Retainer | W195490013 | | Stainless Steel |
| Cross-Milled Retainer | W198300003 | | Stainless Steel |
| Crown Retainer | See Swirl Chamber Chart | | |
| End Plate | W053660012 | | Tungsten Carbide |
| (G) Body O-Ring | W155100222 | | Silicone |
| | A313520221 | | Viton |
| (H) Adaptor | BSPT Thread | NPT Thread | |
| 1/4 Adaptor | W195000010 | W196350018 | Stainless Steel |
| 3/8 Adaptor | W195000028 | W196350026 | Stainless Steel |
| 1/2 Adaptor | W195000036 | W196350034 | Stainless Steel |
| 3/4 Adaptor | W195000044 | W196350042 | Stainless Steel |
| Removal Tool | W196440025 | | DurAl |
| SDX® Adaptor | W19636 | | Stainless Steel |
| SDX® II/III Adaptor | W19637 | | Stainless Steel |
| SDX® V Seal Kit | (10 of each O-Ring) | | |
| | W197690016 | | Viton |
| | W197690024 | | Silicone |

* Specify orifice size and swirl chamber suffix from capacity chart, on pages 6-7

**Please Note:** This chart is only a limited illustration of available sizes. Special materials are available on request for particular applications, please contact us for prices and delivery.

### SDX® V Swirl Chamber Part Numbers

| Ref | Standard* | Flat Back* | Open* | Crown Retainer* |
|---|---|---|---|---|
| SA | W194720014 | W198290014 | W209710018 | W211240012 |
| SB | W194720022 | W198290022 | W209710026 | W211240020 |
| SC | W194720030 | W198290030 | W209710034 | W211240038 |
| SD | W194720048 | W198290048 | W209710042 | W211240046 |
| SE | W194720055 | W198290055 | W209710059 | W211240053 |
| SF | W194720063 | W198290063 | W209710067 | W211240061 |
| SG | W194720071 | W198290071 | W209710075 | W211240079 |
| SH | W194720089 | W198290089 | W209710083 | W211240087 |
| SI | W194720097 | W198290097 | W209710091 | W211240095 |
| SJ | W194720105 | W198290105 | W209710109 | W211240103 |

*Standard Swirl Chamber uses Standard Retainer W195490013 or Crown Retainer W209700001
*Flat Back Swirl Chamber uses Cross Milled Retainer W198300003 or Crown Retainer W209700001
*Open Swirl Chamber uses Crown Retainer (Various Sizes)
*Crown Retainer Part Numbers to be used with Open Swirl Chamber

### SDX® V Interface Adaptors

| Part Number | Ref | Size |
|---|---|---|
| **SDX® to SDX® V Interface Adaptor** | | |
| W19636 | - 1 | 1/4" NPT |
| W19636 | - 2 | 3/8" NPT |
| W19636 | - 3 | 1/2" NPT |
| W19636 | - 4 | 3/4" NPT |
| **SDX® II & III to SDX® V Interface Adaptor** | | |
| W19637 | - 1 | 1/4" NPT |
| W19637 | - 2 | 3/8" NPT |
| W19637 | - 3 | 1/2" NPT |
| W19637 | - 4 | 3/4" NPT |

**Delavan** can offer a range of interface adaptors for the **SDX® V** nozzle. These can be used when converting from previous **SDX®** nozzles over to the new **SDX® V** nozzle. The interface adaptors are there to ensure that the same overall nozzle length of nozzle assembly is achieved.

**The design of the SDX® V is protected by Patents/Patent Applications including: EP 1474243; EP 1832347; US 2007235564; CA 2472771; AU 2002234817; NZ 534493; MX PA04007486.**

## SDX® V Swirl Chambers

**Delavan** has introduced an alternative design of Swirl Chamber especially for the **SDX® V** nozzle. The end plate is no longer integrated but is supplied as a separate component.

This new option addresses occasions where increased wear on the bottom of the standard chamber occurs, caused by cavitation or abrasive particles. In certain circumstances, the bottom of the Swirl Chamber wears out before the walls, or the inlet throat. With the new design, the separate end plate can be replaced and the 'open' Swirl Chamber can be reused, this significantly reduces the cost of ownership. There is also the option to use end plates with improved wear characteristics or chemical resistance.

The new Swirl Chamber required the introduction of a revised retainer that would locate the end plate correctly. The new retainer is designed to centralise the end plate onto the chamber and lock all components into place. It also has a lower pressure drop and improved blockage resistance compared to the existing retainers and Part No. W209700001 can be used with all current **SDX® V Swirl Chamber** derivatives.

The original Swirl Chamber design (Option 1) is the standard for **SDX® V** nozzles. The Flat Back version (Option 2) can be used where materials with a high solids percentage are to be atomised. The Open Swirl Chamber (option 3) is ideal for highly abrasive applications since the end plate is separate and can be replaced completely independently of the Swirl Chamber.

