KAESER COMPRESSORS

Built for a lifetime.™

SmartPipe™

Product Catalog and Installation Guide

kaeser.com

SmartPipe™

Compressed Air Piping

Piping selection directly affects the three key elements of every compressed air system: flow, pressure, and air quality. Poor choices in pipe materials, diameter, and layout cause flow restrictions, often resulting in significant pressure drop. Pressure drop is a main cause of increased energy consumption and under-performing tools and equipment.

Choices in piping also directly impact installation costs. Heavier materials increase fatigue and slow work, especially in overhead installations. Also consider the types of fittings to be used. Some connection types cause pressure drop, need special tools, and take more time to install.

SmartPipe™ System Benefits

Kaeser's SmartPipe is a modular compressed air distribution system that offers both lower installation costs and lower long term operating costs.

It is an excellent choice for compressed air and inert gas distribution for pressures up to 188 psig (13 bar) (consult factory for higher pressures) in temperatures from -4°F to +140°F (-20°C to 60°C). SmartPipe is also ideal for vacuum up to 98.7% (29.6" Hg).

What's so smart about SmartPipe?

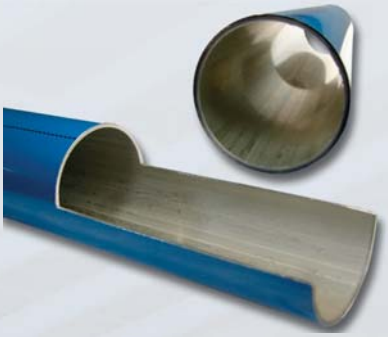
Ease of Installation

Fast to install and easy to modify, Kaeser SmartPipe is the most versatile compressed air distribution system available. Our combination of lightweight materials and connectors dramatically reduces labor and installation time, especially in overhead installations.

Optimum flow and air quality

SmartPipe's smooth calibrated aluminum construction has a low coefficient of friction, providing the best possible laminar flow. Full bore fittings further minimize pressure drop for optimum flow and energy efficiency. Leak free connectors prevent air loss and wasted energy.

SmartPipe is ideal for installations requiring the highest quality air, because it is aluminum it will not rust or corrode. Further, it has no rough surfaces or interior restrictions that accumulate contaminants. The smooth interior with full bore design allows laminar flow to your dryers and filters for efficient removal.



Cutaway of 5 year old SmartPipe. Inside remains smooth and clean with no contaminant build up to cause pressure loss.

Contents

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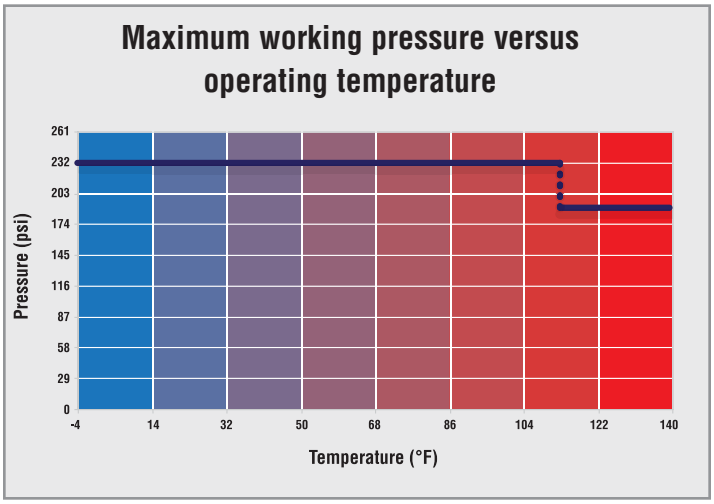
Technical Specifications

SmartPipe is designed for use with compressed air, vacuum, and inert gases. Please consult factory for use with other fluids.

Pressure and Temperature Ranges

- Normal working pressure and temperature: 188 psi, -4°F to ±140°F
- Maximum operating pressure and temperature: 232 psi, -4°F to ±115°F
- Storage temperature: -40°F to +176°F
- Max vacuum: 98.7% (29.6” Hg)
- Consult factory for higher pressures or temperatures



Aluminum Pipe Specification

- 6063-T5 aluminum grade
- Extruded pipe conforms to standards EN755.2, EN755.8 and EN573.3
- Smooth bore ID for optimal flow rate performance
- Powder coat in BLUE (RAL5012/BS1710) with QUALICOAT CERTIFIED lacquer finish exterior
- Consult factory for availability of other colors

Flexible Hose Specification

- Resistant to mineral and synthetic oils
- Maximum working pressure for flexible hose: 145 psi
- Fire resistant, conforms to ISO 8030 standards for compressed air flexible hose and to EN12.115 standard for vacuum flexible hose

Pipe Sizes

Outside Ø (in.)	Outside Ø (mm)	Inside Ø (in.)	Inside Ø (mm)	Wall Thickness Ø (in.)
5/8	16.5	1/2	13	1/16
7/8	25	13/16	21	
1-1/2	40	1-7/16	37	
2	50	1-13/16	46	
2-1/2	63	2-5/16	59	
3	76	2-13/16	72	
4	101	3-13/16	97	
6-5/8	168	6-3/8	161.2	1/8

Sizing

Select the SmartPipe diameter for your application based on required flow and pressure drop.

Estimated Values: Closed loop system at 100 psi with a 5% pressure drop.

Flow Rate (cfm)	Main Ring Length (feet)						Compressor (hp)
	500	1000	2000	3000	4000	5000	
10	16.5	16.5	16.5	25	25	25	<15
25	25	25	25	25	25	25	
50	25	25	40	40	40	40	
75	25	40	40	40	40	40	15 - 40
100	40	40	40	40	40	40	
150	40	40	40	50	50	50	
250	40	40	50	50	63	63	41 - 125
350	50	50	63	63	63	63	
500	63	63	63	76	76	76	
750	63	63	76	76	100	100	126 - 250
1000	76	76	76	100	100	100	
1250	76	76	100	100	100	100	251 - 500
1500	100	100	100	100	100	100	
1750	100	100	100	100	100	100	
2000	100	100	100	100	100	168	
2250	100	100	100	168	168	168	501 - 1000
2500	168	168	168	168	168	168	
2750	168	168	168	168	168	168	
3000	168	168	168	168	168	168	
3250	168	168	168	168	168	168	
3500	168	168	168	168	168	168	
4000	168	168	168	168	168	168	
4500	168	168	168	168	168	168	1001 - 1400
5000	168	168	168	168	168	168	
5500	168	168	168	168	168	168	

Example

An application requires a Kaeser BSD 60 @ 110 psi with the appropriate clean air treatment. The application process cannot tolerate a pressure drop of more than 2.5 psi in the main header when the main header pressure is 100 psi.

Kaeser BSD 60 @ 110 psi = 290 cfm (FAD)
Main header total pipe length (including equivalent length for all fittings) = 1000 ft.
Main header pressure = 100 psi
Pipe size selected from the chart = 63 mm diameter pipe.

Note:

1) To calculate the pressure drop at the point of use, add up the equivalent pipe length for all connectors and air treatment equipment.

2) It is important to keep in mind the maximum pipe velocity for each section of the compressed air distribution system.

    a. Not to exceed 15 ft/s (5 m/s) pipe velocity in the compressor room

    b. Not to exceed 30 ft/s (10 m/s) pipe velocity in main header

    c. Not to exceed 45 ft/s (15 m/s) pipe velocity in the branch lines

Safety

Fire Resistance

All SmartPipe components are non-flammable with no propagation of flame.

- Pipe-to-pipe and male connectors, ball valves, and butterfly valves conform to UL94HB standard
- Fixture clips conform to UL94V-2 standard
- Flexible hoses conform to ISO 8030 norm for compressed air applications, and to EN 12115 norm for vacuum applications
- Pipe powder coat finish is classified M0

Electrical Conductivity

In areas of potential risk, the grounding and electrical continuity of metallic components are obligatory. The SmartPipe system can be used in such environments by undertaking the appropriate precautions according to your local codes.

CE Conformity

SmartPipe conforms to European standard 97/23 CEE-§3.3 (equipment under pressure).

CE

Certification

SmartPipe meets the requirement of ASME B31.1 which stipulates the minimum requirements for the design, materials, fabrication, installation, test, and inspection of power and auxiliary piping systems for industrial plants.

SmartPipe is manufactured under an ISO 9001 Version 2000 Quality Management System.

SmartPipe is certified TÜV as a pledge of safety and quality.

SmartPipe also conforms to European standard 97/23 CEE- §3.3 regarding equipment under pressure and is registered with Canadian Technical Standards & Safety Authority.

Kaeser warrants its SmartPipe products to be free of defects in material and workmanship for a period of two (2) years from the date of purchase of the products.

QUALICOAT certification is a guarantee of the quality of the lacquer finish applied to the SmartPipe aluminum pipe.

