

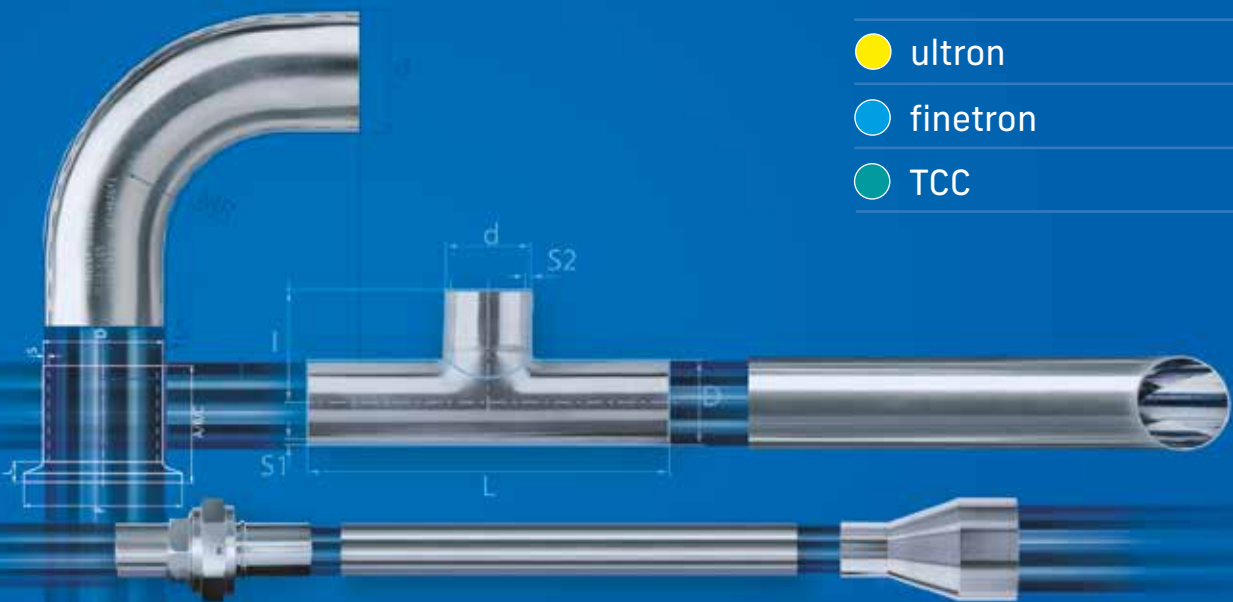
D-ECKWEILER
connecting flow to purity

MICROELECTRONICS

TUBES, PIPES, FITTINGS AND CONNECTIONS

FOR SEMICONDUCTOR
AND HIGH-TECH INDUSTRIES

- ultron
- finetron
- TCC



NORTH AMERICA

Specific inner surfaces
for safe installations.
Highest purity down to Ra 5 µin.



Dockweiler quality
from raw material to delivery.
All certificates are available on:
www.dockweiler.com

Consistent 3.1 certificates
with all important information.
End-to-end documentation
and traceability.



Engineered components
for enhanced efficiency.
Weld seams in perfection and
ultimate quality.

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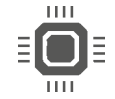
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*VCR® is a registered trademark of Swagelok Company

For UHP gas applications in semiconductor industry and fine chemistry



ep electropolished
cleanroom cleaning and packing



1. SURFACES QUALITIES

Tubes and fittings:	Inner surface (ep)	Outer surface
ultron	Ra _{max.} ≤ 10 µin (0.25 µm)	Ra _{max.} ≤ 48 µin (1.2 µm)
On request:	Ra _{max.} ≤ 5 µin (0.13 µm) Ra _{max.} ≤ 7 µin (0.18 µm) Ra _{max.} ≤ 20 µin (0.51 µm)	

Pipes:	Inner surface (ep)	Outer surface
ultron	Ra _{max.} ≤ 25 µin (0.64 µm)	Mill finish, RA not defined

Additional notes:

- Tubes and fittings will be supplied with a square cut. Different end preparations may be agreed on.
- Other specified surfaces or ends are available upon request.
- The Ra value in the cold worked area of fittings (inner and outer surface) and on the surface of circumferential welds is not defined. For Dimensions OD < 1/4" (6.35 mm) roughness is not defined.
- Free of oil and grease according to CGA G-4.1-2018 and ASTM G93 – level A.
- Electropolishing procedure according to Dockweiler guideline Doc. 8.4-40/3.1/3.3.1
- Passivation acc. ASTM A380 and ASTM A 967
- Cleanroom cleaning and packing (Federal Class 10 / ISO Class 4)

2. MATERIALS

ultron	1.4404 / UNS S31603 (316L), 1.4435 / UNS S31603 (316L), UNS S31603 (316L)
ultron Alloy 22	N06022 according to ASTM B622 / B575 / B574 / B829 (1/4" to 1" seamless tubes)
ultron VIM-VAR	UNS S31603 (316L) VIM-VAR double melted stainless steel according to ASTM A 269/A 632 for OD tubing (Imperial)

Hardness equivalent to:

- max. 180 HV* according to DIN EN ISO 6507-1
- max. 90 HRB* according to DIN EN ISO 6508-1

* comparable to ASTM E-384 (HV) and ASTM E 18-22 (HRB)

3. DIMENSIONS

Tubes and fittings:	Imperial according to ASTM A269 / A270 / A632	
OD x WT:	1/8" x 0.022" to 6" x 0.109"	3.18 x 0.56 mm to 152.4 x 2.77 mm
Length:	OD ≥ 1/4": min. 19.36 ft to max. 19.98 ft (6000 mm -100/+90) OD < 1/4": min. 9.51 ft to max. 9.84 ft (2950 mm ± 50)	
Manufacturing process:	Seamless Tubes ≤ 1" OD (25.40 mm)	Welded tubes ≥ 1 1/2" OD (38.10 mm)
Pipe:	Pipe according to ASTM A312	
Dimensions:	NPS 8, 10, 12 Schedule 10S	Length: min. 19.36 ft to max. 19.98 ft
Manufacturing process:	Welded tubes	

4. QUALITY AND TEST PROCEDURES

Verification of basic test certificate	Visual inspection	Endoscopic inspection of bright finished tubes
Verification of Dimensions	Roughness measurements	Conductivity test (DI water)
TOC-measurement of DI water	Particle measurements	Scanning electron microscope (SEM)
XPS / ESCA	Auger analysis (AES)	

5. TECHNICAL TERMS OF DELIVERY

Tubes and fittings are prepared for orbital welding:

Tubes

According to ASTM A 632 / A 269 / A 270 / A 312 (Pipe), DIN EN 10217-7 / 10216-5 with a length of 19.35 ft - 19.98 ft (5900 - 6090 mm), max. 10% short lengths of min. 9.84 ft (3000 mm). For electropolished tubes with an outer diameter ≤ 5.00 mm, the length is 2950 +/- 50 mm.

Tube fitting components

Prematerial according to DIN11865, ASTM A 403 (Pipe) and ASME B16.9 (Pipe).

Machined components

Prematerial according to ASTM A 479, DIN EN 10088-3, DIN 17440, ASTM A403 (Pipe)

Marking always with

DOCKWEILER / DW-Number / Dimension / Material / Heat number

Tube, pipe and fittings are permanently marked. The marking must provide all necessary information to trace back the heat number and the material grade.

6. DOCUMENTATION, PACKAGING AND SHIPPING

The documentation result by the Dockweiler Inspection Certificate 3.1 according to DIN EN 10204.

Tubes and fittings filled with N2 (99.999% incl. inert gas), closed with PA/PE squares and yellow PE caps, double-bagged and sealed in PE-sleeves.

Delivery in tubular container or wooden crate, fittings in strong cardboard box with shock absorbing filler.

The batch label on the foil contains the information ultron.

For gas applications in semiconductor industry
as well as in photovoltaics



1. SURFACES QUALITIES

Tubes and fittings:	Inner surface (bf)	Outer surface
● finetron	Ra _{max.} ≤ 20 µin (0.51 µm)	Ra _{max.} ≤ 48 µin (1.2 µm)

Additional notes:

- Tubes and fitting will be supplied with a square cut. Different end preparations may be agreed on. Other specified surfaces or ends are available upon request.
- The Ra value in the cold worked area of fittings (inner and outer surface) and on the surface of circumferential welds is not defined. For Dimensions OD < 1/4" (6.35 mm) roughness is not defined.
- Bright finished Surface treatment: Cleaning and test procedure ASTM A 632, S3.
- Free of oil and grease according to CGA G-4.1-2018 and ASTM G93 – level C.

2. MATERIALS

● finetron	1.4404 / UNS S31603 (316L), 1.4435 / UNS S31603 (316L), UNS S31603 (316L)
● finetron Alloy 22	N06022 according to ASTM B622 / B575 / B574 / B829 (1/4" to 1" seamless tubes)

Hardness equivalent to:

- max. 180 HV* according to DIN EN ISO 6507-1
- max. 90 HRB* according to DIN EN ISO 6508-1

* comparable to ASTM E-384 (HV) and ASTM E 18-22 (HRB)

3. DIMENSIONS

Imperial	according to ASTM A269 / A270 / A632	
OD x WT:	1/4" x 0.035" to 6" x 0.109"	6.35 x 0.89 mm to 152.4 x 2.77 mm
Length:	min. 19.36 ft to max. 19.98 ft	6000 mm -100/+90
Manufacturing process:	Seamless Tubes ≤ 1" OD (25.40 mm)	Welded tubes ≥ 1 1/2" OD (38.10 mm)

4. QUALITY AND TEST PROCEDURES

Verification of basic test certificate	Visual inspection	Endoscopic inspection of bright finished tubes
Verification of Dimensions	Roughness measurements	

5. TECHNICAL TERMS OF DELIVERY

Tubes and fittings are prepared for orbital welding according to the following standards:

Tubes

according to AASTM A632 / A269 / A270 / A312 (Pipe), DIN EN 10217-7 / 10216-5 with a length of 19.35 ft - 19.98 ft (5900 - 6090 mm), max. 10% short lengths of min. 9.84 ft (3000 mm).

Tube fitting components

Prematerial according to DIN11865, ASTM A 403 (Pipe) und ASME B16.9 (Pipe).

Machined components

Prematerial according to ASTM A 479, DIN EN 10088-3, DIN 17440, ASTM A 182 (Pipe)

Marking always with

DOCKWEILER / DW-Number / Dimension / Material / Heat number

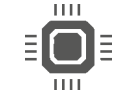
Tube, pipe and fittings are permanently marked. The marking must provide all necessary information to trace back the heat number and the material grade.

6. DOCUMENTATION, PACKAGING AND SHIPPING

The documentation result by the Dockweiler Inspection Certificate 3.1 according to DIN EN 10204.

Bright finished tubes and fittings are closed with opaque PE caps and are individually sealed in PE foil. Delivery in tubular container or wooden crate, fittings in strong cardboard box with shock absorbing filler. The batch label on the foil contains the information finetron.

Widely used in production, process measurement and photovoltaic



1. SURFACES QUALITIES

Tubes and fittings:	Inner surface	Outer surface
● TCC (bf)	Ra _{max.} ≤ 30 μin (0.76 μm)	Ra _{max.} ≤ 48 μin (1.2 μm)

Pipe and pipe fittings:	Inner surface	Outer surface
● TCC (bf)	Ra _{max.} ≤ 32 μin (0.8 μm)	Ra _{max.} ≤ 48 μin (1.2 μm)

Additional notes:

- Tubes and fittings are prepared for orbital welding.
- Other specified surfaces or ends are available upon request.
- Pipes and fitting will be supplied with a square cut. Different end preparations may be agreed on.
- The Ra value in the cold worked area of fittings (inner and outer surface) and on the surface of circumferential welds is not defined. For Dimensions OD ≤ 3/8" (5.00 mm) roughness is not measured.
- Cleaning and test procedure ASTM A 632, S3 and ASTM G93 – level D.

2. MATERIALS

● TCC

1.4435 / UNS S31603 (316L)
1.4404 / UNS S31603 (316L)
UNS S31603 (316L)
UNS S30403 (304L)

Hardness equivalent to:

- max. 180 HV* according to DIN EN ISO 6507-1
- max. 90 HRB* according to DIN EN ISO 6508-1

* comparable to ASTM E-384 (HV) and ASTM E 18-22 (HRB)

3. DIMENSIONS

Tubes and fittings:	Imperial according to ASTM A269 / A270 / A632	
OD x WT:	1/8" x 0.022" to 6" x 0.109"	3.18 x 0.56 mm to 152.4 x 2.77 mm

Length:

OD ≥ 1/4": min. 19.36 ft to max. 19.98 ft (6000 mm -100/+90)
OD < 1/4": min. 9.51 ft to max. 9.84 ft (2950 mm ± 50)

Manufacturing process:	Seamless tubes (≤ 1/2")	Welded or seamless tubes (> 1/2")
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Pipe:	Pipe according to ASTM A312	
Dimensions:	NPS 8, 10, 12 Schedule 10S	Length: min. 19.36 ft to max. 19.98 ft
Length	min. 19.36 ft to max. 19.98 ft (6000 mm -100/+90)	

Manufacturing process:	Welded tubes
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4. QUALITY AND TEST PROCEDURES



Verification of basic test certificate



Visual inspection



Endoscopic inspection of bright finished tubes



Verification of Dimensions



Roughness measurements

5. TECHNICAL TERMS OF DELIVERY

Tubes and fittings are prepared for orbital welding:

Tubes

According to ASTM A 269 / A270 / A 632, DIN EN 10217-7/10216-5 with a length of 5900 - 6090 mm (max. 10% short lengths of min. 3000 mm possible).