## Assembly Procedure:

1. Place **Nozzle Body (A)** thread side up on a flat surface
2. Insert the **Orifice O-Ring (B)** into the **Nozzle Body (A)**
3. Insert the **Orifice Disc (C)** in to the **Nozzle Body (A)** with the 'orifice nose' (the small diameter section of the orifice ) inserted first so that the tapered inlet section can be seen.
4. Place **Swirl Chamber (D)** on top of the **Orifice Disc (C)** with the 'swirl profile' located against the back face of the **Orifice Disc (C)**
5. Ensure that the **Retainer O-Ring (E)** is fitted onto the **Retaining Disc (F)**
6. Push the **Retaining Disc (F)** into the **Nozzle Body (A)** until unit is pressed flat against the back face of the **Swirl Chamber (D)** and **Nozzle Body (A)**
7. Place the **Body O-Ring (G)** into the body o-ring groove positioned above the threads on the outside of the **Nozzle Body (A)**
8. Pick up assembled unit and screw into **Female Adaptor (H)**, hand tighten

## SDX® V Nozzle Assembly


Contact our Helpline or your local distributor for further information
Tel: +44 (0)151 424 6821 or inside USA Toll Free: 1-800 Delavan
E-mail: sales@delavan.co.uk www.delavan.co.uk

# SDX® V Spray Dry Nozzles

**Orifice sizes ranging from 0.016" – 0.250" in increments of 0.001"**
**Swirl Chambers ranging from SA (0.76mm) to SM (16mm)**

**The Orifice and Swirl Chamber sizes below show an example of some possible combinations. with over 220 Orifice sizes and 10 Swirl Chamber variants allows us to find a combination to suit your droplet size, flow rate and spray angle requirements**