ASME

afaq ISO 9001 Qualité AFNOR CERTIFICATION

TÜVRheinland®

ISO8573

QUALICOAT

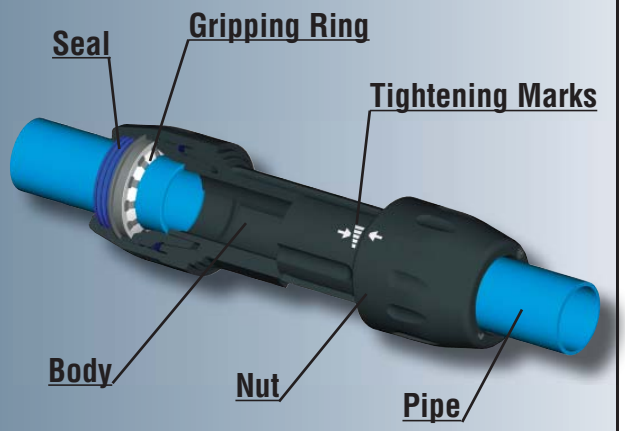
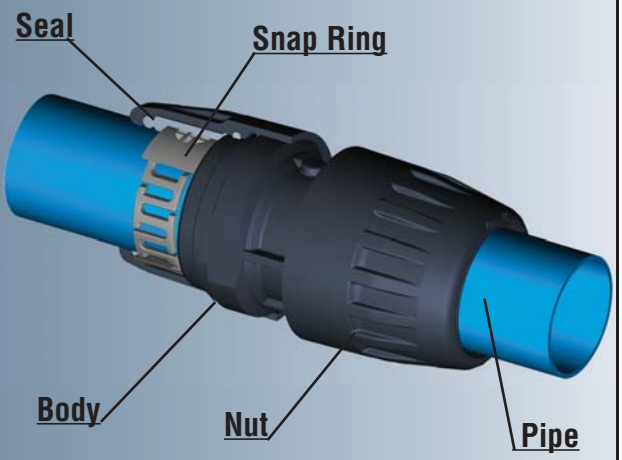
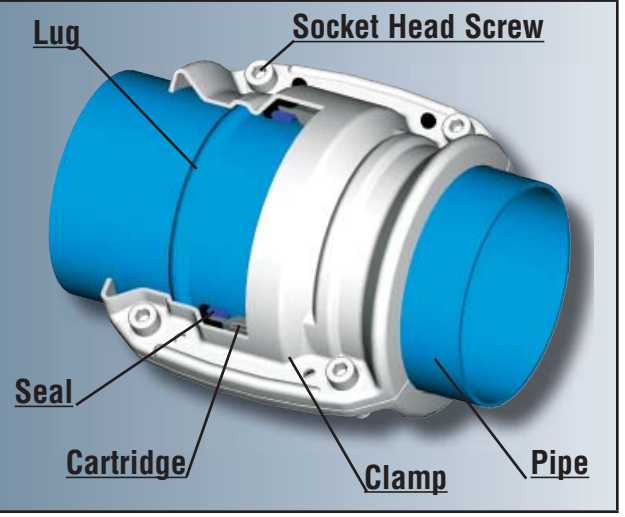
Component Material Specifications

Part No. Prefix	Ø 1/2" (16.5 mm) to Ø 1-1/2" (40 mm)	Ø 2" (50 mm) to Ø 2-1/2" (63 mm)	Part No. Prefix	Ø 3" (76 mm) to Ø 6" (168 mm)
AN1013A	Powder coated aluminum		**ANTA16**	Powder coated aluminum
AN1016A			**ANER01**	Zinc steel & rubber
AN1001E Air	Hose & Coating: Black SBR; Reinforcement: Synthetic braiding		**ANEX01**	Stainless steel
AN1001E Vacuum	Hose & Coating: Black SBR/NBR; Reinforcement: Spiral steel wire		**ANEW05**	Seal: NBR
AN4002 - AN4012	Polyamide with fiberglass	Body: Polyamide with fiberglass; Nut: Treated aluminum	**ANFP01**	Hose & connector: Black SBR/NBR; Reinforcement: Spiral steel wire
AN4088 - AN4099	Body: Treated brass; Nut: Engineering grade plastic	—	**ANRA02 - ANRA04 - ANRA12**	Treated aluminum
Anti Whiplash Strap	Steel			
AN6602 - AN6604	Polyamide with fiberglass	Treated aluminum	**ANRA25 - ANRA31 - ANRA66**	Treated aluminum
AN6605	Body: Treated brass; Nut: Polymer HR / NBR	Body: Treated brass; Nut: Treated aluminum / NBR	**ANRP01**	Body & Pushing Ring: Polyamide with fiberglass; Seal: NBR
AN6606	Polyamide with fiberglass	Aluminum	**ANRR01**	Clamp: Treated steel (6" treated aluminum); Cartridge: Polyamide with fiberglass; Seal: NBR
AN6609	Body: Treated brass; Nut: Polymer HR / NBR	Body: Treated brass; Nut: Treated aluminum / NBR	**ANRR21**	Treated brass
AN6611	Treated brass	—	**ANRR63**	Body: Treated iron; Seal: NBR
AN6612	Polyamide with fiberglass	Treated aluminum	**ANRX02**	Stainless steel 304
AN6621	Treated brass	—	**ANRX04**	
AN6625	Polyamide with fiberglass	Treated aluminum	**ANRX12**	
AN6636 - AN6638 -AN6640	Body: Treated brass; Nut: Polymer HR / NBR	—	**ANRX20**	
AN6642	Treated brass	—	**ANRX24**	
AN6651	Body: Treated brass; Nut: Polyamide with fiberglass	—	**ANRX25**	
AN6653	Body: Treated brass; Nut: Polymer HR	—	**ANRX30**	
AN6663	Body: Polyamide with fiberglass; Insert: Brass		**ANRX63**	
AN6662	Polyamide with fiberglass	Polymer HR	**ANRX64**	
AN6666	Body: Treated brass; Nut: Polyamide with fiberglass	Treated aluminum	**ANRX66**	
AN6675 - AN6679 - AN6689	Body: Treated brass; Nut: Polymer HR / NBR	—	**ANVR02**	Body: Iron Disc & shaft: Stainless steel
AN6676	Polyamide with fiberglass	Body: Treated aluminum; Nut: Polymer HR	**Bracket**	Zinc steel - rubber EPDM
AN6684	Body: Treated brass; Nut: Polyamide with fiberglass			
AN6688 - AN6691	Treated brass			
AN6694 - AN6696	Body: Treated brass; Nut: Polymer HR; Seal: NBR			
ANEA98	Body: Treated iron; Ball valve: Plated brass			
ANRA68 - ANRA69	Polyamide with fiberglass			
Clip - Spacer				
AN0169 Adapter	Steel			
Composite Coupler	Body: Polymer HR/Zamac; Sleeve: Polymer HR; Spring & Ball Bearings: Stainless Steel; Seal: Nitrile; Probe: Treated Steel			
Hose Reel	Metal case; Fixing: Metal			

Note: All SmartPipe pipe, fittings, and valves are guaranteed silicone free.

SmartPipe Technology

The innovative technology of SmartPipe combines lightweight yet durable aluminum piping with reliable and leak free fittings. These components are designed for easy and rapid assembly. The result is a complete compressed air distribution system that costs less to install and is easy to change, but meets the highest industrial standards.

Ø 1/2” (16.5 mm) **Ø 7/8” (25 mm)** **Ø 1-1/2” (40 mm)**	With sizes up to 40 mm, simply push the pipe into the pre-tensioned connectors up to the connection mark. The internal gripping ring of each fitting is automatically engaged and the connection is sealed and secure.	
Ø 2” (50 mm) **Ø 2-1/2” (63 mm)**	50 mm and 63 mm piping employs a double clamp ring that is slid onto the pipe end before the connector. The collar nut on the connector is tightened around the snap ring for a solid connection.	
Ø 3” (76 mm) **Ø 4” (100 mm)** **Ø 6” (168 mm)**	76, 100, and 168 mm SmartPipe sections are assembled with a simple connection cartridge that clamps down over lugs at the pipe ends. The cartridge is tightened with four socket head fasteners.	

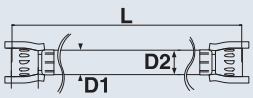
Ø 16.5, 25, 40

Rigid Aluminum Pipe and Flexible Hose

SmartPipe Aluminum Pipe

Ø OD (mm)	Ø ID (in.)	Part No.	L1 (ft.)	L	Wt.	Product Photo	Dimensional Drawing
16.5	1/2	**AN1013A17040**	15	14' 9½"	1.4		
25	7/8	**AN1016A25040**	20	19' 9¾"	4.2		
40	1½	**AN1016A40040**	20	19' 7½"	6.2		

1001E Flexible Hose

D1 (mm)	Ø D2 (in.)	Part No.	L	Min Bend Radius (in.)	For Use with SmartPipe Pipe Diameter	Wt.	Product Photo	Dimensional Drawing
38	7/8	**AN1001E25001**	1' 10"	4	25	1.20		
		AN1001E25003	5'			3.28		
		AN1001E25004	6' 7"			4.40		
54	1-1/2	**AN1001E400002**	3' 3"	16	40	4.57		
		AN1001E400004	6' 7"			7.32		
		AN1001E400005	9' 10"			8.82		

Use part number AN66989903, anti-whiplash strap
Refer to page 64 and 68 for band radius and proper installation

6698 Anti-whiplash Strap

Part No.	Wt.	Product Photo
AN66989903	0.47	

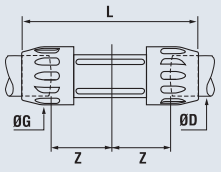
Prevents whiplash should SmartPipe flexible hose be disconnected while under pressure. Conforms to ISO 4414 safety standard.

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

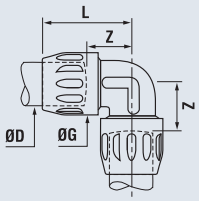
Ø 16.5, 25, 40

Pipe-to-pipe and Threaded Connectors

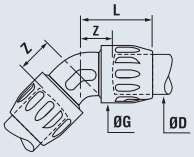
6606 Pipe-to-pipe Connector

ØD (mm)	Part No.	ØG	L	Z	Wt.	Product Photo	Dimensional Drawing
16.5	**AN66061700**	1-5/16	4-3/4	1-15/16	0.16		
25	**AN66062500**	1-3/4	5-15/16	1-7/8	0.28		
40	**AN66064000**	2-5/8	8-1/8	2-1/4	0.76		

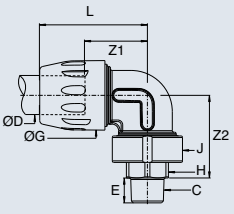
6602 90° Elbow

ØD (mm)	Part No.	ØG	L	Z	Wt.	Product Photo	Dimensional Drawing
16.5	**AN66021700**	1-15/16	2-1/4	1-1/4	0.15		
25	**AN66022500**	1-3/4	2-5/8	1-9/16	0.24		
40	**AN66024000**	2-5/8	4-3/16	2-7/16	0.71		

6612 45° Elbow

ØD (mm)	Part No.	ØG	L	Z	Wt.	Product Photo	Dimensional Drawing
25	**AN66122500**	1-3/4	2-1/4	1-1/8	0.25		
40	**AN66124000**	2-5/8	3-9/16	1-3/4	0.84		