Fittings

According to DIN 11865, ASTM A 403 (Pipe), ASTM A 182 (Pipe)

Marking always with

DOCKWEILER / DW-Number / Dimension / Material / Heat number

Tube, pipe and fittings are permanently marked. The marking must provide all necessary information to trace back the heat number and the material grade.

6. DOCUMENTATION, PACKAGING AND SHIPPING

Documentation

The documentation result by the Dockweiler Inspection Certificate 3.1 according to DIN EN 10204. Optional online documentation WebCert.

Packaging

Bright finished tubes and fittings are sealed with white/opaque PE caps and packaged in PE foil. The batch label contains the information TCC.

Anodically cleaned tubes and fittings are sealed with PE/PA squares and white/opaque PE caps and packed in PE foil. The batch label contains the information TCC.1.

Shipping

Delivery in tubular container or wooden crate, fittings in strong cardboard box with shock absorbing filler.

Dockweiler Order Code System: Easy to select and combine

Order Code Selection for Tubes:

Sample: ultron Tube 1 Inch

Combine: **A** - **C**

Order Code: **U** - **16**

Sample: ultron VIMVAR Tube 1 Inch

Combine: **A** - **C** - **add-on**

Order Code: **U** - **16** - **V**

A. DOCKWEILER QUALITY

Code Quality	Specification	Material
U	ultron	316L (ep)
F	finetron	316L (bf)
T	TCC	316L/304L (bf)

B. BASIC CODE TYPE OF PRODUCT

Code Product	Description
CT	Coil Tube
E4	Elbow 45°
E9	Elbow 90°
TE	Tee Equal
TR	Tee Reducing
RC	Reducer Concentric
DC	Dockweiler Cap
WC	Weld Cap
Z	ZeroCon Connection
WFT	CleanShut Wall Feedthrough
CO	Coaxial Tube
CTE	Coaxial Tee Equal
CTR	Coaxial Reducing Tee
CE4	Coaxial 45° Elbow
CE9	Coaxial 90° Elbow
CS	Coaxial Sleeve
CTM	Coaxial Terminator
CPT	Coaxial Purge Tee
CBP	Coaxial Bulkhead Purge Tee
CFG	Coaxial VCR®* Female Gland
CMG	Coaxial VCR®* Male Gland

C. BASIC CODE OUTER DIAMETER

Code Diameter	Size (Inch)	Wall Thickness
02	1/8	0.022
04	1/4	0.035
06	3/8	0.035
08	1/2	0.049
10	5/8	0.049
12	3/4	0.065
16	1	0.065
24	1 1/2	0.065
32	2	0.065
40	2 1/2	0.065
48	3	0.065
64	4	0.083
96	6	0.109
Pipe Schedule 10S		
96NPS	6	0.130
128NPS	8	0.148
160NPS	10	0.165
192NPS	12	0.180
224NPS	14	0.189
256NPS	16	0.189
288NPS	18	0.189
320NPS	20	0.218

D. ADD-ON MATERIAL GRADE

Code	add-on
V	VimVar for ultron
22	Alloy 22

Order Code Selection for Fittings:

Sample: finetron Elbow 45° 1/2 Inch

Combine: **A** - **B** - **C**

Order Code: **F** - **E4** - **08**

Sample: ultron VIMVAR Elbow 45° 1/2 Inch

Combine: **A** - **B** - **C** - **D**

Order Code: **U** - **E4** - **08** - **V**

Dockweiler Tube Systems: Tubes and Orbital Weld Fittings

For the highest requirements for surfaces, purity and corrosion resistance. Our tubes and fittings meet the highest demands for applications in microelectronics or in other high-tech industries.



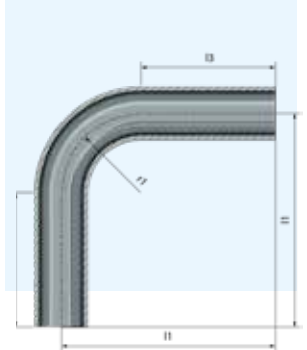
Elbow 45°

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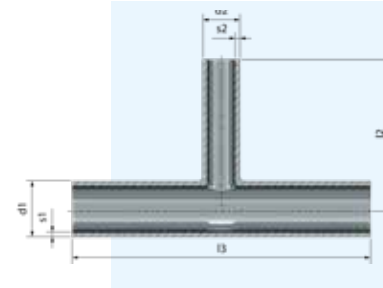
Elbow 90°

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T-Pieces
Equal and
Reduced

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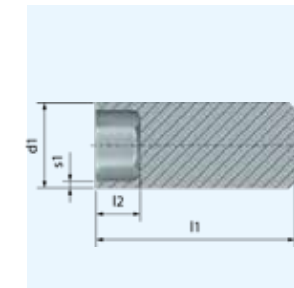
Reducer
Concentric

Page 22



Weld Cap

Page 23



Dockweiler
Cap

Page 24



Imperial Tubes
and Pipes

Page 12



Coil Tube

Page 13



ZeroCon
Connection

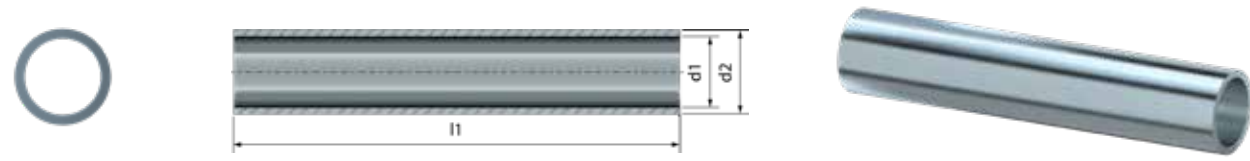
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CleanShut
Feedthrough

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Imperial			ultron	finetron	TCC	Product Code ^B + Diameter ^C	ultron VimVar
Nominal Size d	Wall Thickness s	Weight					
Inch	Inch	lbs/ft	316 L				
1/8	0.022*	0.025	U	-	T	- 02	-
1/4	0.035	0.083	U	F	T	- 04	V*
3/8	0.035	0.132	U	F	T	- 06	V*
1/2	0.049	0.236	U	F	T	- 08	V*
3/4	0.065	0.484	U	F	T	- 12	V*
1	0.065	0.660	U	F	T	- 16	V*
1 1/2	0.065	1.013	U	F	T	- 24	
2	0.065	1.366	U	F	T	- 32	
2 1/2	0.065	1.719	U	F	T	- 40	
3	0.065	2.072	U	F	T	- 48	
4	0.083	3.536	U	F	T	- 64	
6	0.109	6.982	U	F	T	- 96	

*optional with wall thickness 0.028 inch
*VimVar only available for ultron.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C (+ add-on for VimVar)

Alloy 22 – FOR HIGHLY-CORROSIVE MEDIA			ultron	finetron	Product Code ^B + Diameter ^C	Alloy 22 add-on
Nominal Size d	Wall Thickness s	Weight				
Inch	Inch	lbs/ft				
1/4	0.035	0.083	U	F	- 04	- 22
3/8	0.035	0.132	U	F	- 06	- 22
1/2	0.049	0.236	U	F	- 08	- 22
3/4	0.065	0.484	U	F	- 12	- 22
1	0.065	0.660	U	F	- 16	- 22

Further dimensions on request.

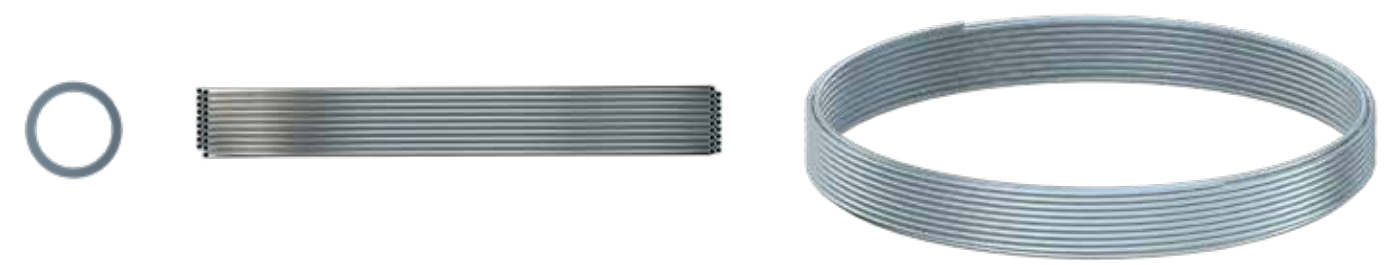
For Order Code please combine:
Quality^A - Product Code^B + Diameter^C + add-on for Alloy 22

PIPE NPS Schedule 10S			ultron	finetron	TCC	Product Code ^B + Diameter ^C
Nominal Size d	Wall Thickness s	Weight				
NPS	Inch	lbs/ft	316 L			
6*	0.133	9.469	U	-	T	- 96NPS
8	0.150	13.621	U	-	T	- 128NPS
10	0.160	18.956	U	-	T	- 160NPS
12	0.180	24.554	U	-	T	- 192NPS
16	0.190	32.302	-	-	T	- 256NPS
20	0.220	47.004	-	-	T	- 320NPS

* optional / on demand
Further dimensions on request.

For Order Code please combine:
Product Quality - Basic Code

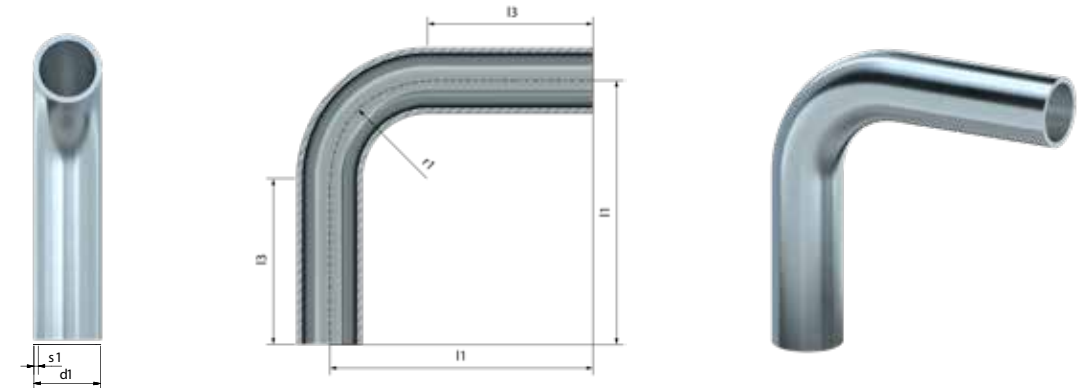
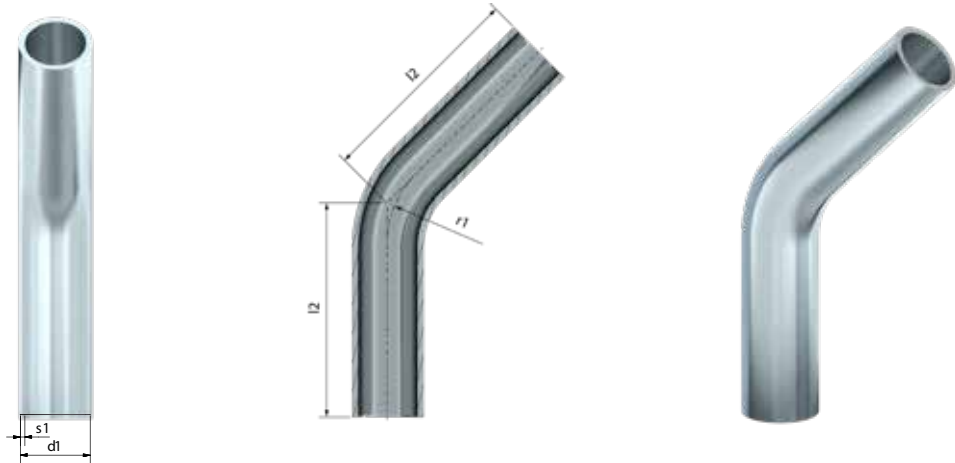
COIL TUBE IMPERIAL



Coil Tube Imperial			ultron	finetron	Product Code ^B + Diameter ^C
Nominal Size d	Wall Thickness s	Weight			
Inch	Inch	lbs/ft	316 L		
1/8	0.022	0.081	-	F	- CT-02
1/4	0.035	0.274	U	F	- CT-04
3/8	0.035	0.433	U	F	- CT-06
1/2	0.049	0.774	U	F	- CT-08

Further dimensions on request.