## SDX® Nozzles Range Capacity Chart

| Metering Sets (Swirl Chamber/Orifice) Swirl Chamber Type | | | | Orifice | Spray Angle (1000 PSIG) | Flow Rate in Litres/HR at BAR G | | | | | Flow Rate in USGPH at PSIG | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mini SDX® | Compact SDX® | SDX® SDX® III | SDX® V | Orifice Dia (in) | Measured with Water | 69 | 138 | 207 | 276 | 345 | 1000 | 2000 | 3000 | 4000 | 5000 |
| SW4 | — | — | — | 0.016 | 70°-75° | 21 | 30 | 37 | 42 | 47 | 6 | 8 | 10 | 11 | 12 |
| SW4 | — | — | — | 0.018 | 70°-75° | 24 | 34 | 42 | 48 | 54 | 6 | 9 | 11 | 13 | 14 |
| SW4 | — | — | — | 0.020 | 70°-75° | 26 | 36 | 45 | 51 | 57 | 7 | 10 | 12 | 14 | 15 |
| SW4 | — | — | — | 0.022 | 70°-75° | 28 | 40 | 49 | 57 | 64 | 8 | 11 | 13 | 15 | 17 |
| SW4 | — | — | — | 0.024 | 70°-75° | 33 | 46 | 56 | 65 | 73 | 9 | 12 | 15 | 17 | 19 |
| — | SAC | SA | SAV | 0.025 | 68° | 51 | 72 | 89 | 102 | 114 | 13 | 19 | 23 | 27 | 30 |
| SW1 | — | — | — | 0.027 | 70°-75° | 55 | 78 | 95 | 110 | 123 | 14 | 20 | 25 | 29 | 32 |
| — | SAC | SA | SAV | 0.028 | 71° | 57 | 80 | 98 | 114 | 127 | 15 | 21 | 26 | 30 | 33 |
| SW1 | — | — | — | 0.030 | 70°-75° | 62 | 88 | 108 | 125 | 140 | 16 | 23 | 29 | 33 | 37 |
| — | SAC | SA | SAV | 0.031 | 74° | 62 | 88 | 108 | 125 | 140 | 16 | 23 | 29 | 33 | 37 |
| SW1 | — | — | — | 0.033 | 70°-75° | 66 | 93 | 114 | 132 | 147 | 17 | 25 | 30 | 35 | 39 |
| — | SAC | SA | SAV | 0.034 | 77° | 68 | 96 | 118 | 136 | 152 | 18 | 25 | 31 | 36 | 40 |
| SW1 | — | — | — | 0.036 | 70°-75° | 71 | 101 | 123 | 142 | 159 | 19 | 27 | 33 | 38 | 42 |
| — | SAC | SA | SAV | 0.037 | 79° | 76 | 107 | 131 | 151 | 169 | 20 | 28 | 35 | 40 | 45 |
| SW2 | — | — | — | 0.038 | 70°-75° | 100 | 142 | 177 | 201 | 224 | 26 | 37 | 47 | 53 | 59 |
| — | SBC | SB | SBV | 0.040 | 76° | 95 | 134 | 164 | 189 | 212 | 25 | 35 | 43 | 50 | 56 |
| SW2 | — | — | — | 0.042 | 70°-75° | 114 | 160 | 197 | 114 | 254 | 30 | 42 | 52 | 30 | 67 |
| — | SBC | SB | SBV | 0.043 | 78° | 104 | 147 | 180 | 208 | 233 | 27 | 39 | 48 | 55 | 61 |
| SW2 | — | — | — | 0.044 | 70°-75° | 119 | 168 | 207 | 238 | 266 | 31 | 44 | 55 | 63 | 70 |
| — | SBC | SB | SBV | 0.046 | 80° | 114 | 160 | 197 | 227 | 254 | 30 | 42 | 52 | 60 | 67 |
| SW2 | — | — | — | 0.048 | 70°-75° | 132 | 187 | 228 | 265 | 296 | 35 | 49 | 60 | 70 | 78 |
| — | SBC | SB | SBV | 0.049 | 81° | 121 | 171 | 210 | 242 | 271 | 32 | 45 | 55 | 64 | 72 |
| SW2 | — | — | — | 0.050 | 70°-75° | 140 | 198 | 243 | 280 | 313 | 37 | 52 | 64 | 74 | 83 |
| — | SBC | SB | SBV | 0.052 | 82° | 129 | 182 | 223 | 257 | 288 | 34 | 48.1 | 59 | 68 | 76 |
| SW3 | — | — | — | 0.054 | 70°-75° | 191 | 270 | 331 | 382 | 389 | 50 | 71 | 87 | 101 | 103 |
| — | SCC | SC | SCV | 0.055 | 78° | 170 | 241 | 295 | 341 | 382 | 45 | 64 | 78 | 90 | 101 |
| SW3 | — | — | — | 0.056 | 70°-75° | 202 | 286 | 351 | 405 | 453 | 53 | 76 | 93 | 107 | 120 |
| — | SCC | SC | SCV | 0.058 | 79° | 182 | 257 | 314 | 363 | 405 | 48 | 68 | 83 | 96 | 107 |
| SW3 | — | — | — | 0.060 | 70°-75° | 219 | 310 | 380 | 439 | 491 | 58 | 82 | 100 | 116 | 130 |
| — | SCC | SC | SCV | 0.061 | 80° | 193 | 273 | 334 | 386 | 431 | 51 | 72 | 88 | 102 | 114 |
| SW3 | — | — | — | 0.062 | 70°-75° | 231 | 327 | 400 | 462 | 516 | 61 | 86 | 106 | 122 | 136 |
| — | SCC | SC | SCV | 0.064 | 81° | 202 | 286 | 351 | 405 | 454 | 53 | 76 | 93 | 107 | 120 |
| — | SCC | SC | SCV | 0.067 | 82° | 212 | 300 | 367 | 424 | 473 | 56 | 79 | 97 | 112 | 125 |
| — | SCC | SC | SCV | 0.070 | 83° | 225 | 318 | 390 | 450 | 503 | 59 | 84 | 103 | 119 | 133 |
| — | SDC | SD | SDV | 0.073 | 78° | 291 | 413 | 503 | 583 | 651 | 77 | 109 | 133 | 154 | 172 |
| — | SDC | SD | SDV | 0.076 | 79° | 310 | 439 | 538 | 621 | 693 | 82 | 116 | 142 | 164 | 183 |
| — | SDC | SD | SDV | 0.079 | 80° | 325 | 462 | 564 | 651 | 727 | 86 | 122 | 149 | 172 | 192 |
| — | SDC | SD | SDV | 0.082 | 81° | 334 | 477 | 583 | 674 | 753 | 89 | 126 | 154 | 178 | 199 |
| — | SDC | SD | SDV | 0.085 | 82° | 348 | 492 | 602 | 696 | 780 | 92 | 130 | 159 | 184 | 206 |
| — | SDC | SD | SDV | 0.088 | 83° | 364 | 515 | 628 | 727 | 814 | 96 | 136 | 166 | 192 | 215 |
| — | — | SE | SEV | 0.091 | 78° | 469 | 662 | 814 | 939 | 1048 | 124 | 175 | 215 | 248 | 277 |
| — | — | SE | SEV | 0.094 | 79° | 484 | 685 | 840 | 969 | 1082 | 128 | 181 | 222 | 256 | 286 |
| — | — | SE | SEV | 0.097 | 80° | 500 | 708 | 867 | 999 | 1117 | 132 | 187 | 229 | 264 | 295 |
| — | — | SE | SEV | 0.100 | 80° | 515 | 727 | 893 | 1029 | 1151 | 136 | 192 | 236 | 272 | 304 |
| — | — | SE | SEV | 0.103 | 81° | 530 | 749 | 920 | 1060 | 1185 | 140 | 198 | 243 | 280 | 313 |
| — | — | SF | SFV | 0.106 | 76° | 723 | 1022 | 1253 | 1446 | 1616 | 191 | 270 | 331 | 382 | 427 |