6609 Male Threaded 90° Elbow, NPT”

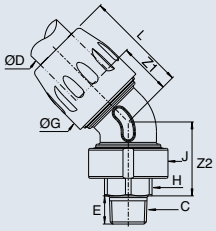
ØD (mm)	C (NPT)	Part No.	E	H	ØG	ØJ	L	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
16.5	1/4	**AN66091714**	3/8	5/8	1-5/16	1-5/16	2-1/4	1-3/16	1-5/8	0.25		
	1/2	**AN66091722**	9/16	15/16			2-5/16	1-1/4	1-13/16	0.29		
25	1/2	**AN66092522**	9/16	1-1/16	1-13/16	1-13/16	2-3/4	1-5/8	2-1/16	0.49		
	3/4	**AN66092528**								0.52		
	1	**AN66092535**	5/8	1-7/16					2-3/16	0.65		
40	1	**AN66094035**	5/8	1-5/8	2-5/8	2-11/16	4-3/16	2-7/16	3	1.43		
	1¼	**AN66094043**	7/8	2					3-3/16	1.72		
	1½	**AN66094050**	1							1.79		
	2	**AN66094044**	15/16	2-3/8						2.04		

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

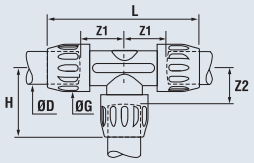
Ø 16.5, 25, 40

Pipe-to-pipe and Threaded Connectors

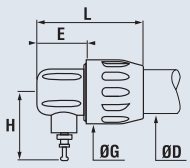
6619 Male Threaded 90° Elbow, NPT

ØD (mm)	C (NPT)	Part No.	E	H	ØG	ØJ	L	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
25	1/2	**AN66192522**	9/16	1-1/16	1-3/4	1-13/16	2-7/16	1-1/4	1-5/8	0.47		
	3/4	**AN66192528**								0.50		
	1	**AN66192535**	5/8	1-7/16					1-3/4	0.63		
40	1	**AN66194035**	5/8	1-5/8	2-5/8	2-11/16	3-11/16	1-3/4	2-5/16	1.43		
	1¼	**AN66194043**	7/8	2					2-1/2	1.64		
	1½	**AN66194050**	1							1.71		
	2	**AN66194044**	7/8	2-3/8			3-7/8	1-1/2	3-1/8	1.96		

6604 Equal Tee

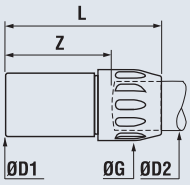
ØD (mm)	Part No.	ØG	H	L	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
16.5	**AN66041700**	1-5/16	2-5/16	4-3/4	1-5/16	1-1/4	0.33		
25	**AN66042500**	1-3/4	2-11/16	6	1-7/8	1-9/16	0.40		
40	**AN66044000**	2-5/8	4	8-1/16	2-14	2-1/4	1.34		

6625 Vented End Cap

ØD (mm)	Part No.	E	ØG	H	L	Wt.	Product Photo	Dimensional Drawing
16.5	**AN66251700**	1	1-3/8	1-13/16	2-7/16	0.21		
25	**AN66252500**	1-5/16	1-3/4	1-7/8	3	0.21		
40	**AN66254000**	1-3/8	2-5/8	2-13/16	3-7/8	0.40		

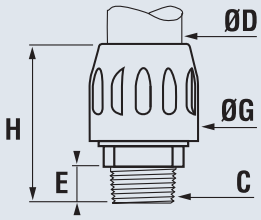
16.5 mm: supplied with LF3000 6 mm plug. Models Ø 25, 40, and 63: supplied with LF 3000 5/16" (8mm) plug.

6666 Plug-in Reducer

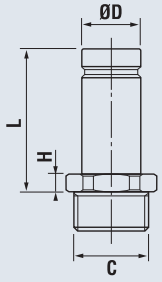
ØD (mm)	ØD2 (mm)	Part No.	ØG	Z	L	Wt.	Product Photo	Dimensional Drawing
25	16.5	**AN66661725**	1-5/16	2	3	0.16		
40	25	**AN66662540**	1-3/4	2-13/16	3-7/8	0.26		

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

6605 Male Threaded Connector, NPT

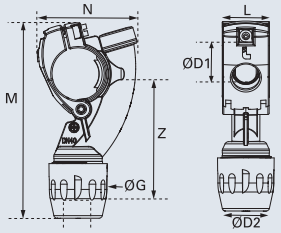
ØD (mm)	C (NPT)	Part No.	E	ØG	H	Wt.	Product Photo	Dimensional Drawing
16.5	1/4	**AN66051714**	3/8	1-3/8	2-1/2	0.26		
	1/2	**AN66051722**	5/8		2-11/16	0.26		
25	1/2	**AN66052522**	5/8	1-3/4	2-3/4	0.60		
	3/4	**AN66052528**			2-13/16	0.73		
	1	**AN66052535**				0.44		
40	1	**AN66054035**	5/8	2-5/8	4-3/8	0.51		
	1¼	**AN66054043**	7/8			0.97		
	1½	**AN66054050**	1		4-1/2	1.36		
	2	**AN66054044**	15/16		4-3/8	3.11		

6621 Male Threaded Adapter, NPT

ØD (mm)	C (NPT)	Part No.	L	H	Wt.	Product Photo	Dimensional Drawing
16.5	1/2	**AN66211722**	1-11/16	3/16	0.07		
25	1/2	**AN66212522**	1-15/16	1/4	0.11		
	3/4	**AN66212528**					
	1	**AN66212535**			0.15		
40	1¼	**AN66214043**	2-15/16	5/16	0.34		
	1½	**AN66214050**		3/8	0.44		

Quick Assembly Brackets

6662 Quick Assembly Bracket

ØD1 (mm)	ØD2 (mm)	Part No.	M	ØG	L	N	Z	Wt.	Product Photo	Dimensional Drawing
25	16.5	**AN66622517**	5-1/2	1-5/16	1-7/16	2-1/2	3-1/4	0.22		
	25	**AN66622500**	5-1/4	1-3/4			3	0.26		
40	16.5	**AN66624017**	6-1/16	1-5/16	1-1/2	3	3-1/2	0.30		
	25	**AN66624025**	5-15/16	1-3/4			3-1/4	0.34		

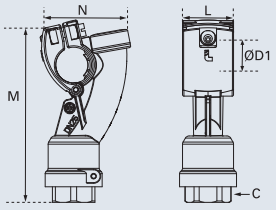
To drill SmartPipe pipe, use drilling tools AN66980201 and AN66980202.

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Ø 16.5, 25, 40

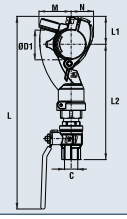
Quick Assembly Brackets

6663 Quick Assembly Mini-bracket with Female Thread, NPT

ØD1 (mm)	Part No.	C	M	L	N	Wt.	Product Photo	Dimensional Drawing
25	AN66632522	1/2	4-5/8	1-7/16	2-1/2	0.26		
40	AN66634022		3/16	1-1/2	3	0.34		

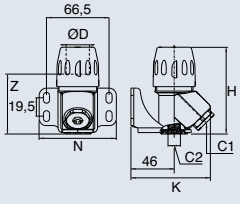
Supplied with brass plug. To drill SmartPipe pipe, use drilling tools AN6698201 and AN66980202.

6668 Quick Assembly Mini-bracket with Ball Valve, NPT

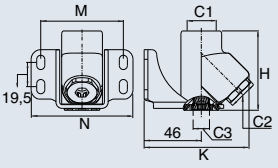
ØD1 (mm)	Part No.	C	L	L1	L2	M	N	Wt.	Product Photo	Dimensional Drawing
25	AN66682522	1/2	10-1/6	1-1/4	6-1/8	1-9/16	15/16	0.95		
40	AN66684022		10-5/8	1-9/16	6-3/8	1-3/4	1-1/4	0.96		

Wall Brackets

6640 1 Port 45° Wall Bracket, NPT

Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H	Z	K	N	Wt.	Product Photo	Dimensional Drawing
16.5	AN66401722	1/2	1/4	3-1/2	2-1/2	3-5/16	3-1/4	1.16		
25	AN66402522			3-5/8						

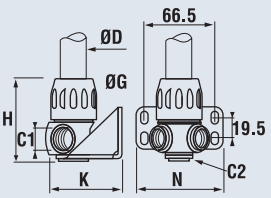
6642 1 Port 45° Threaded Wall Bracket, NPT

Ø (mm)	Part No.	C1 (NPT)	C2 (NPT)	C3 (NPT)	H	K	M	N	Wt.	Product Photo	Dimensional Drawing
16.5	AN66422222	1/2	1/2	1/4	2-1/2	3-5/16	2-5/8	3-1/4	1.06		

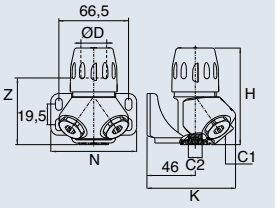
Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Wall Brackets

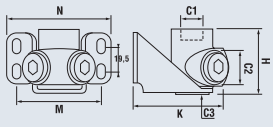
6684 2 Port 90° Wall Bracket, NPT

Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	G	H	K	N	Wt.	Product Photo	Dimensional Drawing
16.5	AN66841722	1/2	1/4	1-5/16	2-9/16	2-15/16	3-1/4	0.90		
25	AN66842522			1-3/4	3-3/16			1.10		

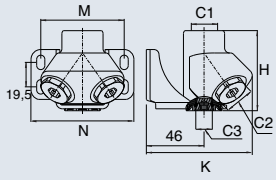
6689 2 Port 45° Wall Bracket, NPT

Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H	Z	K	N	Wt.	Product Photo	Dimensional Drawing
16.5	AN66891722	1/2	1/4	3-1/2	2-1/2	3-5/16	3-1/4	1.47		
25	AN66892522			3-5/8				1.49		

6688 2 Port 90° Threaded Wall Bracket, NPT

Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	C3 (NPT)	H	K	M	N	Wt.	Product Photo	Dimensional Drawing
16.5	AN66882222	1/2	1/2	1/4	1-7/8	2-7/8	2-5/8	3-1/4	1.0		