For Order Code please combine:
Product Quality - Basic Code



Nominal Size	Wall Thickness	Length	Radius	ultron	finetron	TCC	Product Code ^B + Diameter ^C
d1	s1	l2	r1	●	●	●	
Inch		Inch		316 L			
1/4	0.035	2.000	0.563	U	F	T	- E4-04
3/8	0.035	2.000	1.126	U	F	T	- E4-06
1/2	0.049	2.252	1.063	U	F	T	- E4-08
3/4	0.065	2.252	1.126	U	F	T	- E4-12
1	0.065	2.252	1.500	U	F	T	- E4-16
1 1/2	0.065	2.500	2.252	U	F	T	- E4-24
2	0.065	3.000	3.000	U	F	T	- E4-32
2 1/2	0.065	3.374	6.000	U	F	T	- E4-40
3	0.065	3.626	3.752	U	F	T	- E4-48
4	0.083	4.500	4.500	U	F	T	- E4-64
6	0.109	6.252	6.000	U	F	T	- E4-96

Further dimensions on request.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C

Nominal Size	Wall Thickness	Length	Length	Radius	ultron	finetron	TCC	Product Code ^B + Diameter ^C	ultron VimVar
d1	s1	l1	l3	r1	●	●	●		●
Inch		Inch			316 L				
1/4	0.035	2.626	2.063	0.563	U	F	T	- E9-04	- V
3/8	0.035	2.626	1.500	1.126	U	F	T	- E9-06	- V
1/2	0.049	3.000	1.937	1.063	U	F	T	- E9-08	- V
3/4	0.065	3.000	1.874	1.126	U	F	T	- E9-12	- V
1	0.065	3.000	1.500	1.500	U	F	T	- E9-16	- V
1 1/2	0.065	3.752	1.500	2.252	U	F	T	- E9-24	
2	0.065	4.752	1.752	3.000	U	F	T	- E9-32	
2 1/2	0.065	5.500	1.748	3.752	U	F	T	- E9-40	
3	0.065	6.252	1.752	4.500	U	F	T	- E9-48	
4	0.083	8.000	2.000	6.000	U	F	T	- E9-64	
6	0.109	11.500	2.500	9.000	U	F	T	- E9-96	

*VimVar only available for ultron.
Further dimensions on request.

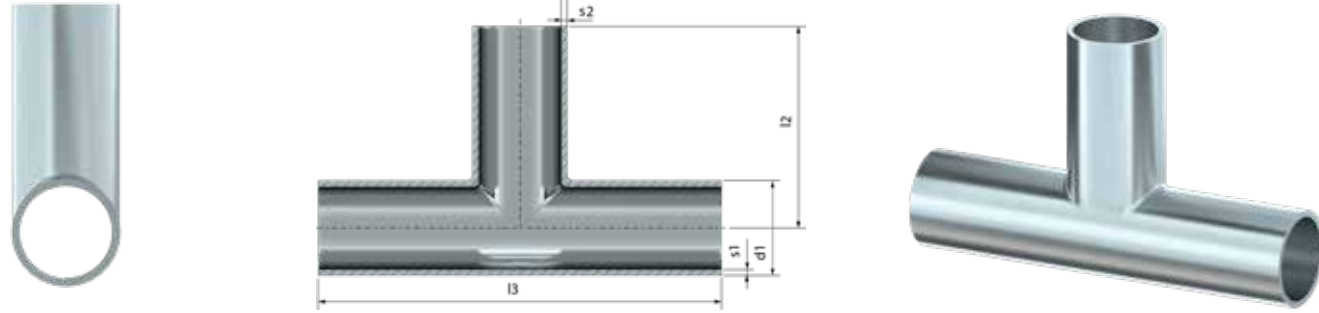
For Order Code please combine:
Quality^A - Product Code^B + Diameter^C (+ add-on for VimVar)

Alloy 22 – FOR HIGHLY-CORROSIVE MEDIA

Nominal Size	Wall Thickness	Length	Length	Radius	ultron	finetron	Product Code ^B + Diameter ^C	Alloy 22 add-on
d	s1	l1	l3	r1	●	●		
Inch		Inch						
1/4	0.035	2.626	2.063	0.563	U	F	- 04	- 22
3/8	0.035	2.626	1.500	1.126	U	F	- 06	- 22
1/2	0.049	3.000	1.937	1.063	U	F	- 08	- 22
3/4	0.065	3.000	1.874	1.126	U	F	- 12	- 22
1	0.065	3.000	1.500	1.500	U	F	- 16	- 22

Further dimensions on request.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C + 22 add-on



Imperial d1 x d2	Wall Thickness		Length		ultron	finetron	TCC	Product Code ^B + Diameter ^C	ultron VimVar
	s1	s2	l3	l2					
Inch					316L				
1/4 x 1/4	0.035	0.035	3.504	1.752	U	F	T	- TE-04	- V*
3/8 x 3/8	0.035	0.035	3.504	1.752	U	F	T	- TE-06	- V*
1/2 x 1/2	0.049	0.049	3.748	1.874	U	F	T	- TE-08	- V*
3/4 x 3/4	0.065	0.065	4.252	2.000	U	F	T	- TE-12	- V*
1 x 1	0.065	0.065	4.252	2.126	U	F	T	- TE-16	- V*
1 1/2 x 1 1/2	0.065	0.065	4.748	2.374	U	F	T	- TE-24	
2 x 2	0.065	0.065	5.748	2.874	U	F	T	- TE-32	
2 1/2 x 2 1/2	0.065	0.065	6.252	3.126	U	F	T	- TE-40	
3 x 3	0.065	0.065	6.752	3.374	U	F	T	- TE-48	
4 x 4	0.083	0.083	8.252	4.126	U	F	T	- TE-64	
6 x 6	0.109	0.109	11.252	5.626	U	F	T	- TE-96	

*VimVar only available for ultron.

Further dimensions on request.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C (+ add-on for VimVar)

Alloy 22 – FOR HIGHLY-CORROSIVE MEDIA

Nominal Size d	Wall Thickness s1	Length l1	Length l3	Radius r1	ultron	finetron	Product Code ^B + Diameter ^C	Alloy 22 add-on
1/4 x 1/4	0.035	0.035	3.504	1.752	U	F	- TE-04	- 22
3/8 x 3/8	0.035	0.035	3.504	1.752	U	F	- TE-06	- 22
1/2 x 1/2	0.049	0.049	3.748	1.874	U	F	- TE-08	- 22
3/4 x 3/4	0.065	0.065	4.252	2.000	U	F	- TE-12	- 22
1 x 1	0.065	0.065	4.252	2.126	U	F	- TE-16	- 22

Further dimensions on request.

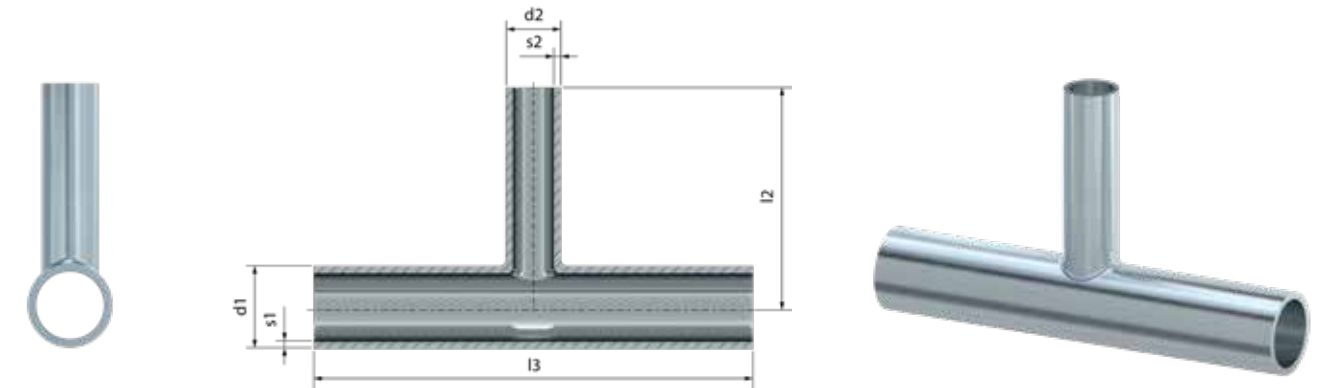
For Order Code please combine:
Quality^A - Product Code^B + Diameter^C + 22 add-on

Imperial d1 x d2	Wall Thickness		Length		ultron ●	finetron ●	TCC ●	Product Code ^B + Diameter ^C	ultron VimVar ●
	s1	s2	l3	l2					
Inch	Inch		Inch		316L				
3/8 x 1/4	0.035	0.035	3.504	1.752	U	F	T	- TR-06-04	V*
1/2 x 1/4	0.049	0.035	3.748	1.874	U	F	T	- TR-08-04	V*
1/2 x 3/8	0.049	0.035	3.748	1.874	U	F	T	- TR-08-06	V*
3/4 x 1/4	0.065	0.035	4.252	2.000	U	F	T	- TR-12-04	V*
3/4 x 3/8	0.065	0.035	4.252	2.000	U	F	T	- TR-12-06	V*
3/4 x 1/2	0.065	0.049	4.252	2.000	U	F	T	- TR-12-08	V*
1 x 1/4	0.065	0.035	4.252	2.126	U	F	T	- TR-16-04	V*
1 x 3/8	0.065	0.035	4.252	2.126	U	F	T	- TR-16-06	V*
1 x 1/2	0.065	0.049	4.252	2.126	U	F	T	- TR-16-08	V*
1 x 3/4	0.065	0.065	4.252	2.126	U	F	T	- TR-16-12	V*
1 1/2 x 1/2	0.065	0.049	4.748	2.374	U	F	T	- TR-24-08	
1 1/2 x 3/4	0.065	0.065	4.748	2.374	U	F	T	- TR-24-12	
1 1/2 x 1	0.065	0.065	4.748	2.374	U	F	T	- TR-24-16	
2 x 1/2	0.065	0.049	5.748	2.626	U	F	T	- TR-32-08	
2 x 3/4	0.065	0.065	5.748	2.626	U	F	T	- TR-32-12	
2 x 1	0.065	0.065	5.748	2.626	U	F	T	- TR-32-16	
2 x 1 1/2	0.065	0.065	5.748	2.626	U	F	T	- TR-32-24	
2 1/2 x 1/2	0.065	0.049	6.252	2.874	U	F	T	- TR-40-08	
2 1/2 x 3/4	0.065	0.065	6.252	2.874	U	F	T	- TR-40-12	
2 1/2 x 1	0.065	0.065	6.252	2.874	U	F	T	- TR-40-16	
2 1/2 x 1 1/2	0.065	0.065	6.252	2.874	U	F	T	- TR-40-24	
2 1/2 x 2	0.065	0.065	6.252	2.874	U	F	T	- TR-40-32	
3 x 1/2	0.065	0.049	6.752	3.126	U	F	T	- TR-48-08	
3 x 3/4	0.065	0.065	6.752	3.126	U	F	T	- TR-48-12	
3 x 1	0.065	0.065	6.752	3.126	U	F	T	- TR-48-16	
3 x 1 1/2	0.065	0.065	6.752	3.126	U	F	T	- TR-48-24	
3 x 2	0.065	0.065	6.752	3.126	U	F	T	- TR-48-32	
3 x 2 1/2	0.065	0.065	6.752	3.126	U	F	T	- TR-48-40	
4 x 1/2	0.083	0.049	8.252	3.626	U	F	T	- TR-64-08	
4 x 3/4	0.083	0.065	8.252	3.626	U	F	T	- TR-64-12	
4 x 1	0.083	0.065	8.252	3.626	U	F	T	- TR-64-16	
4 x 1 1/2	0.083	0.065	8.252	3.626	U	F	T	- TR-64-24	
4 x 2	0.083	0.065	8.252	3.874	U	F	T	- TR-64-32	
4 x 2 1/2	0.083	0.065	8.252	3.874	U	F	T	- TR-64-40	
4 x 3	0.083	0.065	8.252	3.874	U	F	T	- TR-64-48	
6 x 4	0.109	0.083	11.252	5.126	U	F	T	- TR-96-64	

*VimVar only available for ultron.