## SDX® Nozzles Range Capacity Chart

| Metering Sets (Swirl Chamber/Orifice) Swirl Chamber Type | | | | Orifice | Spray Angle (1000 PSIG) | Flow Rate in Litres/HR at BAR G | | | | | Flow Rate in USGPH at PSIG | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mini SDX® | Compact SDX® | SDX® SDX® III | SDX® V | Orifice Dia (in) | Measured with Water | 69 | 138 | 207 | 276 | 345 | 1000 | 2000 | 3000 | 4000 | 5000 |
| — | — | SF | SFV | 0.109 | 76° | 749 | 1060 | 1298 | 1499 | 1677 | 198 | 280 | 343 | 396 | 443 |
| — | — | SF | SFV | 0.112 | 77° | 769 | 1086 | 1332 | 1537 | 1718 | 203 | 287 | 352 | 406 | 454 |
| — | — | SF | SFV | 0.115 | 77° | 787 | 1113 | 1363 | 1575 | 1760 | 208 | 294 | 360 | 416 | 465 |
| — | — | SF | SFV | 0.118 | 78° | 814 | 1151 | 1408 | 1628 | 1821 | 215 | 304 | 372 | 430 | 481 |
| — | — | SG | SGV | 0.121 | 73° | 1003 | 1419 | 1737 | 2006 | 2244 | 265 | 375 | 459 | 530 | 593 |
| — | — | SG | SGV | 0.124 | 73° | 1026 | 1450 | 1775 | 2051 | 2294 | 271 | 383 | 469 | 542 | 606 |
| — | — | SG | SGV | 0.127 | 74° | 1052 | 1487 | 1824 | 2104 | 2354 | 278 | 393 | 482 | 556 | 622 |
| — | — | SG | SGV | 0.130 | 75° | 1079 | 1525 | 1870 | 2157 | 2411 | 285 | 403 | 494 | 570 | 637 |
| — | — | SG | SGV | 0.133 | 75° | 1105 | 1563 | 1915 | 2210 | 2472 | 292 | 413 | 506 | 584 | 653 |
| — | — | SH | SHV | 0.136 | 70° | 1567 | 2214 | 2714 | 3134 | 3505 | 414 | 585 | 717 | 828 | 926 |
| — | — | SH | SHV | 0.14 | 71° | 1628 | 2301 | 2820 | 3255 | 3641 | 430 | 608 | 745 | 860 | 962 |
| — | — | SH | SHV | 0.145 | 72° | 1703 | 2407 | 2948 | 3406 | 3808 | 450 | 636 | 779 | 900 | 1006 |
| — | — | SH | SHV | 0.15 | 73° | 1760 | 2490 | 3047 | 3520 | 3936 | 465 | 658 | 805 | 930 | 1040 |
| — | — | SH | SHV | 0.155 | 74° | 1817 | 2570 | 3145 | 3634 | 4061 | 480 | 679 | 831 | 960 | 1073 |
| — | — | SI | SIV | 0.16 | 70° | 2044 | 2892 | 3539 | 4088 | 4568 | 540 | 764 | 935 | 1080 | 1207 |
| — | — | SI | SIV | 0.165 | 71° | 2195 | 3104 | 3804 | 4391 | 4910 | 580 | 820 | 1005 | 1160 | 1297 |
| — | — | SI | SIV | 0.17 | 72° | 2347 | 3319 | 4065 | 4693 | 5246 | 620 | 877 | 1074 | 1240 | 1386 |
| — | — | SI | SIV | 0.175 | 73° | 2460 | 3478 | 4262 | 4920 | 5500 | 650 | 919 | 1126 | 1300 | 1453 |
| — | — | SI | SIV | 0.18 | 74° | 2555 | 3615 | 4425 | 5110 | 5712 | 675 | 955 | 1169 | 1350 | 1509 |
| — | — | SI | SIV | 0.185 | 75° | 2649 | 3747 | 4587 | 5299 | 5923 | 700 | 990 | 1212 | 1400 | 1565 |
| — | — | SJ | SJV | 0.19 | 71° | 3293 | 4656 | 5704 | 6586 | 7362 | 870 | 1230 | 1507 | 1740 | 1945 |
| — | — | SJ | SJV | 0.195 | 72° | 3369 | 4765 | 5836 | 6737 | 7532 | 890 | 1259 | 1542 | 1780 | 1990 |
| — | — | SJ | SJV | 0.20 | 73° | 3463 | 4898 | 5999 | 6927 | 7744 | 915 | 1294 | 1585 | 1830 | 2046 |
| — | — | SJ | SJV | 0.205 | 74° | 3634 | 5136 | 6294 | 7267 | 8126 | 960 | 1357 | 1663 | 1920 | 2147 |
| — | — | SJ | SJV | 0.21 | 75° | 3785 | 5352 | 6556 | 7570 | 8463 | 1000 | 1414 | 1732 | 2000 | 2236 |

All spray angles are based on water at a pressure of 1000 psi (69 bar). The MINI SDX® has a nominal spray angle of 70°- 75° due to it's unique cone faced orifice.