6691 2 Port 45° Threaded Wall Bracket, NPT

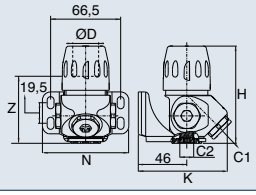
Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	C# (NPT)	H	K	M	N	Wt.	Product Photo	Dimensional Drawing
16.5	AN66912222	1/2	1/2	1/4	2-1/2	3-5/16	2-5/8	3-1/4	1.39		

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

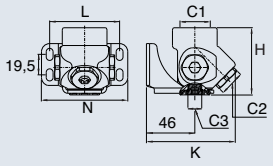
Ø 16.5, 25, 40

Wall Brackets

6696 3 Port 45° Wall Bracket, NPT

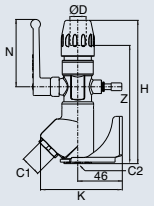
Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H	Z	K	N	Wt.	Product Photo	Dimensional Drawing
25	**AN66962522**	1/2	1/4	3-5/8	2-1/2	3-5/16	3-1/4	1.59		

6636 3 Port Threaded Wall Bracket, NPT

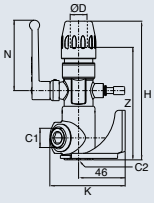
Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	C3 (NPT)	H	K	M	N	Wt.	Product Photo	Dimensional Drawing
25	**AN66362822**	3/4	1/2	1/4	2/12	3-5/16	2-5/8	3-1/4	1.49		

Wall Brackets with Ball Valve

6679 1 Port 45°, NPT

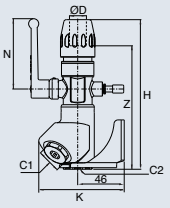
Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H	Z	K	N	Wt.	Product Photo	Dimensional Drawing
16.5	**AN66791722**	1/2	1/4	5-13/16	4-7/8	3-5/16	2-3/4	1.92		
25	**AN66792522**			6-13/16	5-5/8		4-1/4	3.37		

6675 2 Port 90°, NPT

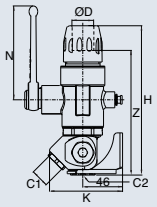
Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H	Z	K	N	Wt.	Product Photo	Dimensional Drawing
16.5	**AN66751722**	1/2	1/4	5-3/8	4-3/8	2-15/16	2-3/4	1.76		
25	**AN66752522**			6-7/16	5-3/16		4-1/4	3.21		

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

6694 2 Port 45°, NPT

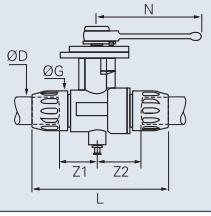
Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H	Z	K	N	Wt.	Product Photo	Dimensional Drawing
16.5	**AN66941722**	1/2	1/4	5-13/16	4/78	3-5/16	2-3/4	1.92		
25	**AN66942522**			6-13/16	5-5/8		4-1/4	3.37		

6638 3 Port 45°, NPT

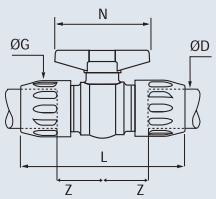
Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H	Z	K	N	Wt.	Product Photo	Dimensional Drawing
25	**AN66382522**	1/2	1/4”	6-13/16	5/5/8	3-15/16	4-1/4	3.82		

Ball Valves

4099 Lockable Double Female, Vented

Ø OD (mm)	Part No.	ØG	L	N	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
16.5	**AN40991700**	1-5/16	4-3/4	2-3/4	1-1/8	1-11/16	1.3		
25	**AN40992500**	1-3/4	6	4-1/4	1-9/16	2-3/16	2.7		

4002 Double Female Valve

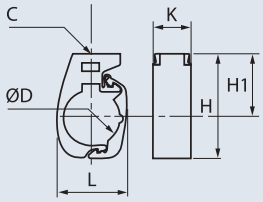
Ø OD (mm)	Part No.	ØG	L	N	Z	Wt.	Product Photo	Dimensional Drawing
40	**AN40024000**	2-5/8	8	4-13/16	2-1/4	1.32		

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Ø 16.5, 25, 40

Mounting Hardware

6697 Fixing Clip for Ridig Pipe

ØD (mm)	C (UNC)	Part No.	H1	H	K	L	Wt.	Product Photo	Dimensional Drawing
16.5	1/4	AN66971701	1-13/16	2-7/16	1-3/16	1-3/16	0.06		
25		AN66972501		2-9/16		1-1/2	0.07		
40		AN66974001		2-7/8		2	0.08		

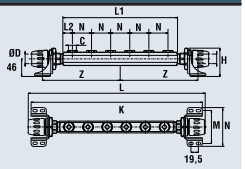
SmartPipe fixing clips are designed to bear a maximum weight of 44 lbs. However, to ensure good stability of the network, we recommend the use of at least 2 clips per length of pipe.

Example:

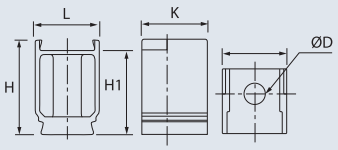
- *Maximum 5 ft. space between clips for 10 ft. lengths of pipe*
- *Maximum 10 ft. space between clips for 20 ft lengths of pipe*

Only use this clip for fixing SmartPipe rigid pipe, all other types of pipe clips are to be avoided. Fix the clip to the rigid support (U-channel, cable tray) to allow for expansion while retaining the pipe.

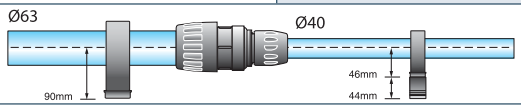
6653 6 Port Manifold

ØD (mm)	C (NPT)	Part No.	L	L1	L2	K	N	Z	H	M	Wt.	Product Photo	Dimensional Drawing
25	1/2	AN6653252206	18-1/4	11-13/16	1	17-5/8	2	8	2-15/16	3-3/8	5.07		
40		AN6653402206	20-11/16	12-3/16	1	18-7/16	2	8-9/16	3-1/4	4-1/8	8.55		

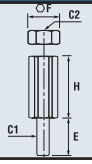
6697 Spacer

ØD (mm)	Part No.	H	H1	K	L	Wt.	Product Photo	Dimensional Drawing
11	AN66970003	2	1-3/4	1-3/8	1-3/16	0.04		

This spacer, in conjunction with a SmartPipe pipe clip, allows consistent alignment of pipes when different diameters of pipe are run concurrently in the same line.



0169 Threaded Rod Adapter

C1	Part No.	E	H	Wt.	Product Photo	Dimensional Drawing
1/4”	AN0169000500	5/8	1-3/16	0.12		

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

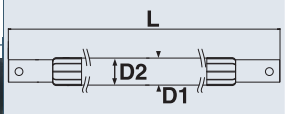
Ø 50, 63

Rigid Aluminum Pipe and Flexible Hose

SmartPipe Aluminum Pipe

Ø OD (mm)	Ø OD (in.)	Part No.	L1 (ft.)	L	Wt.	Product Photo	Dimensional Drawing
50	2	**AN1016A5004**	20	19' 7 1/8"	9.68		
63	2½	**AN1016A6304**	20	19' 7 1/8"	13.84		

1001E Flexible Hose

D1	D2	Part No.	L	Min Bend Radius (in.)	For Use with SmartPipe Pipe Diameter	Wt.	Product Photo	Dimensional Drawing
2½	2	**AN1001E500009**	3' 3"	11	2	6.07		
		AN1001E500004	6' 6"			9.5		
3-1/8	2½	**AN1001E630008**	4' 7"	12	2½	8.64		
		AN1001E630005	9' 10"	25		17.8		
		AN1001E630006	13' 1"			23.6		

Use part number AN66989903, anti-whiplash strap
Refer to page 64 and 68 for band radius and proper installation

6698 Anti-whiplash Strap

Part No.	Wt.	Product Photo
AN66989903	0.47	

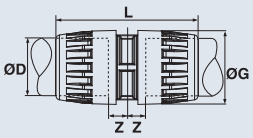
Prevents whiplash should SmartPipe flexible hose be disconnected while under pressure. Conforms to ISO 4414 safety standard.

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

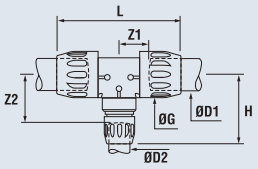
Ø 50, 63

Pipe-to-pipe and Threaded Connectors

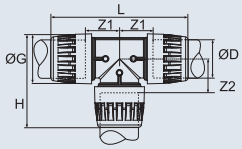
6606 Pipe-to-pipe Connector

ØD (mm)	Part No.	ØG	L	Z	Wt.	Product Photo	Dimensional Drawing
50	AN66065000	3-1/8	6-3/4	1	1.81		
63	AN66066300	3-9/16	6-3/4	1			

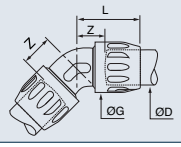
6604 Reducing Tee

ØD1 (mm)	D2 (mm)	Part No.	ØG	H	L	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
50	25	AN66045025	3-1/8	5-7/16	9-1/8	2-3/16	4-3/8	2.54		
	40	AN66045040		6-3/16			4-1/4	2.79		
63	40	AN66046340	3-9/16	6-5/16	9-5/8	2-7/16	4-9/16	3.31		
	50	AN66046350		7	9-15/16	2-3/16	4-5/8	3.31		

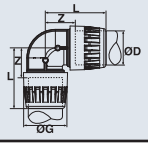
6604 Equal Tee

ØD (mm)	Part No.	ØG	H	L	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
50	AN66045000	3-3/16	6-1/8	9-1/8	2-3/16	2-3/16	2.65		
63	AN66046300	3-9/16	4-13/16	9-5/8	2-7/16	2-7/16	2.98		

6612 45° Elbow

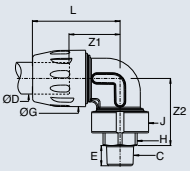
ØD (mm)	Part No.	ØG	L	Z	Wt.	Product Photo	Dimensional Drawing
50	AN66125000	3-1/8	3-7/8	1-1/2	1.20		
63	AN66126300	3-9/16	4	2-3/8	1.70		