Further dimensions on request.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C (+ add-on for VimVar)

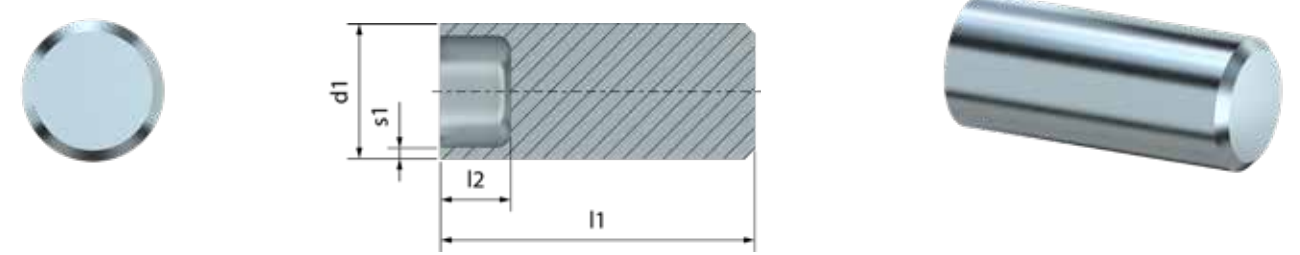
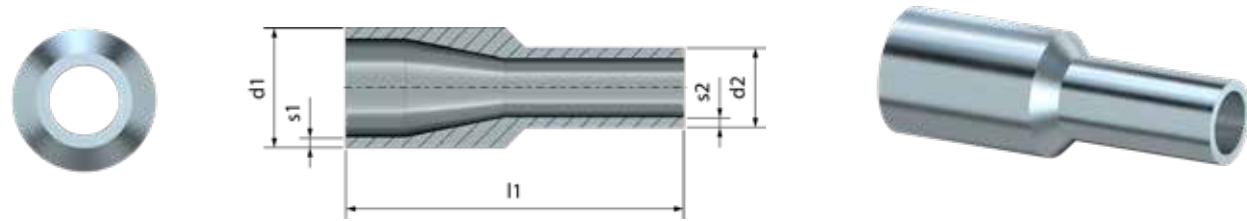


Alloy 22 – FOR HIGHLY-CORROSIVE MEDIA

Nominal Size d	Wall Thickness s1	Length l1	Length l3	Radius r1	ultron ●	finetron ●	Product Code ^B + Diameter ^C	Alloy 22 add-on
1/2 x 1/4	0.049	0.035	3.748	1.874	-	F	- TR-08-04	22
1/2 x 3/8	0.049	0.035	3.748	1.874	U	F	- TR-08-06	22
3/4 x 1/4	0.065	0.035	4.252	2.000	U	F	- TR-12-04	22
3/4 x 3/8	0.065	0.035	4.252	2.000	U	F	- TR-12-06	22
3/4 x 1/2	0.065	0.049	4.252	2.000	U	F	- TR-12-08	22
1 x 1/4	0.065	0.035	4.252	2.126	U	F	- TR-16-04	22
1 x 3/8	0.065	0.035	4.252	2.126	U	F	- TR-16-06	22
1 x 1/2	0.065	0.049	4.252	2.126	U	F	- TR-16-08	22
1 x 3/4	0.065	0.065	4.252	2.126	U	F	- TR-16-12	22

Further dimensions on request.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C + 22 add-on



Imperial				ultron	finetron	TCC	Product Code ^B + Diameter ^C	ultron VimVar
d1 x d2	s1	s2	l1					
Inch	Inch			316L				
3/8 x 1/4	0.035	0.035	1.625	U	F	T	- RC-06-04	V*
1/2 x 1/4	0.049	0.035	1.496	U	F	T	- RC-08-04	V*
1/2 x 3/8	0.049	0.035	1.496	U	F	T	- RC-08-06	V*
3/4 x 1/4	0.065	0.035	1.496	U	F	T	- RC-12-04	V*
3/4 x 3/8	0.065	0.035	2.000	U	F	T	- RC-12-06	V*
3/4 x 1/2	0.065	0.049	2.362	U	F	T	- RC-12-08	V*
1 x 1/2	0.065	0.049	2.362	U	F	T	- RC-16-08	V*
1 x 3/4	0.065	0.065	2.125	U	F	T	- RC-16-12	V*
1 1/2 x 1/2	0.065	0.049	3.150	U	F	T	- RC-24-08	
1 1/2 x 3/4	0.065	0.065	3.000	U	F	T	- RC-24-12	
1 1/2 x 1	0.065	0.065	2.500	U	F	T	- RC-24-16	
2 x 1	0.065	0.065	3.375	U	F	T	- RC-32-16	
2 x 1 1/2	0.065	0.065	2.500	U	F	T	- RC-32-24	
2 1/2 x 1	0.065	0.065	3.937	U	F	T	- RC-40-16	
2 1/2 x 1 1/2	0.065	0.065	3.375	U	F	T	- RC-40-24	
2 1/2 x 2	0.065	0.065	2.500	U	F	T	- RC-40-32	
3 x 1 1/2	0.065	0.065	4.250	U	F	T	- RC-48-24	
3 x 2	0.065	0.065	3.375	U	F	T	- RC-48-32	
3 x 2 1/2	0.065	0.065	2.625	U	F	T	- RC-48-40	
4 x 2	0.083	0.065	5.125	U	F	T	- RC-64-32	
4 x 2 1/2	0.083	0.065	4.250	U	F	T	- RC-64-40	
4 x 3	0.083	0.065	3.875	U	F	T	- RC-64-48	
6 x 3	0.109	0.065	7.250	U	F	T	- RC-96-48	
6 x 4	0.109	0.083	5.625	U	F	T	- RC-96-64	

*VimVar only available for ultron.

Further dimensions on request.

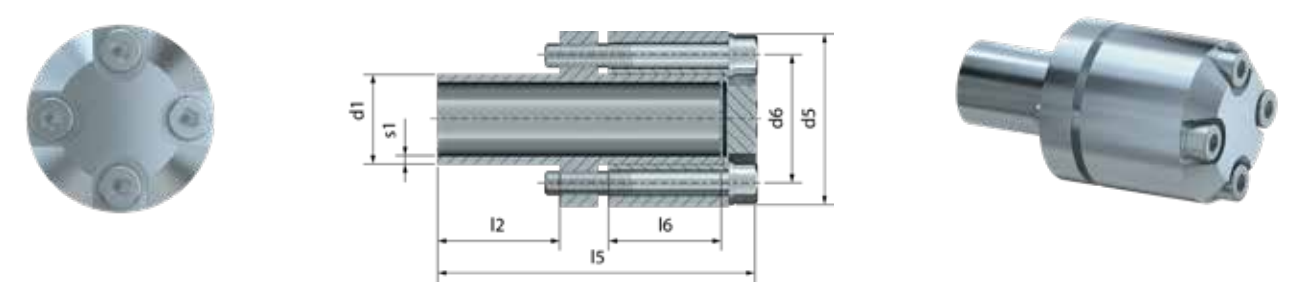
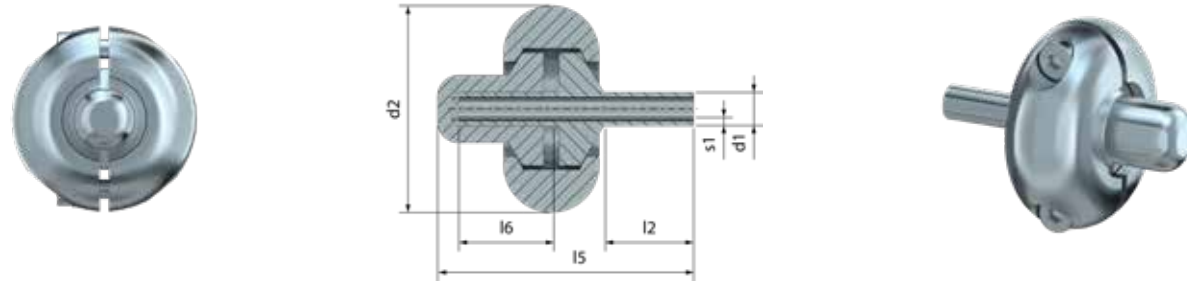
For Order Code please combine:
Quality^A - Product Code^B + Diameter^C (+ add-on for VimVar)

Imperial				ultron	finetron	TCC	Product Code ^B + Diameter ^C
d1	s1	l1	l2				
Inch	Inch	Inch		316L			
1/4	0.035	1.368	0.197	U	F	T	- WC-04
3/8	0.035	1.750	0.197	U	F	T	- WC-06
1/2	0.049	1.750	0.197	U	F	T	- WC-08
3/4	0.065	1.750	0.394	U	F	T	- WC-12
1	0.065	1.750	0.394	U	F	T	- WC-16
1 1/2	0.065	2.000	0.394	U	F	T	- WC-24
2	0.065	2.000	0.591	U	F	T	- WC-32
2 1/2	0.065	2.000	0.591	U	F	T	- WC-40
3	0.065	2.000	0.591	U	F	T	- WC-48
4*	0.083	2.500	0.886	U	F	T	- WC-64
6*	0.109	7.874*	5.906	U	F	T	- WC-96

Further Dimensions on request.

* Differing design: not machined but formed end welded to tube stub

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C



Imperial

Imperial

d1	s1	l2	l5	d5	d6	l6	ultron	Product Code ^B + Diameter ^C
Inch	Type	Inch					316L	
1/4	A	0.035	0.750	1.910	1.540	-	1.050	U - DC-04

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C

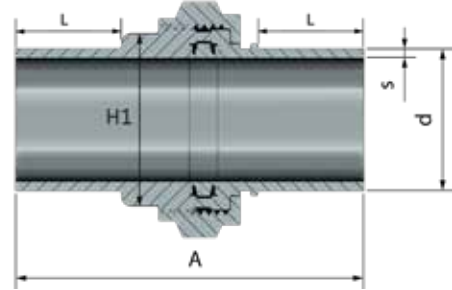
Further Dimensions on request.

d1	s1	l2	l5	d5	d6	l6	ultron	Product Code ^B + Diameter ^C
Inch	Type	Inch					316L	
1/2	B	1.020	2.620	1.070	-	1.020	1.020	U - DC-08
3/4	B	1.020	2.650	1.460	1.060	1.020	1.020	U - DC-12
1	B	1.020	2.690	1.710	1.310	1.020	1.020	U - DC-16
1 1/2	B	1.180	3.040	2.280	1.850	1.180	1.180	U - DC-24
2	B	1.770	4.300	2.780	2.350	1.770	1.770	U - DC-32
2 1/2	B	1.770	4.340	3.280	2.850	1.770	1.770	U - DC-40
3	B	1.770	4.380	3.780	3.350	1.770	1.770	U - DC-48
4	B	2.170	5.210	4.780	4.350	2.170	2.170	U - DC-64
6	B	2.170	5.290	6.780	6.350	2.170	2.170	U - DC-96

Further Dimensions on request.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C

Complete Kit



Please note: The system size for the screwed ZeroCon kit is always based on the number for the gasket and the number for the connecting nut



Dimensions	d	s	A	L	H1	H2	ultron	finetron	Product Code ^B + Diameter ^C
System	Inch		Inch				316L		
20-1	1/4	0.035	2.453	0.748	7/16"	3/4"	U	F	- Z-SK-04
40-2	3/8	0.035	2.453	0.748	9/16"	15/16"	U	F	- Z-SK-06
60-3	1/2	0.049	2.453	0.748	5/8"	1 1/16"	U	F	- Z-SK-08
90-4	3/4	0.065	2.453	0.748	7/8"	1 1/4"	U	F	- Z-SK-12
130-5	1	0.065	2.453	0.748	1 1/16"	1 1/2"	U	F	- Z-SK-16

↑ ↑ ↑
For Order Code please combine:
Quality^A - Product Code^B + Diameter^C

Gaskets	Tube (d)	ultron	finetron	Product Code ^B + Diameter ^C
System	Inch	316L		
20	1/4	U	F	- Z-SR-04
40	3/8	U	F	- Z-SR-06
60	1/2	U	F	- Z-SR-08
90	3/4	U	F	- Z-SR-12
130	1	U	F	- Z-SR-16

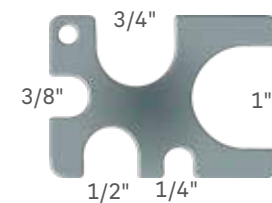
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For Order Code please combine:
Quality^A - Product Code^B + Diameter^C

The ZeroCon Kit consists of:

- Pressure joint (1x)
- Screw joint (1x)
- Metal gasket (1x)
- Nut (1x)
- Assembly instruction

The ZeroCon Disassembly Tool

Order Code: Z-SDT

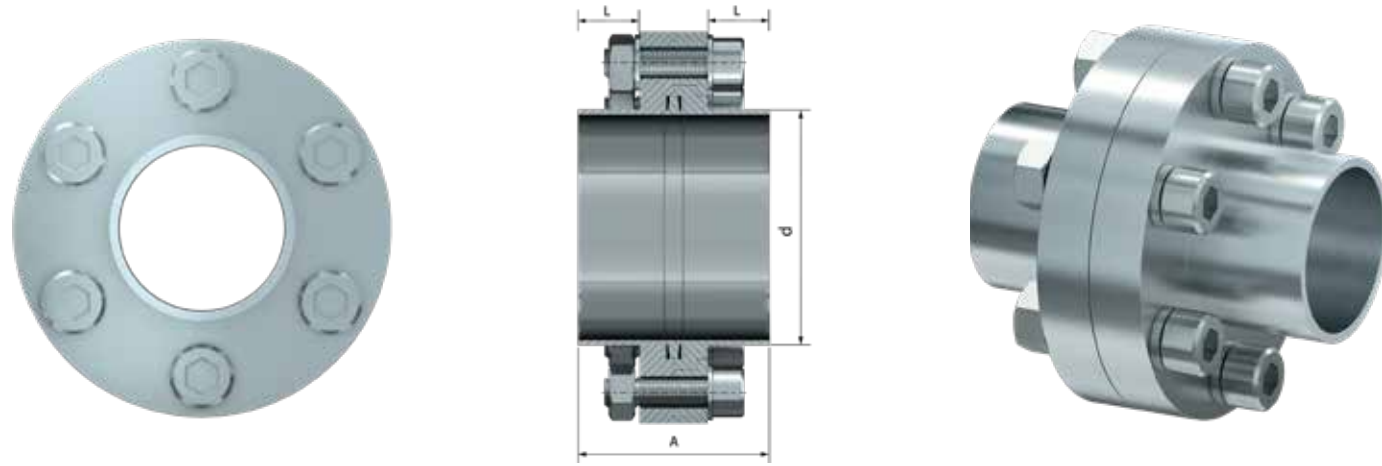


Please follow the assembly instructions for the correct use of the tool. The instruction is part of the ZeroCon kit.