## Note: The **Delavan SDX®** family of nozzles are protected by Patent.

The design of the **SDX® V** is protected by Patents/Patent Applications including: EP 1474243; EP 1832347; US 2007235564; CA 2472771; AU 2002234817; NZ 534493; MX PA04007486.

## SDX® Carbide Reference Guide

| Delavan Reference | Carbide Description | SRS Star Rating Abrasion | Corrosion | Erosion |
|---|---|---|---|---|
| Standard Grade | General Purpose Tungsten Carbide<br>Used in all of Delavan's **SDX®** products and suitable for most applications | ★★★ | ★★★ | ★★★ |
| Standard Plus Grade | General Purpose Tungsten Carbide<br>Improved resistance for use with High Pressure applications | ★★★★ | ★★★★ | ★★★★ |
| Premium Grade | Speciality Tungsten Carbide<br>Best suited for Chemical and Abrasion Resistance | ★★★★★ | ★★★★ | ★★★★★ |
| Superior Grade | Speciality Tungsten Carbide<br>Best suited for pure Chemical Resistance with Caustic or Acid materials | ★★ | ★★★★★ | ★★★★ |

**Delavan's Star Rating System (SRS)** outlines three primary properties of wear on our Carbide Products; Abrasion, Corrosion and Erosion. Scale = Lowest Rating (★) to Highest Rating (★★★★★)

The **SDX®** family of products comes with carbide internal components made from our Standard Grade of Carbide which is noted by our part numbers. Please contact **Delavan** for questions on our complete line of material selections.

**Caution:** These ratings are subject to each application and should be used as a general guide.

# SDX® V Spray Dry Nozzles

## SDX® V ACCESSORIES

### Cone Faced Body

These are designed to prevent build up on the front face of the nozzle body. Available in angles to suit individual applications.

Cone Faced Body Part Numbers

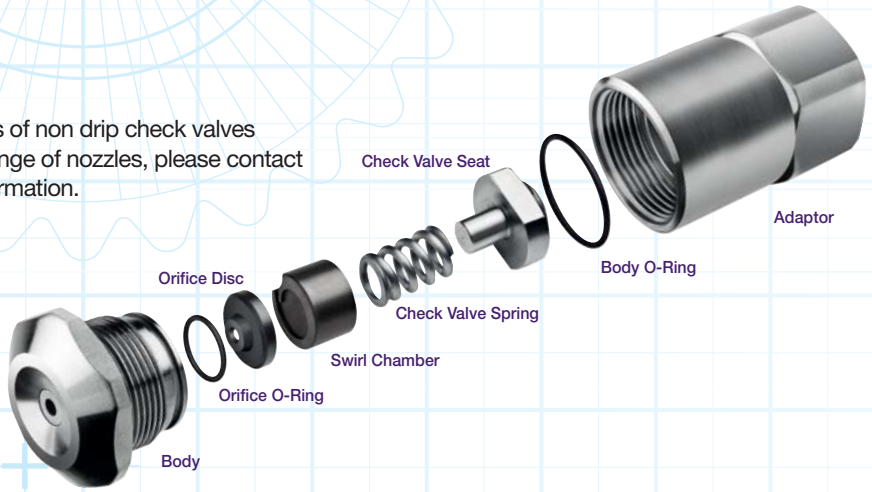
| Nozzle | 70° | 80° | 90° |
|---|---|---|---|
| SDX® | A203190010 | A203190028 | A203190036 |
| SDX® III | W118820015 | W118820023 | W118820031 |
| SDX® V | W196000019 | W196000027 | W196000035 |

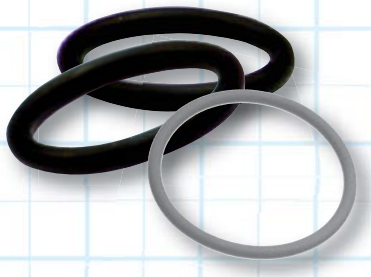
### Butt Weld Adaptor

We offer the butt weld adaptor in a range of standard pipe sizes, configurations and lengths, with custom designs available upon request. Ensure that adaptor welds are carried out to the appropriate safety approvals and standards.

### Check Valves

There are several versions of non drip check valves available for the SDX V range of nozzles, please contact the factory for further information.