6602 90° Elbow

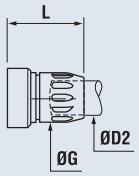
ØD (mm)	Part No.	ØG	L	Z	Wt.	Product Photo	Dimensional Drawing
50	AN66025000	3-1/8	6-1/8	2-1/4	1.77		
63	AN66026300	3-9/16	4-13/16	2-3/8	2.17		

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

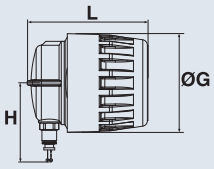
6609 Male Threaded 90° Elbow, NPT

ØD (mm)	C (NPT)	Part No.	E	H	ØG	ØJ	L	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
50	1½	**AN66095050**	7/8	2	3-1/8	3-1/8	4-9/16	2-3/16	3-13/16	4.00		
	2	**AN66095044**	7/8	2-3/8					3-7/8	4.00		
63	2½”	**AN66096341**	1-1/16	3-1/8	3-9/16	3-9/16	4-7/8	2-3/8	4-3/16	4.04		
	3”	**AN66096346**	1-3/16	3-3/4					3-1/4	6.01		

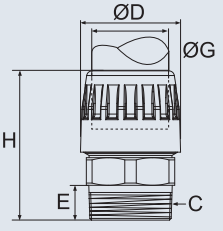
6666 Plug-in Reducer

ØD (mm)	ØD2 (mm)	Part No.	ØG	L	Wt.	Product Photo	Dimensional Drawing
50	40	**AN66664050**	2-5/8	4-7/16	0.70		
	63	**AN66665063**	3-1/8	4-15/16	1.15		
63	40	**AN66664063**	2-5/8	4-7/16	1.90		

6625 Vented End Cap

ØD (mm)	Part No.	E	ØG	H	L	Wt.	Product Photo	Dimensional Drawing
50	**AN66255000**	1-7/8	3-1/8	2-5/8	4-1/4	1.0		
63	**AN66256300**	1-1/4	3-9/16	2-15/16	4-3/8	1.0		

6605 Male Threaded Connector, NPT

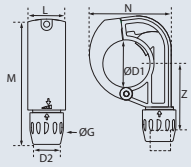
ØD (mm)	Part No.	C (NPT)	E	ØG	H	Wt.	Product Photo	Dimensional Drawing
50	**AN66055050**	1½	7/8	3-1/8	4-11/16	2.78		
	AN66055044	2			4-3/4	2.35		
63	**AN66056344**	2	13/16	3-9/16	4-11/16	2.30		
	AN66056341	2½	1		5-1/8	3.00		
	AN66056346	3	1-1/16		5-1/2	4.90		

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

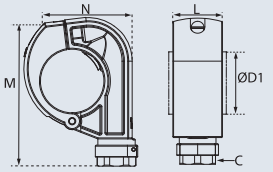
Ø 50, 63

Quick Assembly Brackets

6662 Quick Assembly Bracket

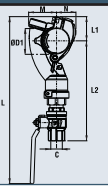
ØD1 (mm)	ØD2	Part No.	M	ØG	L	N	Z	Wt.	Product Photo	Dimensional Drawing
50	25	**AN66625025**	5-3/16	1-3/4	1-1/2	3-7/8	2-5/16	0.34		
63	25	**AN66626325**	6-9/16	1-3/4	2	4-1/4	3	0.70		

6663 Quick Assembly Mini-bracket with Female Thread, NPT

ØD1 (mm)	Part No.	C	M	L	N	Wt.	Product Photo	Dimensional Drawing
50	**AN66635022**	1/2	5-1/2	2	3-7/8	1.10		
	AN66635028	3/4						
63	**AN66636322**	1/2						
	AN66636328	3/4						

Ball Valve

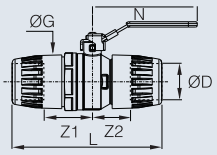
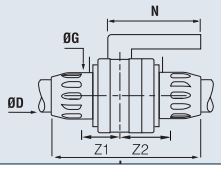
6668 Quick Assembly Mini-bracket with Ball Valve, NPT

ØD1 (mm)	Part No.	C	L	L1	L2	M	N	Wt.	Product Photo	Dimensional Drawing
50	**AN66685022**	1/2	9-3/4	1-13/16	5-1/4	3-7/16	1-1/4	1.07		
63	**AN66686322**	1/2	10-13/16	2-1/2	5-5/8	2-3/8	1-7/8	1.50		
	AN66686328	3/4	11-11/16		5-3/4			1.70		

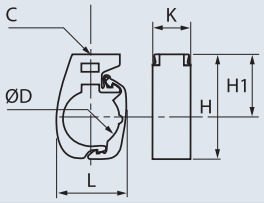
Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Ball Valve

4012 Lockable Double Female Valve

ØD (mm)	Part No.	G	L	N	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
50	**AN40925000**	3-1/8	8-13/16	6-1/8	2-3/8	1-11/16	3.37		
63	**AN40126300**	3-9/16	10-15/16	7-5/16	3-5/16	3-7/8	5.42		

6697 Fixing Clip for Rigid Pipe

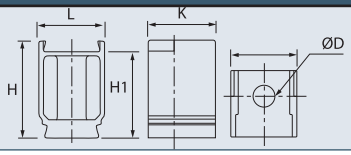
ØD (mm)	C (UNC)	Part No.	H1	H	K	L	Wt.	Product Photo	Dimensional Drawing
50	3/8	**AN66975001**	3-9/16	5	1-3/16	2-7/8	0.15		
63	3/8	**AN66976301**							

SmartPipe fixing clips are designed to bear a maximum weight of 44 lbs. To ensure good stability, use at least 2 clips per 20 ft. section of pipe.
Example:
- *Maximum 5 ft. space between clips for 10 ft. lengths of pipe*
- *Maximum 10 ft. space between clips for 20 ft. lengths of pipe.*

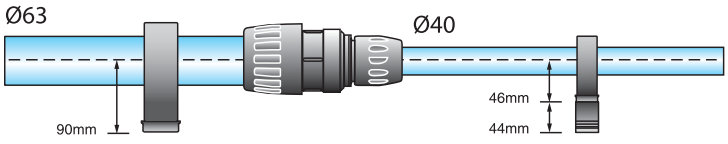
Only use this clip for fixing SmartPipe rigid pipe, all other types of pipe clips are to be avoided. Fix the clip to a rigid support (U-channel, cable tray) to allow for expansion while retaining the pipe.

Mounting Hardware

6697 Spacer for Rigid Pipe

ØD (mm)	Part No.	H	H1	K	L	Wt.	Product Photo	Dimensional Drawing
11	**AN66970003**	2	1-3/4	1-3/8	1-3/16	0.4		

This spacer, used with a SmartPipe clip, allows consistent alignment of pipes when different diameters of pipe are used in the same run.

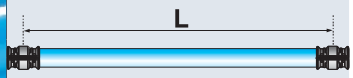


Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

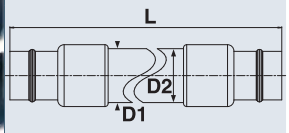
Ø 76, 100

Rigid Aluminum Pipe

SmartPipe Aluminum Pipe

Ø OD (mm)	Ø ID (in.)	Part No.	L1 (ft.)	Wt.	Product Photo	Dimensional Drawing
76.3	3	**ANTA16L104**	20	17		
101.8	4	**ANTA16L304**	20	25.7		

FP01 Flexible Hose

Ø D1 (mm)	Ø D2 (in.)	Part No.	L	Min Bend Radius	For Use with SmartPipe Pipe Diameter (mm)	Wt.	Product Photo	Dimensional Drawing
91	3	**ANFP01L101**	4'11"	14	76	11.4		
		ANFP01L102	6'6"			15.2		
116	4	**ANFP01L302**	6'6"	20	100	28.2		
		ANFP01L303	9'10"			40.5		

Use two connectors RR01 to connect flexible hoses FP01 to SmartPipe pipe.
Use part number AN66989903, anti-whiplash strap
Refer to page 64 and 68 for band radius and proper installation

6698 Anti-whiplash Strap

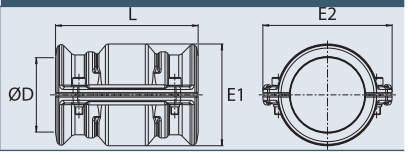
Part No.	L	Wt.	Product Photo
AN66989903	3'3"	0.47	

Prevents whiplash should SmartPipe flexible hose be disconnected while under pressure. Conforms to ISO 4414 safety standard.

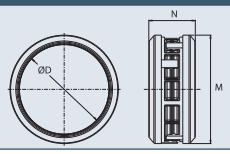
Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Pipe-to-pipe and Threaded Connectors

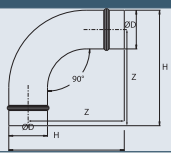
RR01 Pipe-to-pipe Connector (clamp and cartridge)

Ø OD (mm)	Part No.	L	E1	E2	Wt.	Product Photo	Dimensional Drawing
76	ANRR01L100	5-3/4	4-1/16	5-3/16	2.33		
100	ANRR01L300		5-1/16	6-3/16	3.06		

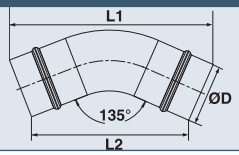
RP00 Cartridge (spare part)

Ø OD (mm)	Part No.	M	N	Wt.	Product Photo	Dimensional Drawing
76	ANRP00L100	3-1/2	2-1/16	8.3		
100	ANRP00L300	4-7/8	2-1/16	10.2		

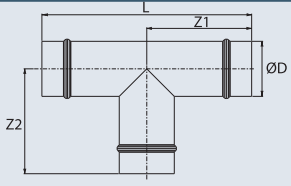
RX02 90° Elbow

Ø OD (mm)	Part No.	H	Z	Wt.	Product Photo	Dimensional Drawing
76	ANRX02L100	8-15/16	7-7/16	2.21		
100	ANRX02L300	10-15/16	8-11/16	3.86		

RX12 45° Elbow

Ø OD (mm)	Part No.	L1	L2	Wt.	Product Photo	Dimensional Drawing
76	ANRX12L100	9	6	2.21		
100	ANRX12L300	10-11/16	7-1/4	3.86		

RX04 Equal Tee

Ø OD (mm)	Part No.	L	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
76	ANRX04L100	11-7/16	5-11/16	5-11/16	2.33		
100	ANRX04L300	12-3/16	6-1/8	5-5/16	3.06		

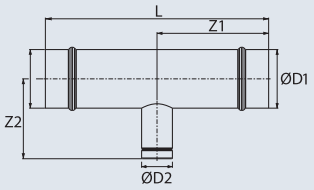
Use three connectors ANRR01 to connect equal tee ANRX04 to Smartpipe pipe.