Nuts	Tube (d)	Nut (d)	finetron	Product Code ^B + Diameter ^C
System	Inch	Inch	316L	
1	1/4	6.350	F	- Z-N-04
2	3/8	9.530	F	- Z-N-06
3	1/2	12.700	F	- Z-N-08
4	3/4	19.050	F	- Z-N-12
5	1	25.400	F	- Z-N-16

↑ ↑
For Order Code please combine:
Quality^A - Product Code^B + Diameter^C

Complete Kit



d	Dimensions			Wrench Size			ultron	finetron	Product Code ^B + Diameter ^C
	s	A	L	Screw Set	H1	H2			
Inch							316L		
1	0.065	2.283	0.787	1F	10 (3/8")	5 (3/16")	U	F	Z-FK-16
1 1/2	0.065	2.441	0.787	2F	13 (1/2")	6 (7/32")	U	F	Z-FK-24
2	0.065	2.441	0.787	2F	13 (1/2")	6 (7/32")	U	F	Z-FK-32
3	0.065	2.441	0.787	3F	16 (5/8")	8 (5/16")	U	F	Z-FK-48
4	0.083	2.441	0.787	4F	16 (5/8")	8 (5/16")	U	F	Z-FK-64

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C

The ZeroCon Kit consists of:

- Fixed flange (1x)
- Rotatable flange (1x)
- Metal gasket (1x)
- Screw set (1x)
- Assembly instruction

Please follow the assembly instructions for the correct use of the tool. The instruction is part of the ZeroCon kit.



Disassembly Tool	Dimensions of Screws	Order Code
System	Bolt / mm	
1F	M6 x 30	Z-FDT-M6
2F	M8 x 35	Z-FDT-M8
3F	M10 x 35	Z-FDT-M10
4F	M10 x 35	Z-FDT-M10

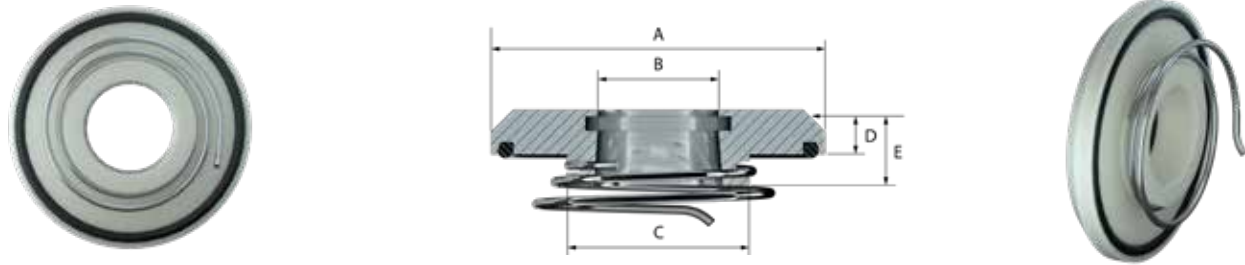


Inch	Gaskets	ultron	finetron	Product Code ^B + Diameter ^C
Inch		316L		
1		U	F	Z-SR-16
1 1/2		U	F	Z-SR-24
2		U	F	Z-SR-32
3"		U	F	Z-SR-48
4"		U	F	Z-SR-64

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C

Screw Set	Dimensions of Screws		Amount of Screws	Lock washer	finetron	Product Code ^B + Diameter ^C
	System	Bolt / mm				
					316L	
1F	M6 x 30	M6 x 1	6	SWS-M6	F	Z-SN-M6
2F	M8 x 35	M8 x 1	8	SWS-M8	F	Z-SN-M8
3F	M10 x 35	M10 x 1	8	SWS-M10	F	Z-SN-M10-8
4F	M10 x 35	M10 x 1	10	SWS-M10	F	Z-SN-M10-10

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C



Imperial

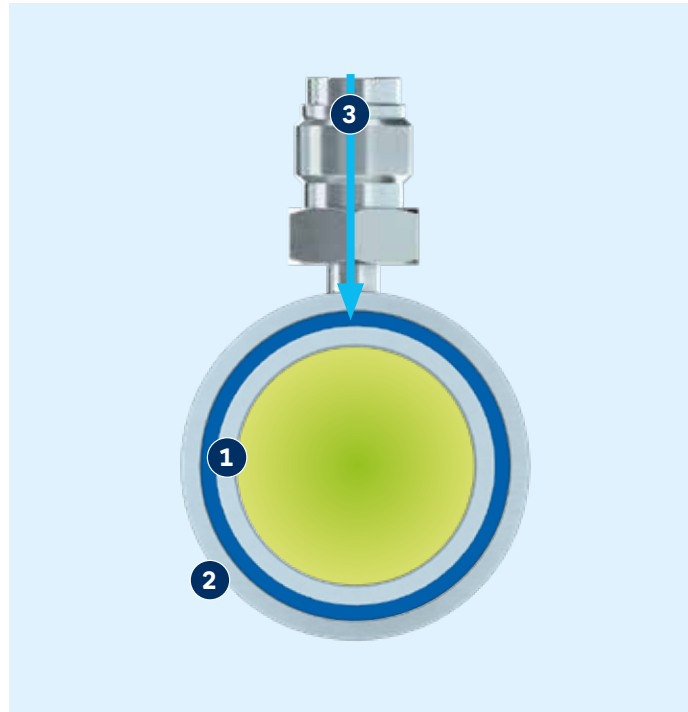
Clean Shut Dimensions

Tube Dimensions	Cover width	Tube Feedthrough	Wall Feedthrough	Thickness	Length	Order Code
	Ø A	Ø B	Ø C	D	E	
Inch	Inch					
1/2	2.520	0.508	1.339	0.394	0.709	WFT - 08 - PV
3/4	2.953	0.758	1.772	0.394	0.709	WFT - 12 - PV
1	2.953	1.008	1.772	0.394	0.709	WFT - 16 - PV
1 1/2	4.134	1.508	2.953	0.394	0.787	WFT - 24 - PV
2	4.134	2.008	2.953	0.394	0.787	WFT - 32 - PV
2 1/2	5.433	2.508	4.252	0.394	0.866	WFT - 40 - PV
3	5.433	3.008	4.252	0.394	0.866	WFT - 48 - PV
4	5.866	4.008	5.000	0.394	0.866	WFT - 64 - PV

Further dimensions on request.

COAX – The Coaxial Tube System

COAX double wall tube system is a safe solution for transport of explosive, toxic, corrosive, or highly viscous media. COAX tubes and fittings consist of an inner process tube and an outer safety tube. Spacers on the inside ensure safe flow.



Design of the COAX Tube System

- 1 Inner process tube (ultron or TCC)**
For explosive, toxic, aggressive or highly viscous media.
- 2 Outer safety tube (TCC)**
For safety or accumulation as well as for temperature-controlled media for heating or cooling.
- 3 VCR® connector**
The interface of the VCR® connection enables sensory measurements.

VCR® is a registered trademark of Swagelok Company

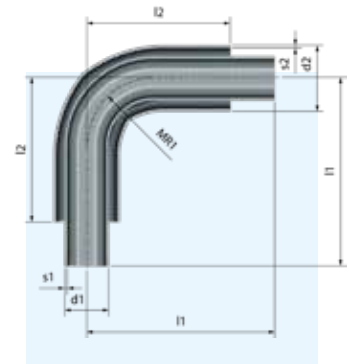
Coaxial 45° Elbow

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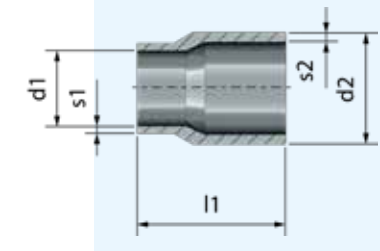
Coaxial 90° Elbow

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Coaxial Weld Sleeve

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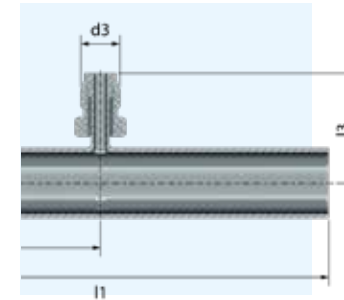


Coaxial Terminator

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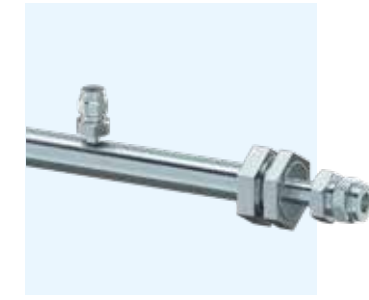
Coaxial Purge Tee

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Coaxial Bulkhead Purge Tees

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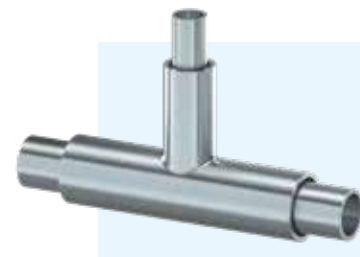
Coaxial Tubing

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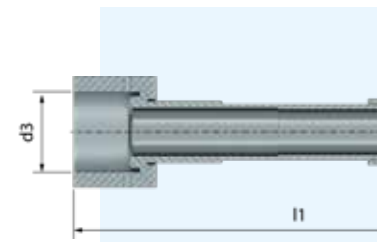
Coaxial Tee / Reducing Tee

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Coaxial VCR® Female Gland

Page 46



Coaxial VCR® Male Gland

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ALLOY 22 – FOR HIGHLY-CORROSIVE MEDIA

Imperial

Inner Tube		Outer Tube		ultron	Product Code ^B + Diameter ^C	ultron VimVar
d1	s1	d2	s2			
Inch				316L		
1/4	0.035	1/2	0.049	U	CO-04	V*
3/8	0.035	5/8	0.049	U	CO-06	V*
1/2	0.049	3/4	0.065	U	CO-08	V*
3/4	0.065	1	0.065	U	CO-12	V*
1	0.065	1 1/2	0.065	U	CO-16	V*

¹⁾²⁾ Inner tube always 316L (ep), outer tube 316L or 304L (bf).

Coaxial tube represented using inner tube Dimensions.

*VimVar only available for ultron.