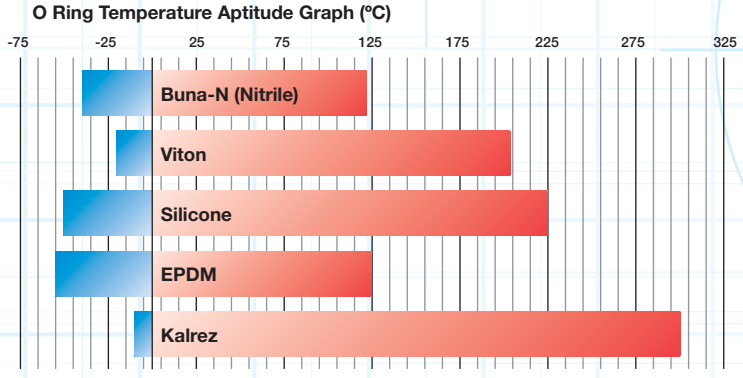


### Seal Kits

We supply seal kits for the SDX V Nozzle in various materials.
Each kit comprises of 10 of each seal.
Delavan recommends that seals are changed after each run.

The 'O' Ring, otherwise known as Toroidal Seal, is an exceptionally versatile sealing device. Delavan supplied 'O' Rings are of the highest quality currently available on the market, and are specified specifically for our nozzle components. This data sheet offers Delavan 'O' Ring consumers a range of performance and compatibility data from our standard supply materials. We recognise that not all applications are suitable for these standard readily available materials and offer alternatives to suit individual applications on request. We are also able to offer FDA (Food and Drug Association) approved materials accompanied by a certificate.



# TRAINING

**The Delavan SDX range of nozzles are fully supported in the field through organised training sessions and backed up with decades of technical experience in spray drying.**

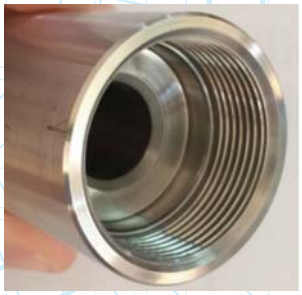
Delavan offers a maintenance and training program for operators and OEM's to ensure that you have all of the tools necessary for trouble free operation of your spray nozzles.

Some of the topics covered are:

- Maintenance
- Assembly / disassembly
- Inspection of carbide components, the effects of wear and what to look out for
- Good practice guide

# MAINTENANCE CONSIDERATIONS

*SDX V offers built in thread protection to eliminate potential damage caused during maintenance*

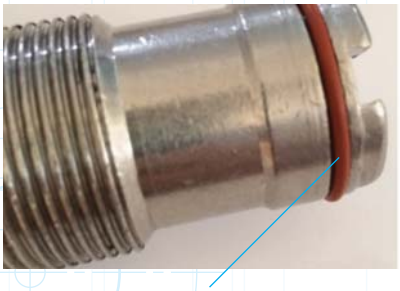


The Delavan SDX nozzle range has been specifically designed for high pressure applications with the SDX III configuration being in service throughout the world for over 40 years. Each component throughout the SDX range is precision machined to tested and proven dimensions with close tolerances to suit the exacting requirements demanded by the process.

In order to ensure that the nozzles continue to operate effectively it is vital that each component is handled carefully, ensuring that there is no damage to the components. This is particularly important with the sealing surface areas and the threads. Any slight damage to a sealing face or surface, or to a thread profile, can potentially cause an issue. If there is any doubt about the condition of a component then Delavan would suggest that the item is replaced.

*Damage to threads on SDX III Nozzle*

The Delavan SDX range of nozzles has been operating successfully and safely throughout the world for over 60 years. In developing the SDX range independent high pressure cycling and proof pressure testing was commissioned in order to ensure that we can support the ever increasing demands of our customers.



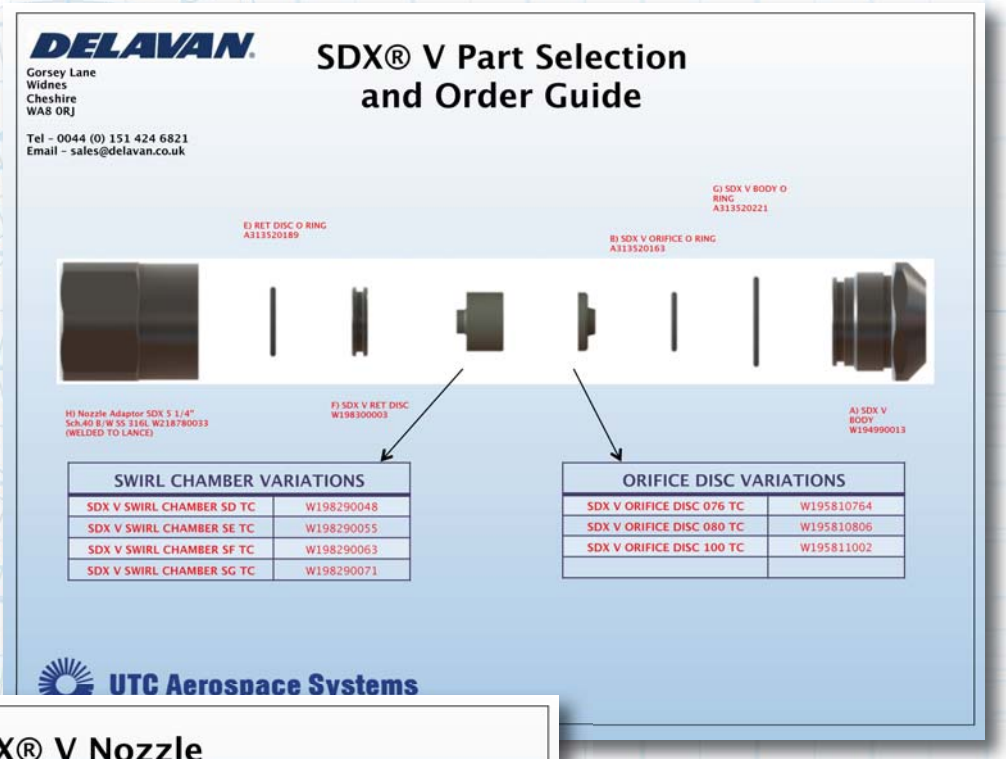
*Particular attention needs to be paid to sealing areas ensuring that no damage is present that can compromise the integrity of the O-rings. Delavan strongly recommends the replacement of these O-rings each time the nozzle is assembled.*