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Ø 76, 100

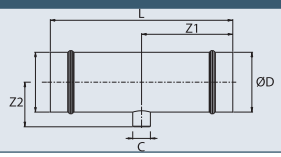
Pipe-to-pipe and Threaded Connectors

RX24 Reducing Tee

Ø D1 (mm)	Ø D2 (mm.)	Part No.	L	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
76	40	**ANRX24L140**	11-7/16	5-11/16	4-1/8	2.01		
	50	**ANRX24L150**	9-7/16	4-3/4	8-1/4			
	63	**ANRX24L163**	11-7/16	5-11/16	6-7/16	2.29		
100	40	**ANRX24L340**	12-3/16	6-1/8	4-5/8	3.46		
	63	**ANRX24L363**			6-15/16	3.75		
	76	**ANRX04L3L1**			5-5/16	3.75		

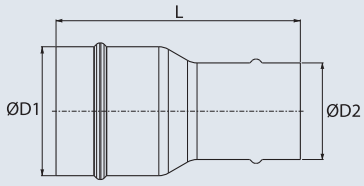
Use two connectors (ANRR01) to connect reducing tees ANRX24 to SmartPipe pipes Ø 76 and Ø 100 and to connect pipe-to-pipe connector AN6606 to SmartPipe pipes Ø 40 and Ø 63.

RX20 Threaded Tee

ØD (mm)	Part No.	C (NPT)	L	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
76	**ANRX20L1N04**	1/2	11-7/16	5-11/16	2-1/2	1.92		
100	**ANRX24L3N04**		12-3/16	6-1/8	3	6.35		

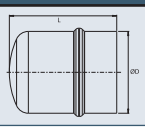
Use two connectors ANRR01 to connect threaded tee ANRX20 to Smartpipe pipe.

RX64, RX66 Plug-in Reducer

Ø D1 (mm)	Ø D2 (mm)	Part No.	L	Wt.	Product Photo	Dimensional Drawing
76	50	**ANRX64L150**	8-11/16	2.29		
	63	**ANRX64L163**	9-1/16	2.29		
100	63	**ANRX64L363**	9-13/16	3.46		
	76	**ANRX66L3L1**	7-9/16	3.75		

Use one connector AN4401 to connect plug-in reducer ANRX64 to SmartPipe pipes Ø 76 and Ø 100 and one to connect pipe-to-pipe connector AN6606 to connect SmartPipe Ø 63.

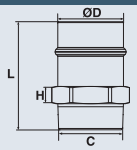
RX25 End Cap

ØD (mm)	Part No.	L	Wt.	Product Photo	Dimensional Drawing
76	**ANRX25L100**	3-15/16	0.71		
100	**ANRX25L300**	4-1/4	1.17		

Use one connector ANRR01 to connect end cap ANRX25 to SmartPipe pipe.

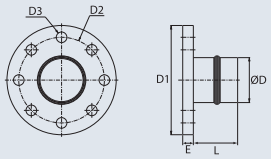
Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

RR21 Male Threaded Adapter, NPT

Ø OD (mm)	Part No.	C (NPT)	L	H	Wt.	Product Photo	Dimensional Drawing
76	**ANRR21L1N20**	2-1/2	4-15/16	13/16	2.00		
	ANRR21L1N24	3			2.35		

Use one connector ANRR01 to connect male adaptor ANRR21 to SmartPipe pipe.

RX30, RX 31 Flange Adaptor

ØD (mm)	DN	Part No.	D1	D2	D3	E	L	Wt.	Product Photo	Dimensional Drawing
76	65	**ANRX30L100**	7-5/16	5-3/4	11/16	3/8	2-15/16	7.05		
	80	**ANRX3IL100***	7-7/8	6-5/16	3/4	1/2				
100	100	**ANRX30L300**	8-11/16	7-1/8	11/16	3/8		12.0		
		ANRX31L300*	9	7-1/2	3/4	1/2				

**ANRX31 dimensions conform to ANSI standards*

EW05 Flange Gasket

ØD (mm)	Part No.	For use with Flange Reference	Wt.	Product Photo
76	**ANEW05L100**	ANRX30L100	0.06	
100	**ANEW05L300**	ANRX30L300	0.11	

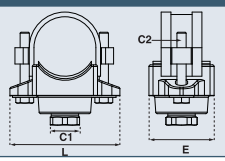
EW06 Flange Bolt Kit

Part No.	C (UNC)	L	Wt.	Product Photo
ANEW060001	5/8	2-3/8	0.8*	

**Kit contains eight bolts and eight nuts.*

Quick Assembly Direct Feed Brackets

RR63 Simple Reducing Bracket

ØD (mm)	Part No.	C1 (NPT)	C2	E	L	Wt.	Product Photo	Dimensional Drawing
76	**ANRR63L1N08**	1	M12	2	5-3/8	4.15		
100	**ANRR63L3N08**			3-1/8		4.25		

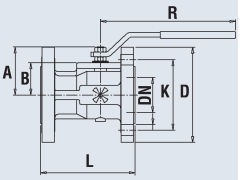
Supplied with Ø 7/8 - 1" adaptor (AN66212535). To drill SmartPipe pipe, use drilling tool ANEW090030.

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Ø 76, 100

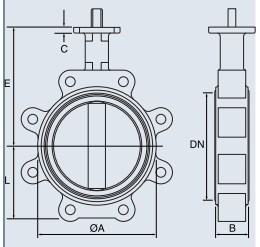
Ball Valve

VR01 Ball Valve

ØD (mm)	DN	Part No.	A	B	D	L	K	R	Wt.	Product Photo	Dimensional Drawing
76	65	**ANVR01L100***	4	2-15/16	7-5/16	5-11/16	6-11/16	12-1/2	24.3		
100	100	**ANVR01L300***	5-3/8	4-1/16	8-11/16	7	7-1/2	15	43.4		

DN Flange Adapters are required.
76 mm ANRX30L100; 100 mm ANRX30L300

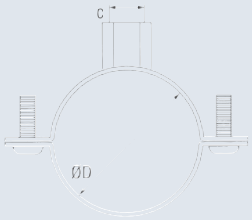
VR03 Butterfly Valve

ØD (mm)	DN	Part No.	ØA	B	E	L	C	Wt.	Product Photo	Dimensional Drawing
76	3	**AN3171303**	4-3/4	1-3/4	6-5/16	2-15/16	3/8	9		
Valve is not supplied with bolt kit. Bolt kit part number is ANFNWLBBZ1M for 3". Valve has a bonded seal and does not require a flange gasket. ANSI standard, class 150.										
100	4	**AN3171304**	5-15/16	2-1/16	7-1/16	3-3/4	3/8	15		
Valve is not supplied with bolt kit. Valve requires a bolt kit; part number ANFNWLBBZ1P for 4". Valve has a bonded seal and does not require a flange gasket. ANSI standard, class 150.										

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Mounting Hardware

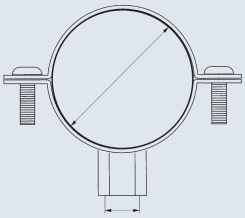
ER01 Rubber Insulated Pipe Mounting Bracket

ØD (mm)	Part No.	C1 (UNC)	Wt.	Product Photo	Dimensional Drawing
76	**ANER01L100**	3/8	0.26		
100	**ANER01L300**		0.30		

To ensure good stability of the network, we recommend the use of at least 2 brackets per length of pipe.
Example:
- *Maximum 5 ft. space between brackets for 10 ft. lengths of pipe*
- *Maximum 10 ft. space between brackets for 20 ft. lengths of pipe*

Use only this bracket for fixing SmartPipe rigid pipe, all other types of pipe brackets are to be avoided. Fix the bracket to a rigid support (U-channel, cable tray) to allow for expansion while retaining the pipe.

EX01 Pipe Mounting Bracket

ØD (mm)	Part No.	C1 (UNC)	Wt.	Product Photo	Dimensional Drawing
76	**ANEX01L100**	3/8	4.09		
100	**ANEX01L300**		4.73		

To ensure good stability of the network, we recommend the use of at least 2 brackets per length of pipe.
Example:
- *Maximum 5 ft. space between brackets for 10 ft. lengths of pipe*
- *Maximum 10 ft. space between brackets for 20 ft. lengths of pipe*

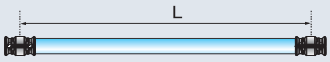
Use only this bracket for fixing SmartPipe rigid pipe, all other types of pipe brackets are to be avoided. Fix the bracket to a rigid support (U-channel, cable tray) to allow for expansion while retaining the pipe.

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Ø 168

Rigid Aluminum Pipe

SmartPipe Aluminum Pipe

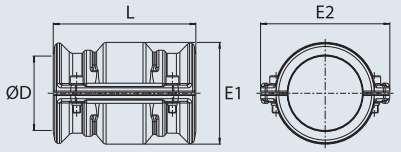
Ø OD (mm)	Ø ID (in.)	Part No.	L (ft.)	Wt.	Product Photo	Dimensional Drawing
168.3	6	**ANTA16L804**	20	64.87		

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

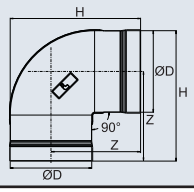
Ø 168

Pipe-to-pipe and Threaded Connectors

RR01 Pipe-to-pipe Connector (clamp and cartridge)

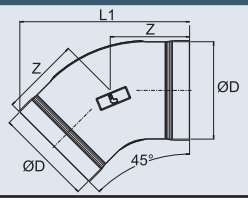
Ø OD (mm)	Part No.	L	E1	E2	Wt.	Product Photo	Dimensional Drawing
168	**ANRR01L800**	5-1/2	8-3/8	9-1/16	5.67		

RA02 90° Elbow

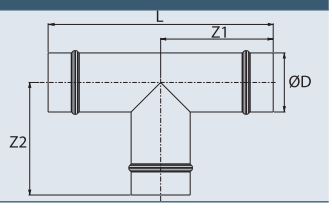
Ø OD (mm)	Part No.	H	Z	Wt.	Product Photo	Dimensional Drawing
168	**ANRA02L800**	10-5/8	7-1/4	6.77		

Use two connectors (ANRR01) to connect 90° elbow (ANRR02) to SmartPipe.