Further Dimensions on request.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C (+ add-on for VimVar)

Imperial

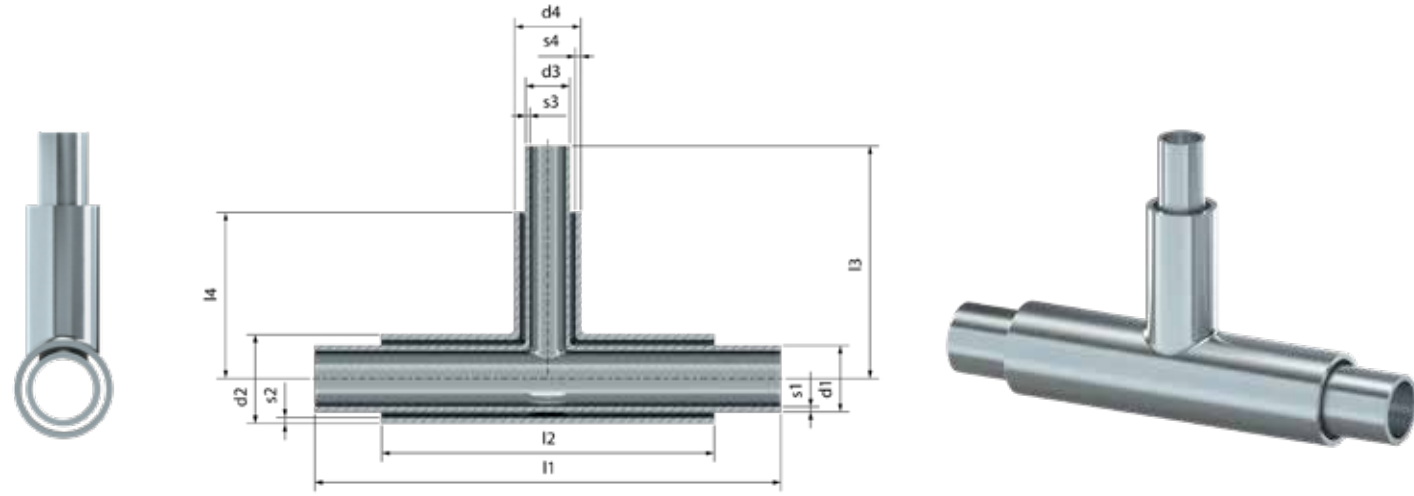
Inner Tube		Outer Tube		ultron	finetron	Product Code ^B + Diameter ^C	Alloy 22 add-on
d1	s1	d2	s2				
Inch							
1/4	0.035	1/2	0.049	U	F	CO-04	22
3/8	0.035	5/8	0.049	U	F	CO-06	22
1/2	0.049	3/4	0.065	U	F	CO-08	22
3/4	0.065	1	0.065	U	F	CO-12	22
1	0.065	1 1/2	0.065	U	F	CO-16	22

¹⁾²⁾ Inner tube alloy 22, outer tube 316L or 304L (bf).

Coaxial tube represented using inner tube Dimensions.

Further Dimensions on request.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C + add-on for 22



**ALLOY 22
FOR HIGHLY-CORROSIVE MEDIA**

Dimension details see below

Imperial

Inch		ultron	finetron	Product Code ^B + Diameter ^C	Alloy 22 add-on
1/4	x 1/4	U	F	CTE-04	22
3/8	x 3/8	U	F	CTE-06	22
1/2	x 1/2	U	F	CTE-08	22
3/4	x 3/4	U	F	CTE-12	22
1	x 1	U	F	CTE-16	22

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C + add-on for 22

Imperial

Inner Tube

Outer Tube

Main Tube

Branch

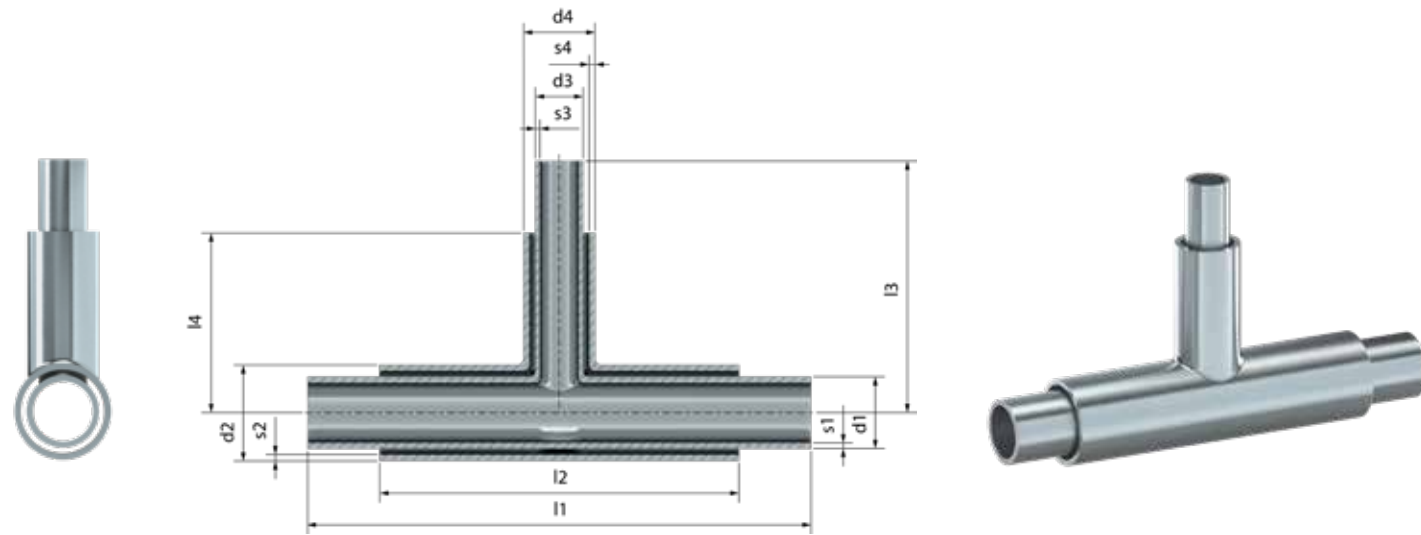
Inch	Inner Tube		Outer Tube		Main Tube		Branch		ultron	Product Code ^B + Diameter ^C	ultron VimVar
	Main Tube	Branch	Main Tube	Branch	Inner Tube	Outer Tube	Outer Tube	Inner Tube			
	d1	s1	d3	s3	d2	s2	d4	s4			
1/4 x 1/4	0.250	0.035	0.250	0.035	0.500	0.049	0.500	0.049		CTE-04	V*
3/8 x 3/8	0.375	0.035	0.375	0.035	0.625	0.049	0.625	0.049		CTE-06	V*
1/2 x 1/2	0.500	0.049	0.500	0.049	0.750	0.065	0.750	0.065		CTE-08	V*
3/4 x 3/4	0.750	0.065	0.750	0.065	1.000	0.065	1.000	0.065		CTE-12	V*
1 x 1	1.000	0.065	1.000	0.065	1.500	0.065	1.500	0.065		CTE-16	V*

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C (+ add-on for VimVar)

Coaxial tube represented using inner tube Dimensions.
Standard is inner tube ultron, outer tube TCC.

*VimVar only available for ultron.

Further Dimensions on request.



**ALLOY 22
FOR HIGHLY-CORROSIVE MEDIA**

Dimension details see below

Imperial	ultron	finetron	Product Code ^B + Diameter ^C	Alloy 22 add-on
3/8 x 1/4	U	F	CTR-06-04	22
1/2 x 1/4	U	F	CTR-08-04	22
1/2 x 3/8	U	F	CTR-08-06	22
3/4 x 1/4	U	F	CTR-12-04	22
3/4 x 3/8	U	F	CTR-12-06	22
3/4 x 1/2	U	F	CTR-12-08	22
1 x 1/4	U	F	CTR-16-04	22
1 x 3/8	U	F	CTR-16-06	22
1 x 1/2	U	F	CTR-16-08	22
1 x 3/4	U	F	CTR-16-12	22

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C + add-on for 22

Imperial	Inner Tube				Outer Tube				Main Tube		Branch	
	Main Tube		Branch		Main Tube		Branch		Inner Tube	Outer Tube	Outer Tube	Inner Tube
	d1	s1	d3	s3	d2	s2	d4	s4	l1	l2	l3	l4
Inch	Inch											
3/8 x 1/4	0.375	0.035	0.250	0.035	0.625	0.049	0.500	0.049	5.000	3.500	2.500	1.750
1/2 x 1/4	0.500	0.049	0.250	0.049	0.750	0.065	0.500	0.049	5.250	3.750	2.625	1.875
1/2 x 3/8	0.500	0.049	0.375	0.049	0.750	0.065	0.625	0.049	5.250	3.750	2.625	1.875
3/4 x 1/4	0.750	0.065	0.250	0.065	1.000	0.065	0.500	0.049	5.250	3.750	2.625	1.875
3/4 x 3/8	0.750	0.065	0.375	0.065	1.000	0.065	0.625	0.049	5.250	3.750	2.625	1.875
3/4 x 1/2	0.750	0.065	0.500	0.065	1.000	0.065	0.750	0.065	5.250	3.750	2.625	1.875
1 x 1/4	1.000	0.065	0.250	0.065	1.500	0.065	0.500	0.049	6.250	4.250	3.125	2.125
1 x 3/8	1.000	0.065	0.375	0.065	1.500	0.065	0.625	0.049	6.250	4.250	3.125	2.125
1 x 1/2	1.000	0.065	0.500	0.065	1.500	0.065	0.750	0.065	6.250	4.250	3.125	2.125
1 x 3/4	1.000	0.065	0.750	0.065	1.500	0.065	1.000	0.065	6.250	4.250	3.125	2.125

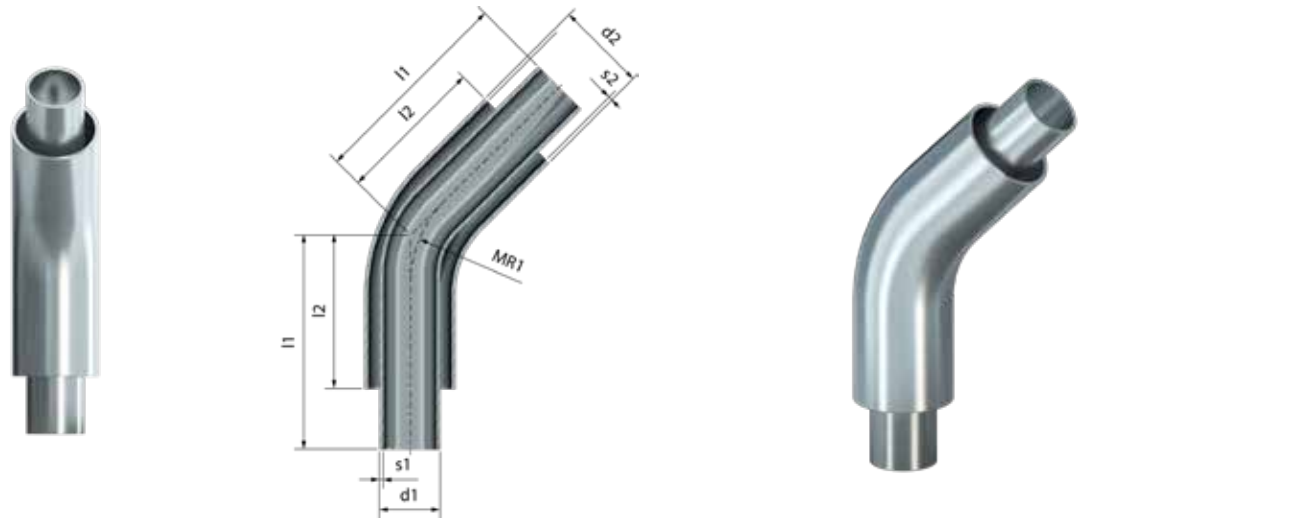
ultron	Product Code ^B + Diameter ^C	ultron VimVar
316L		
U	CTR-06-04	V*
U	CTR-08-04	V*
U	CTR-08-06	V*
U	CTR-12-04	V*
U	CTR-12-06	V*
U	CTR-12-08	V*
U	CTR-16-04	V*
U	CTR-16-06	V*
U	CTR-16-08	V*
U	CTR-16-12	V*

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C (+ add-on for VimVar)

Coaxial tube represented using inner tube Dimensions.
Standard is inner tube ultron, outer tube TCC.

*VimVar only available for ultron.

Further Dimensions on request.



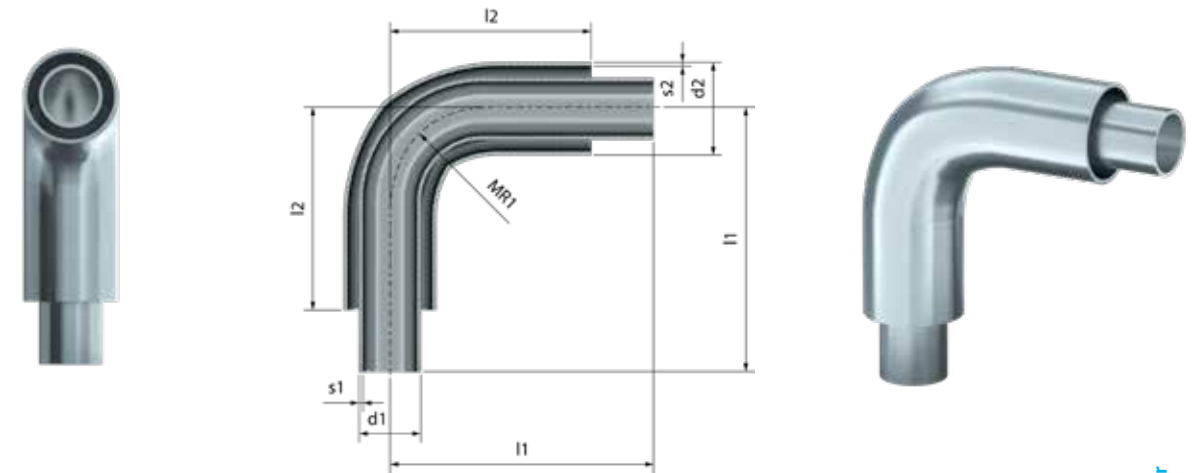
Imperial

Inner Tube		Dimensions				Radius	ultron	Product Code ^B + Diameter ^C		
d1	s1	l1	d2	s2	l2	MR1				
Inch		Inch				Inch	316 L			
1/4	0.035	3.876	0.500	0.049	3.126	1.500	U	-	CE4-04	bent
3/8	0.035	3.876	0.625	0.049	3.126	2.244	U	-	CE4-06	bent
1/2	0.049	4.302	0.750	0.065	3.552	3.346	U	-	CE4-08	bent
3/4	0.065	5.339	1.000	0.065	4.339	3.346	U	-	CE4-12	bent
1	0.065	3.500	1.500	0.065	2.500	1.500	U	-	CE4-16	welded

Coaxial tube represented using inner tube Dimensions. Standard is inner tube UL, outer tube TC.