Contact our Helpline or your local distributor for further information
www.duesen.de
anfrage@duesen.de

# SDX® V Spray Dry Nozzles

## ORDERING

**Ordering guides are available to suit specific requirements, contact Delavan for more information**



DELAVAN

Gorsey Lane
Widnes
Cheshire
WA8 0RJ

Tel - 0044 (0) 151 424 6821
Email - sales@delavan.co.uk

SDX® V Part Selection and Order Guide

G) SDX V BODY O RING A313520221

E) RET DISC O RING A313520189

B) SDX V ORIFICE O RING A313520163

H) Nozzle Adaptor SDX S 1/4" Sch.40 B/W SS 316L W218780033 (WELDED TO LANCE)

F) SDX V RET DISC W198300003

A) SDX V BODY W194990013

| SWIRL CHAMBER VARIATIONS | |
|---|---|
| SDX V SWIRL CHAMBER SD TC | W198290048 |
| SDX V SWIRL CHAMBER SE TC | W198290055 |
| SDX V SWIRL CHAMBER SF TC | W198290063 |
| SDX V SWIRL CHAMBER SG TC | W198290071 |

| ORIFICE DISC VARIATIONS | |
|---|---|
| SDX V ORIFICE DISC 076 TC | W195810764 |
| SDX V ORIFICE DISC 080 TC | W195810806 |
| SDX V ORIFICE DISC 100 TC | W195811002 |
| | |

UTC Aerospace Systems

DELAVAN

Gorsey Lane
Widnes
Cheshire
WA8 0RJ

Tel - 0044 (0) 151 424 6821
Email - sales@delavan.co.uk

SDX® V Nozzle Assembly Instructions

G) SDX V BODY O RING A313520221

E) RET DISC O RING A313520189

B) SDX V ORIFICE O RING A313520163

H) Nozzle Adaptor SDX S 1/4" Sch.40 B/W SS 316L W218780033 (WELDED TO LANCE)

F) SDX V RET DISC W198300003

A) SDX V BODY W194990013

1) Place **Nozzle Body (A)** thread side up on a flat surface
2) Insert the **Orifice O Ring (B)** into the **Nozzle Body (A)**
3) Insert the **Orifice Disc (C)** into the **Nozzle Body (A)** with the 'orifice nose' (smallest diameter inserted first into the nozzle body, locating at the front)
4) Place **Swirl Chamber (D)** on top of the **Orifice Disc (C)** with the swirl side contacting the **Orifice Disc (C)**
5) Ensure that the **Retainer O Ring (E)** is fitted onto the **Retaining Disc (F)**
6) Push the **Retaining Disc (F)** into the **Nozzle Body (A)** until it is pressed flat against the back of the swirl chamber
7) Place the **Body O Ring (G)** into the body o ring groove positioned above the threads on the outside of the **Nozzle Body (A)**
8) Ensure that the complete assembly doesn't rattle
9) Pick up assembled unit and screw into the **Adaptor (H)** and tighten by hand

**ENSURE THAT 'O' RINGS ARE CHANGED EVERY TIME MAINTENANCE IS CARRIED OUT USING GENUINE DELAVAN COMPONENTS**

UTC Aerospace Systems

### Understanding the "custom" aspect of each application is of critical importance to spray drying.

Almost every dryer presents a unique situation and that is why Delavan uses computer analysis programs to produce information on spray angles and flow rates before installing any nozzles into the spray dryer, saving valuable time and money. Contact our Helpline or your local distributor for further information.

# Nozzle Specification Information
# Enquiry Form

This enquiry sheet serves as a guide so that we may better assist you in proper nozzle selection. Many times the optimum nozzle combination cannot be found on the first attempt but the more completely this form is filled out, the better our chance of success.