RA12 45° Elbow

Ø OD (mm)	Part No.	L1	Z	Wt.	Product Photo	Dimensional Drawing
168	**ANRA12L800**	12-1/4	5-3/8	5.22		

RA04 Equal Tee

Ø OD (mm)	Part No.	L	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
168	**ANRA04L800**	14-3/16	7-1/16	7-5/16	10.98		

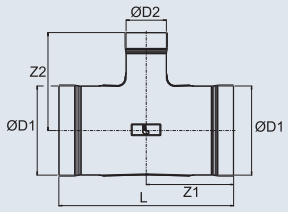
Use three connectors ANRR01 to connect equal tees (ANRX04 and ANRA04) to Smartpipe pipe.

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Ø 168

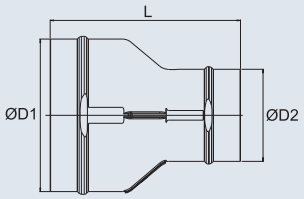
Pipe-to-pipe and Threaded Connectors

RA04 Reducing Tee

Ø D1 (mm)	Ø D2 (in.)	Part No.	L	Z1	Z2	Wt.	Product Photo	Dimensional Drawing
168	4	**ANRA04L8L3**	13	6-1/2	7-5/16	6.99		
	3	**ANRA04L8L1**				6.94		
	2-1/2	**ANRA04L863**			8-11/16	6.83		

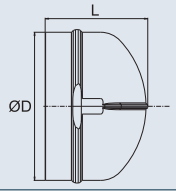
Use two connectors (ANRR01) to connect reducing tees (ANRA04) to SmartPipe pipes Ø 168, Ø 101, and Ø 76 and to connect pipe-to-pipe connectors AN6606 to SmartPipe pipes Ø 63.

RA66 Plug-in Reducer

Ø D1 (mm)	Ø D2 (mm)	Part No.	L	Wt.	Product Photo	Dimensional Drawing
168	101	**ANRA66L8L3**	8-1/4	3.31		
	76	**ANRA66L8L1**	9-13/16	3.06		

Use one connector (ANRRAN01) to connect plug-in reducer (RA66) to SmartPipe pipe.

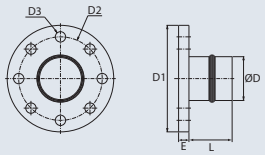
RA25 End Cap

ØD (mm)	Part No.	L	Wt.	Product Photo	Dimensional Drawing
168	**ANRA25L800**	4-5/8	2.58		

Use one connector (ANRR01) to connect end caps (ANRA25) to SmartPipe pipe.

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

RA31 Flange Adaptor

ØD (mm)	DN	Part No.	D1	D2	D3	E	L	Wt.	Product Photo	Dimensional Drawing
168	5-5/16	**ANRA31L800**	11	9-7/16	7/8	2	3-15/16	7.56		

**ANRA31 dimensions conform to ANSI standards*

EW05 Flange Gasket

ØD (mm)	Part No.	For use with Flange Reference	Wt.	Product Photo
168	**ANEW05L800**	ANRA31L800	0.18	

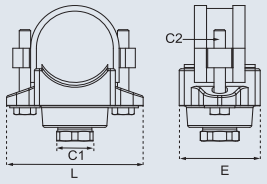
EW06 Flange Bolt Kit

Part No.	C (UNC)	L	Wt.	Product Photo
ANEW060005	M20	3-1/8	0.20	

**Kit contains eight bolts and eight nuts.*

Quick Assembly Direct Feed Brackets

RR63 Simple Reducing Bracket

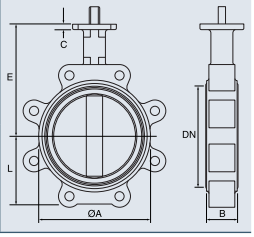
ØD (mm)	Part No.	C1 (NPT)	C2	E	L	Wt.	Product Photo	Dimensional Drawing
168	**ANRR63L8N12**	1-1/2	16	3-9/16	9-1/4	7.50		
	ANRR63L8N16	2		4-1/16				

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Ø 168

Valves

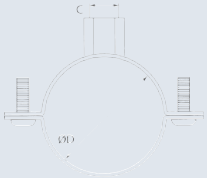
VR03 Butterfly Valve

ØD (mm)	DN	Part No.	ØA	B	E	L	C	Wt.	Product Photo	Dimensional Drawing
168	6	**AN3171306**	8-1/16	2-1/16	8-1/16	5	3/8	24.91		

Valve is not supplied with bolt kit. Bolt kit part number is ANFNWLBBZ1U. Valve has a bonded seal and does not require a flange gasket. ANSI standard class 150.

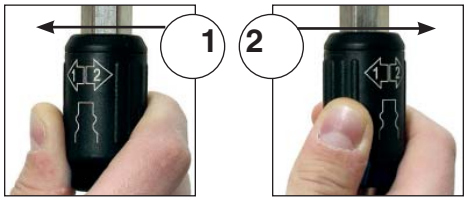
Mounting Hardware

ER01 Rubber Insulated Pipe Mounting Bracket

ØD (mm)	Part No.	C1 (UNC)	Wt.	Product Photo	Dimensional Drawing
168	**ANER01L800**	3/8	0.26		

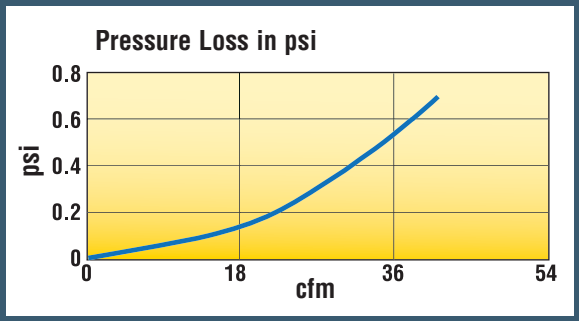
Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Composite Quick-Connect Couplers and Plugs

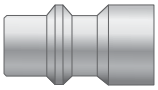


SmartPipe couplers are designed for easy one-handed connection and disconnection. To connect, simply press the plug into the coupler port. To disconnect, twist the coupler sleeve once to the left to vent pressure, then once to the right to release the plug. These couplers comply with ISO 4414 and EN 983 safety standards.

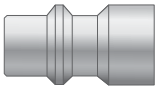
Pressure Loss in Couplers



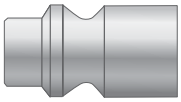
Cv rating = 1.24



ISO B 1/4
ISO 6150 B
AFNOR NF 4-053
US.MIL.C4109
CEJN 310
RECTUS 23-24



ISO B 3/8
ISO 6150 B
AFNOR NF 4-053
US.MIL.C4109
CEJN 430
RECTUS 30



ARO B 1/4
ARO 210
CEJN 300
ORION 44510
PARKER 50
RECTUS 14-22

ISO B 1/4 Body

Male NPT

Product Photo	Part No.	NPT
	ANCP05U1N02	1/4
	ANCP05U1N03	3/8
	ANCP05U1N04	1/2

Male Plug NPT

Product Photo	Part No.	NPT
	ANCA84U1N02	1/4”
	ANCA84U1N03	3/8”

Female Plug NPT

Product Photo	Part No.	NPT
	ANCA83U1N02	1/4”
	ANCA83U1N03	3/8”

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Composite Quick-Connect Couplers and Plugs

ISO B 3/8 Body

Male NPT

Product Photo	Part No.	NPT
	ANCP05U2N02	1/4
	ANCP05U2N03	3/8
	ANCP05U2N04	1/2

Male Plug NPT

Product Photo	Part No.	NPT
	ANCA84U2N02	1/4”
	ANCA84U2N03	3/8”

Female Plug NPT

Product Photo	Part No.	NPT
	ANCA83U2N02	1/4”
	ANCA83U2N03	3/8”

ARO 1/4 Body

Male NPT

Product Photo	Part No.	NPT
	ANCP05A1N03	3/8
	ANCP05A1N04	1/2

Male Plug NPT

Product Photo	Part No.	NPT
	ANCA84A1N02	1/4”
	ANCA84A1N03	3/8”

Female Plug NPT

Product Photo	Part No.	NPT
	ANCA83A1N02	1/4”
	ANCA83A1N03	3/8”

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Installation Tools

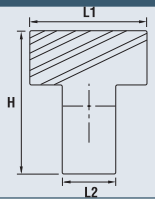
6698 Tool Case

For SmartPipe	Part No.	H	L	I	Wt.	Product Photo
Ø 16.5 - 25 - 40 - 50 - 63	**AN66980005**	12-7/8	11-3/8	4-5/32	13.0	

This tool case simplifies using and transporting tools. It contains all the tools necessary for completing a SmartPipe installation.