Further Dimensions and qualities on request.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C



Imperial

Inner Tube		Dimensions				Radius	ultron	Product Code ^B + Diameter ^C	ultron VimVar			
d1	s1	l1	d2	s2	l2	MR1						
Inch		Inch				Inch	316 L					
1/4	0.035	4.752	0.500	0.049	4.002	1.500	U	-	CE9-04	-	V*	bent
3/8	0.035	5.146	0.625	0.049	4.396	2.244	U	-	CE9-06	-	V*	bent
1/2	0.049	7.260	0.750	0.065	6.510	3.346	U	-	CE9-08	-	V*	bent
3/4	0.065	7.510	1.000	0.065	6.510	3.346	U	-	CE9-12	-	V*	bent
1	0.065	4.251	1.500	0.065	3.251	1.500	U	-	CE9-16	-	V*	welded

Coaxial tube represented using inner tube Dimensions. Standard is inner tube UL, outer tube TC.

*VimVar only available for ultron.

Further Dimensions on request.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C (+ add-on for VimVar)

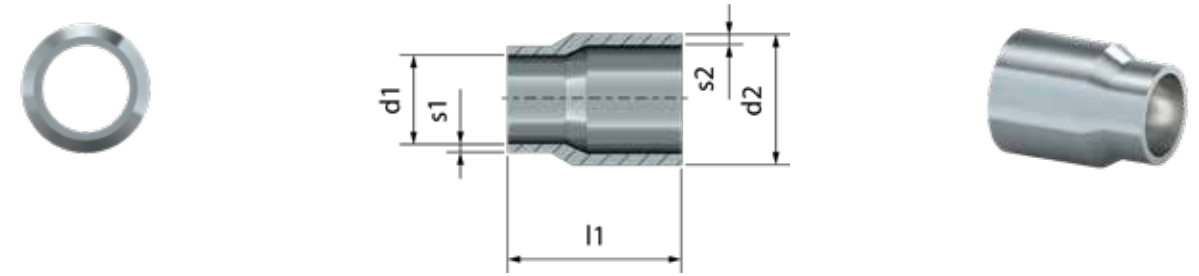
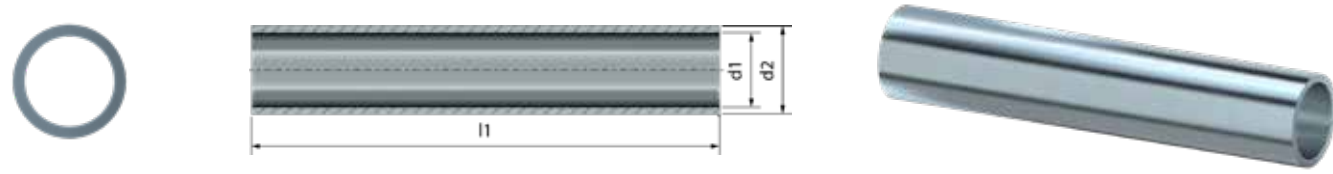
ALLOY 22
FOR HIGHLY-CORROSIVE MEDIA

Dimension details see above

Imperial

Inch	ultron	finetron	Product Code ^B + Diameter ^C		Alloy 22 add-on	
			316 L			
1/4	U	F	-	CE9-04	-	22
3/8	U	F	-	CE9-06	-	22
1/2	U	F	-	CE9-08	-	22
3/4	U	F	-	CE9-12	-	22
1	U	F	-	CE9-16	-	22

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C + add-on for 22



Imperial	For outer tube d	Sleeve			TCC	Product Code ^B + Diameter ^C	
		d1	d2	l1			
Inch	Inch	Inch	Inch	Inch			
1/4	1/2	0.508	0.625	4.000	T	-	CS-04
3/8	5/8	0.634	0.750	4.000	T	-	CS-06
1/2	3/4	0.760	0.875	4.000	T	-	CS-08
3/4	1	1.008	1.181	4.000	T	-	CS-12
1	1 1/2	1.512	1.669	4.000	T	-	CS-16

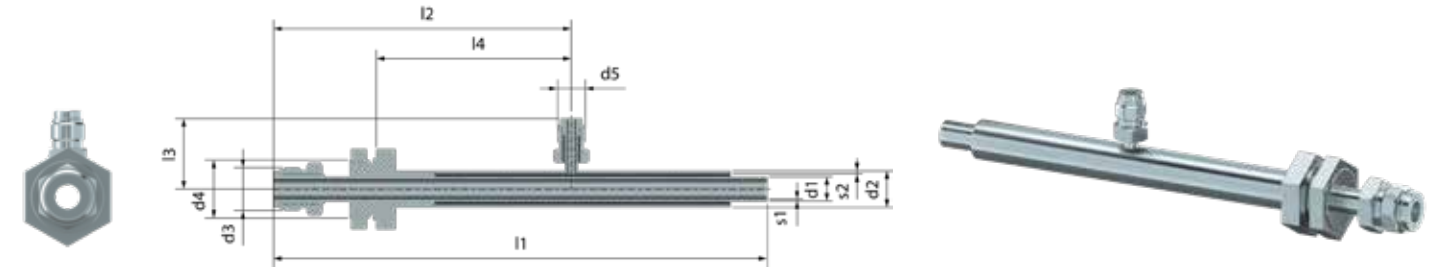
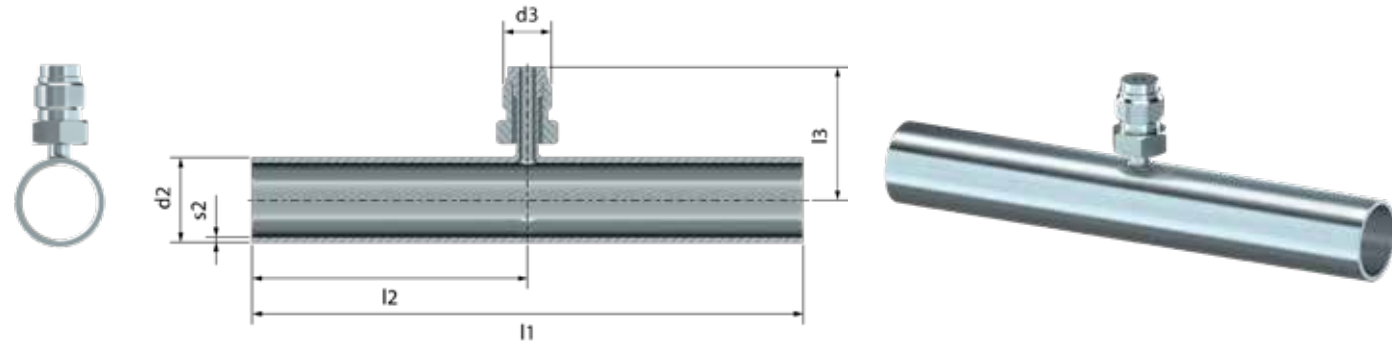
Further Dimensions on request.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C

Imperial	Terminator			TCC	Product Code ^B + Diameter ^C	
	d1	d2	l1			
Inch	Inch	Inch	Inch			
1/4	0.250	0.500	1.000	T	-	CTM-04
3/8	0.375	0.625	1.000	T	-	CTM-06
1/2	0.500	0.750	1.000	T	-	CTM-08
3/4	0.750	1.000	1.250	T	-	CTM-12
1	1.000	1.500	1.250	T	-	CTM-16

Further Dimensions on request.

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C



For outer tube	Nominal Size			Length			VCR®	TCC	Product Code ^B + Diameter ^C
	d	d2	s2	l1	l2	l3			
	Inch			Inch			Inch		
1/4"	0.500	0.049		5.748	2.874	1.311	1/4	T	- CPT-04
3/8"	0.625	0.049		6.000	3.000	1.370	1/4	T	- CPT-06
1/2"	0.750	0.065		6.000	3.000	1.433	1/4	T	- CPT-08
3/4"	1.000	0.065		6.500	3.250	1.559	1/4	T	- CPT-12
1"	1.500	0.065		6.500	3.250	1.805	1/4	T	- CPT-16

Further Dimensions on request.

*VCR® is a registered trademark of Swagelok Company

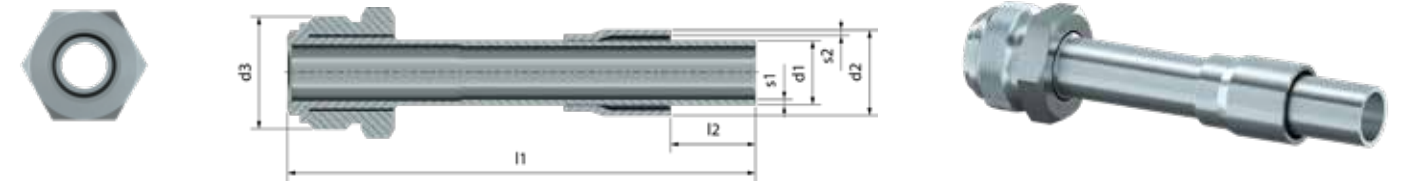
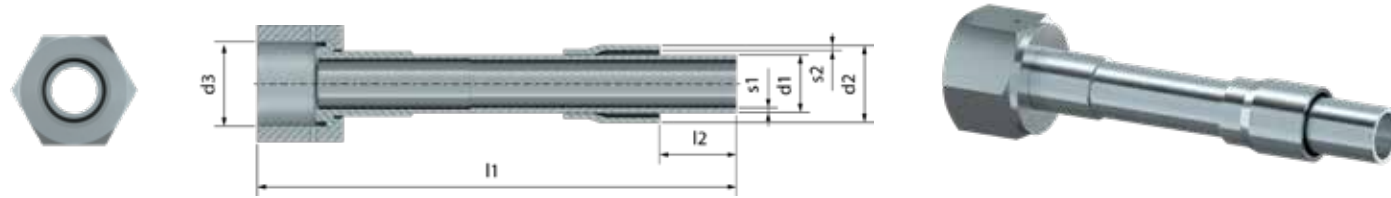
For Order Code please combine:
Quality^A - Product Code^B + Diameter^C

Nominal Size				Length				Main tube	Branch		Straight thread	ultron	Product Code ^B + Diameter ^C
d1	s1	d2	s2	l1	l2	l3	l4	VCR® Size	VCR® Tube Size	VCR® Size	Size		
											Wall aperture	316 L	
1/4	0.035	0.500	0.049	9.563	5.689	1.305	2.165	1/4	1/4	1/4	M20 x 1.5	U	- CBP-04
3/8	0.035	0.625	0.049	10.087	6.087	1.370	2.102	1/4	1/4	1/4	M30 x 2	U	- CBP-06
1/2	0.049	0.750	0.065	10.087	6.087	1.433	2.102	1/4	1/4	1/4	M30 x 2	U	- CBP-08

Further Dimensions on request.

*VCR® is a registered trademark of Swagelok Company

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C



d1	s1	d2	s2	l1	l2	VCR® Size	ultron	Product Code ^B + Diameter ^C
Inch						Inch	316 L	
1/4	0.035	0.500	0.049	3.500	0.750	1/4	U	- CFG-04
3/8	0.035	0.625	0.049	3.500	0.750	1/2	U	- CFG-06
1/2	0.049	0.750	0.065	3.500	0.750	1/2	U	- CFG-08
3/4	0.065	1.000	0.065	5.500	1.000	3/4	U	- CFG-12
1	0.065	1.500	0.065	5.500	1.000	1	U	- CFG-16

d1	s1	d2	s2	l1	l2	VCR® Size	ultron	Product Code ^B + Diameter ^C
Inch						Inch	316 L	
1/4	0.035	0.500	0.049	3.500	0.750	1/4	U	- CMG-04
3/8	0.035	0.625	0.049	3.500	0.750	1/2	U	- CMG-06
1/2	0.049	0.750	0.065	3.500	0.750	1/2	U	- CMG-08
3/4	0.065	1.000	0.065	5.500	1.000	3/4	U	- CMG-12
1	0.065	1.500	0.065	5.500	1.000	1	U	- CMG-16

Further Dimensions on request.