Name: _____ Date: _____

Company: _____

Address: _____

_____

_____

Tel No: _____ Fax No: _____

## THE FEED MATERIAL

Substance Being Sprayed _____ % Solids _____

Specific Gravity (Or Density) _____ Viscosity _____

Acidic Or Alkaline (Ph) _____

## THE NOZZLE

Nozzle Type Currently Used _____

Manufacturer _____ No. Of Nozzles _____

Rated Flow And Spray Angle _____ Average Wear Life _____
(Per Nozzle)

Pipe Size _____

## THE DRYER

Dryer Manufacturer _____ Inlet Air Temp _____

Cocurrent/Countercurrent Air _____ Outlet Air Temp _____

Drying Diameter At Nozzle Position _____ Max Pump Pressure _____

Pump Manufacturer _____ Operating Pressure _____

## THE DRY PRODUCT

% Moisture _____ Density _____

Pounds Per Hour _____ Solubility _____

Comments

Please Email To: anfrage@duesen.de

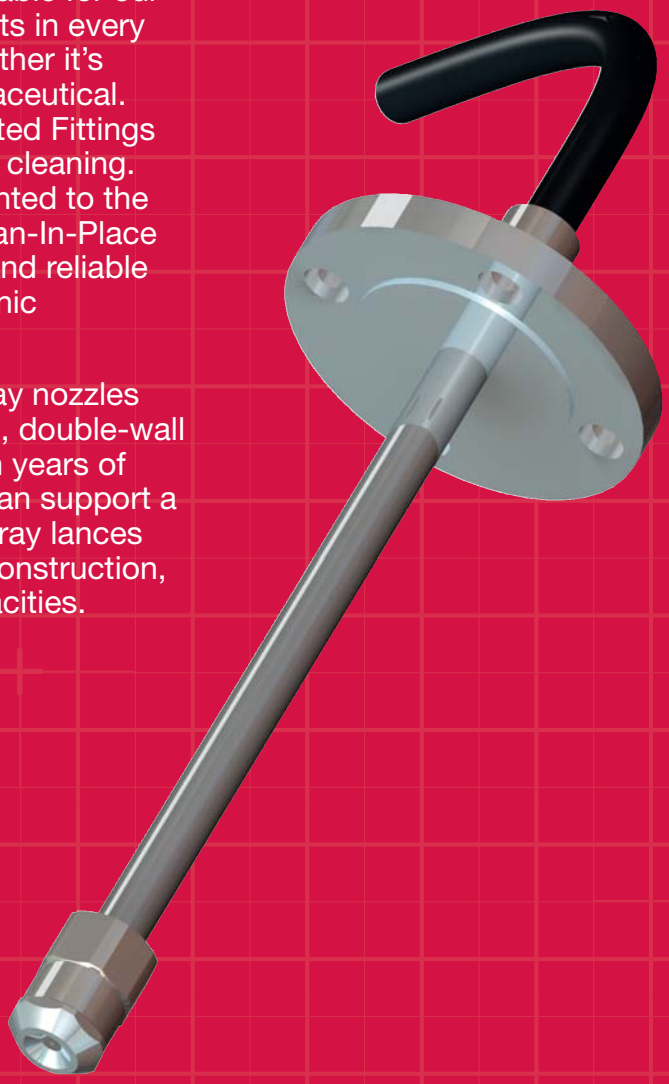
DELAVAN
www.delavan.co.uk

# We Don't Just Supply the Nozzles...

**Delavan's** extensive experience goes beyond just the nozzle with a full range of engineered support for spray lances. **Delavan** offers a variety of production services to best meet your needs. For new systems, we will handle each stage of development from preliminary design to servicing the product. **Delavan** can also enhance current designs or simply manufacture products from existing designs. We can provide cooled or heated lances, support special mounting flanges, by-pass or purge systems to meet every industry standard. Whether it is FDA or other coded installments e.g. DIN, JIS or ANSI Delavan has the ability to supply. Contact the factory for more information...

Standard Designs are available for our **SDX**® and **SwirlAir**® products in every Spray Dry application, whether it's Food, Chemical, or Pharmaceutical. Flanged Port or Wall Mounted Fittings prevents splash-out during cleaning. Sanitary Connections mounted to the vessel with automated Clean-In-Place valving provides a simple and reliable process for stringent hygienic operations.

Extended Lances with Spray nozzles are available for single-wall, double-wall and insulated vessels. With years of proven designs, **Delavan** can support a large range of extended spray lances with multiple materials of construction, with extensive testing capacities.



**Distributor:**
**VIPTech GmbH**
**Lessingstrasse 12**
**D-72663 Großbettlingen**

**Web: www.duesen.de**
**mail: anfrage@duesen.de**
**Tel: +49 07022 948 735**
**Fax: +49 07022 948 636**

An ISO 9001:2000 Registered Company

FM 523589 003

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