*VCR® is a registered trademark of Swagelok Company

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C

Further Dimensions on request.

*VCR® is a registered trademark of Swagelok Company

For Order Code please combine:
Quality^A - Product Code^B + Diameter^C

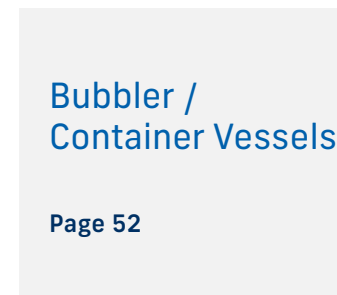
Optimized designs, the purest surfaces, perfected welds

When it comes to implementing complex components and systems Dockweiler is your manufacturing specialist. Maximizing productivity is the primary goal. This requires a highly reliable and efficient solution. The focus here is on low dead space and surface optimization.



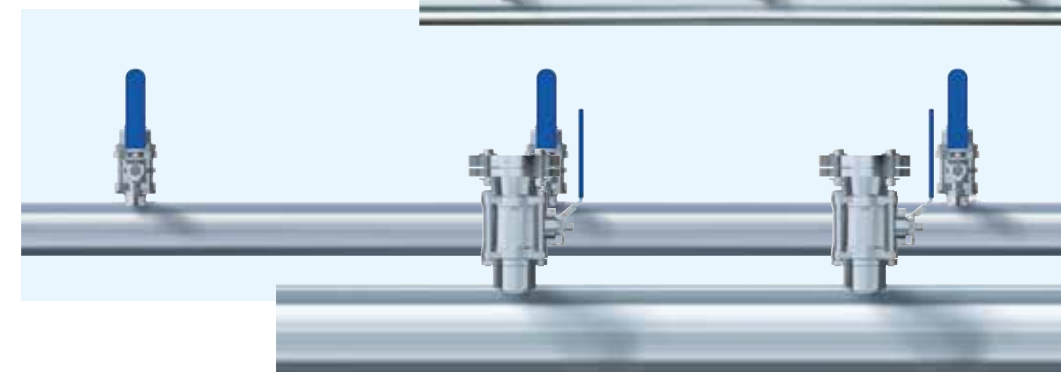
Flextron
Corrugated
Hoses

Page 50



Bubbler /
Container Vessels

Page 52



Prefabricated
Laterals

Page 54

FLEXTRON – THE “FLEXIBLE” STAINLESS STEEL TUBE

Flextron is manufactured from mechanically corrugated stainless steel (1.4404), as standard. An additional braid of stainless steel wire ensures a higher pressure resistance and protects the hose from damage. The unique combination of an electropolished surface and a flexible corrugated hose minimizes the risk of contamination and enables gas transport under full UHP conditions throughout the system. With Flextron, oscillations and vibrations can be decoupled and done to the highest purity standards.



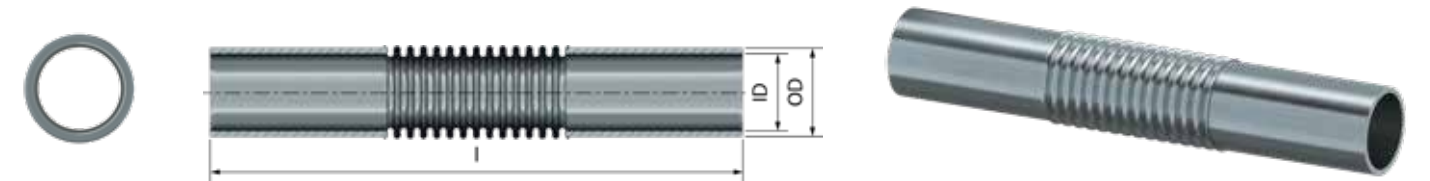
Flextron DN6 with VCR® connection



Flextron DN6 with optional wire braiding and welding ends



Flextron DN8 with ZeroCon connection



Features	Variants
Material	1.4404 UNS S31603 (316L)
System lengths (including welding ends)	6", 12", 24" and 36" (up to 60" on request)
Hose diameter	DN 6, DN 10 and DN 20
Hose couplings	1/4", 3/8", 1/2", 3/4", 1"
Surface treatment	Electropolished $Ra_{avg} \leq 24 \mu\text{in}$ (0.60 μm) i/d Surface Valley $Ra_{avg} \leq 16 \mu\text{in}$ (0.40 μm) i/d Surface Peak
Connections	Welding ends VCR® ZeroCon KF- / CF flanges and others on request
Wire braiding (optional)	1.4301 UNS S30403 (304L)

VCR® is a registered trademark of Swagelok Company

Imperial	Type	OD / AD	ID	Minimum Bending radius static ¹	Bending radius dynamic ¹	Pressure rating ¹	Weight	ultron
Inch			Inch			[psig]	[lb/ft]	
1/4	not braided	0.4	0.2	1	5.5	261	0.08	U
	braided	0.5	0.2	1	5.5	1,160	0.16	U
3/8	not braided	0.4	0.2	1	5.5	261	0.08	U
	braided	0.5	0.2	1	5.5	1,160	0.16	U
1/2	not braided	0.56	0.4	1.5	7.5	116	0.07	U
	braided	0.6	0.4	1.5	7.5	1,160	0.16	U
3/4	not braided	1	0.8	2.8	11.2	44	0.18	U
	braided	1.1	0.8	2.8	11.2	653	0.33	U
1	not braided	1	0.8	2.8	11.22	44	0.18	U
	braided	1.1	0.8	2.8	11.22	653	0.33	U

¹ Tested according ISO 10380 at room Temperature (20°C)

PROCESS VESSELS (BUBBLER) FOR ORGANOMETALLIC COMPOUNDS

Dockweiler process vessels guarantee safety when feeding ultra-pure media to critical manufacturing steps such as metal organic vapor phase epitaxy (MOVPE). In addition they offer a plus in safety due to their absolute tightness (helium leakage rate $\leq 4.0 \times 10^{-9}$ mbar l s⁻¹) and robust design.

HPL SERIES

The Dockweiler HPL series stands out from the competition by offering the most efficient utilization of the medium (e.g. trimethylgallium/TMG).

Electropolishable orbital welding seams, optimal vessel size and shape and the elimination of dead space ensure the highest level of saturation of the carrier gas.

HPS SERIES

With the patented HPS solids bubbler, Dockweiler has developed a completely new bubbler design.

To ensure continuous saturation of the carrier gas with the filling medium, the HPS bubbler has a patented chamber system through which the flow of carrier gas is channeled.

ECO SERIES

The Dockweiler ECO series offers a variant of the HPL bubbler designed for the evaporation of liquids.

Dockweiler has systematically standardized the components used to offer an inexpensive alternative to the HPL bubbler.



OPTIONS

Dockweiler's HPL and HPS series bubblers can be customized with a wide range of options to create the ideal match for your application.

Valves **1**

We use Ham-Let 90° monolever rotating diaphragm valves as standard for our bubblers. Valves from the following manufacturers are also optionally available: Swagelok, Carten Controls, Parker and other valves on request.

Crossover Function **2**

The crossover function is a purging option with no dead space for eliminating oxygen from the system (including the inlet and outlet valves) during filling on the chemical manufacturer's premises or while the bubbler is connected to a process. It thus offers a simple, efficient solution for cleaning the gas path.



Level Sensor **3**

The level sensor is a signal generator that, together with a fill level indicator, reliably displays the residual amount of organometallic compound in the bubbler. Dockweiler offers an ultrasonic sensor for the bubbler, featuring specified switching points (90%, 70%, 30%, 10%) for signaling the fill level.

Polarized Connectors **4**

The standard design features male face seal for both connectors. To prevent confusion when connecting, Dockweiler offers male and female connectors.

TECHNICAL DATA

Application Areas

HPL and ECO series for Fluids
HPS for Solids

Volumes

from 0,053 to 14,794 gal US
(200 ml to 56 l)

Materials

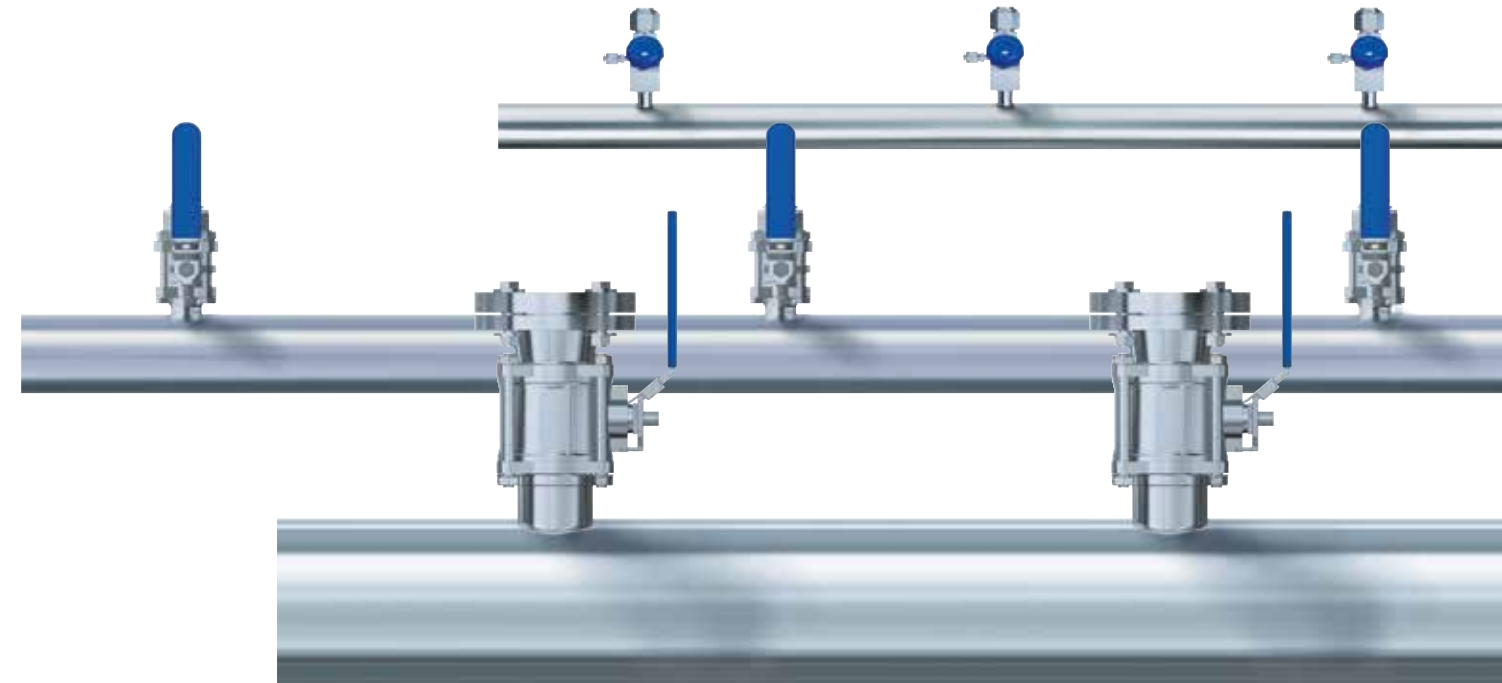
1.4404, 1.4435, UNS S31603 (316L),
UNS N08367 (AL-6XN),
UNS N08904 (904L), UNS N06022 (Alloy 22)

Surface Options

- $Ra_{avg} \leq 16 \mu\text{m}$ and $Ra_{avg} \leq 10 \mu\text{m}$ for electropolished version
- bright finished, anodically cleaned, electropolished

PREFABRICATED LATERALS

Manifolds for utility lines are designed to simplify UHP, CFOS and PCW installations. UHP Manifolds are necked out and then welded, tested and packaged in an ISO 4 / Class 10 cleanroom. The use of prefabricated manifolds reduces the overall installation and acceptance process of the system through faster purge time and reduced particle count.



LATERAL

Maximum length
 24 ft. / 7.3 m

Welding
 • SEMI F78-0611
 • SEMI F81-0611

Tests / Documentation
 Leak test:
 100% Helium Leak Tested to 1×10^{-9} scc/sec

Weld Logs
 Material Certifications

TUBE

Material
 UNS S31603 (316L) / 1.4404 / 1.4435

Dimensions
 1/2" up to 6" Further Dimensions on request

Inner surface options

- **ultron:** Ra_{max} 10 μ m
 others on request
- **TCC:** Ra_{max} 30 μ m

VALVES

Type
 Ball valves, diaphragm valve or equivalent valves.
 Multiple configurations available.

Dimensions
 1/4" up to 1"

Handle color
 White (standard); color handles are available

Air operated valves available upon request



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97035, USA

✉ sales.us@dockweiler.com

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