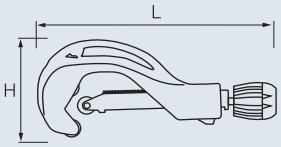
- *Drilling fixtures* *AN66980103 and AN669801*
- *Drilling Tools* *AN66980201*
- *Cutter for pipe* *AN66980301*
- *Chamfer tool* *AN66980401*
- *Deburring tool* *AN66980402*
- *Set tightening spanners (2)* *AN66980503*
- *Marking tool* *AN66980403*

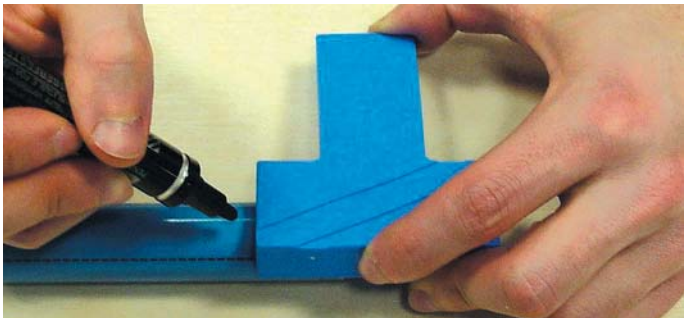
6698 Marking Tool for Aluminum Pipe

For SmartPipe	Part No.	H	L1	L2	Wt. (oz.)	Product Photo	Dimensional Drawing
Ø 16.5 - 25 - 40	**AN66980403**	3-7/16	2-7/8	1-1/4	0.38		

The marking tool enables connection guidelines to be marked on cut lengths of SmartPipe pipes. These marks indicate the insertion limits of the pipe into the fitting in order to ensure good airtight connection and security of grip.

4A51 Pipe Cutter

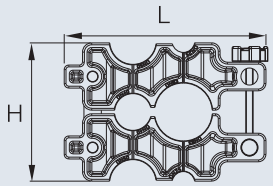
For SmartPipe	Part No.	L	H	Wt. (oz.)	Product Photo	Dimensional Drawing
Ø 16.5 - 25 - 40 - 50 - 63	**AN4A515**	9-1/16	3-13/16	28.8		
Ø 76 - 100	**AN4A516**					
Ø 168	**AN1X0Y6**	23-5/8	11-13/16	31.5		



Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

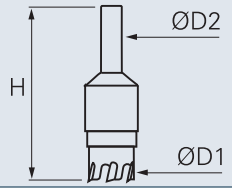
Installation Tools

6698 Drilling Fixture for Rigid Aluminum

For SmartPipe	Part No.	H	L	Wt.	Product Photo	Dimensional Drawing
Ø 25 - 63	**AN66980103**	6	8-5/8	3.81		

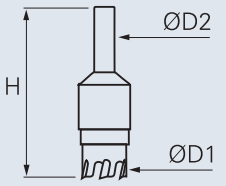
After drilling, deburr and clean the pipe.

6698 Drilling Tool for Rigid Aluminum Pipe

For SmartPipe	Part No.	ØD1	ØD2	H	Wt.	Product Photo	Dimensional Drawing
Ø 25	**AN66980202**	5/8	7/16	2-7/8	0.33		

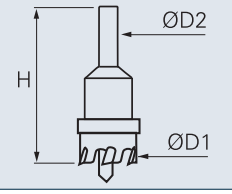
Drilling tool AN66980202 allows the installation of Ø 25 SmartPipe brackets. Can be used with all types of drills.

6698 Drilling Tool for Rigid Aluminum Pipe

For SmartPipe	Part No.	ØD1	ØD2	H	Wt.	Product Photo	Dimensional Drawing
Ø 40- 63	**AN66980201**	7/8	1/2	2-3/4	0.33		

Drilling tool AN66980201 allows the installation of Ø 40 and Ø 63 SmartPipe brackets. It is also used to create the two holes needed for double-clamp ring connectors when cutting to length Ø 63 SmartPipe pipe.

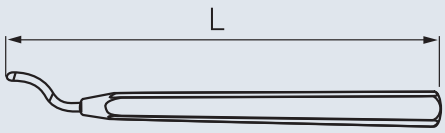
6698 Drilling Tool for Rigid Aluminum Pipe

For SmartPipe	Part No.	ØD1	ØD2	H	Wt.	Product Photo	Dimensional Drawing
Ø 76 - 168	**ANEW090030**	1-3/16	1/2	2-3/4	0.43		

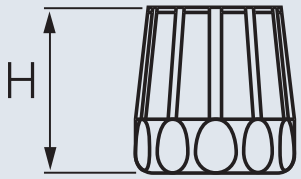
Drilling tool ANEW090030 allows the installation of Ø 76 and Ø 100 SmartPipe direct feed brackets. After drilling, it is important to deburr and clean the pipe.

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

6698 Deburring Tool for Aluminum Pipe

Part No.	L	Wt.	Product Photo	Dimensional Drawing
AN66980402	5-1/2	0.01		

6698 Chamfer Tool for Aluminum Pipe

For SmartPipe	Part No.	H	Wt.	Product Photo	Dimensional Drawing
Ø 16.5 - 25 - 40	**AN66980401**	2-1/2	0.80		

Spanner Wrenches for Ø 63 mm Fittings

For SmartPipe	Part No.	Wt.	Product Photo
Ø 50 - 63	**AN66980503**	1.68 ea.	

This set includes two tightening spanners.

Portable Tool Kit

Part No.	V	Wt.	Product Photo
ANEW010002	14	20.9	

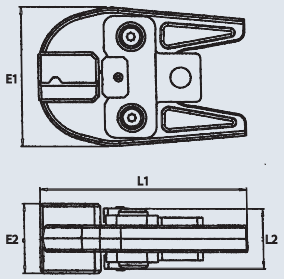
This case contains: 1 - portable tool, 1 - 14V battery, and 1 - battery charger. It does not include forming jaws.

Dimensions in inches (in) and weight in pounds (lbs.) unless othewise noted.

Installation Tools

Ø 76, 100, 168 Only

Forming Jaws for Portable Tool

ØD	Part No.	E1	E2	L1	L2	Wt.	Product Photo	Dimensional Drawing
76	**ANEW02L100**	4	2-1/16	6	1-13/16	5.7		
100	**ANEW02L300**		2-3/4			6.2		
168	**ANEW02L800**		2-3/4			9.0		

14V Battery for Portable Tool

Part No.	V	Wt.	Product Photo
ANEW030001	14	1.48	

Minimum number of lugs

Ø 3”	Ø 4”	Ø 6”
5	**6**	**10**

IMPORTANT! DO NOT OVERLAP THE LUGS.

Installation Guidelines

The following pages provide detailed guidance for assembling and installing SmartPipe components. Below are general planning and installation guidelines:

SmartPipe has been specially designed for compressed air and vacuum applications. It may also be used for inert gases such as argon and nitrogen. Consult Kaeser regarding use with other gases/fluids.

SmartPipe installation should be performed in accordance with good safety practices regarding working at heights, eye and ear protection, ventilation, static electricity, etc.

When modifying an existing SmartPipe installation (disassembling, adding drops, etc.), make sure the system is depressurized before doing any work.

Flexible hose is recommended on the compressor pad to absorb vibrations (especially with piston compressors) and facilitate maintenance. It should also be used to correct for misaligned piping, bypass obstacles, and allow for expansion/contraction.

The diameter of the pipe will influence pressure drop and the operation of point-of-use equipment. Select the diameter according to the required flow rate and acceptable pressure drop at the point of use. Refer to the sizing chart under Technical Specifications earlier in this guide. Also, to avoid excessive pressure loss, plan the system with minimal bends, bypasses, and in-line pipe reductions.

Plan for expansion/contraction and deflection prior to assembly. Follow guidelines provided below.

Position drops as close as possible to the point of use. This minimizes the use of hoses which can be tripping hazards and common sources of air leaks and pressure drops.

Once an installation or modification is complete, make sure all connections are full and tight before pressurizing the system.

Do not bury SmartPipe underground or immerse/encase SmartPipe in concrete, foam, or other solid material.

Do not use SmartPipe as structural support for other equipment or hang anything from SmartPipe.

Do not use SmartPipe to electrically ground any other equipment.

Do not expose SmartPipe to caustic or corrosive chemicals.

Do not weld SmartPipe.

Do not bend SmartPipe except in certain situations. Please contact Kaeser for further information.

Do not connect rigid SmartPipe to the compressor. Use flexible hose to absorb vibrations and always use anti-whiplash strap.

Do not use SmartPipe where the compressed air temperature is above 140°F.

Do not use pipe wrench to tighten fittings on 16.5, 25, or 40 mm pipe.

Safety Instructions

- The SmartPipe installation is to be used only for compressed air and inert gases; for other compatible fluids, please consult the factory.
- The SmartPipe installation may be attached to a ceiling only if the clips are fixed to a solid base or to 3/8” threaded rod hangers. The base must allow a proper alignment of fixing clips in order to ensure their stability and efficiency when normal expansion and contraction occur. Refer to ASME B31.3 and local codes.
- The SmartPipe installation must be protected against mechanical and other shocks and impacts, and particular care must be taken to protect tubes and other components in areas where fork lift trucks, other moving vehicles, moving equipment, or other activity creates a risk of contact with the SmartPipe system.
- SmartPipe rigid tubes must not be bent, welded, twisted, or deformed, as this decreases the strength and integrity of the pipe system.
- SmartPipe tubes and connectors must not be subjected to greater numbers of rotations than are specified in the installation guide.
- The effects of expansion and contraction in the particular application must be considered, to avoid having components become deformed, leading to failure.
- All of the technical characteristics of the SmartPipe system must be taken into account in the installation and assembly for the particular application. The technical characteristics are found in the SmartPipe catalog and the Installation Guide.
- All SmartPipe assembly, installation, and service must be done by properly trained personnel familiar with the products, their characteristics, their limitations, the hazards involved, OSHA and other applicable safety requirements, and the assembly and installation requirements.
- The SmartPipe installation must meet all safety standards in OSHA or any other applicable regulations, requirements or standards.
- Air pressure in the system must not exceed 232 psi. Higher pressures increase the risks of breakage and leaks. Consult the factory for specific applications.
- The SmartPipe system may not be used in an environment with ambient temperatures in excess of 140° F. Such temperatures may cause leakage in seals.
- The air pressure must be turned off during assembly, installation, repair, service, or replacement.
- The SmartPipe system should be pressure tested after installation is complete, but before the system is put into operation. Likewise, the system should be pressure tested after any servicing or repairs, and after any abnormal circumstances, such as extreme temperatures or physical shock.
- All procedures and descriptions in the Installation Guide must be followed.

WARNING: Installation and assembly must be completed as set forth in the Installation Guidelines. Failure to comply precisely with these instructions can cause unsafe operating conditions and serious personal injury or death. Compressed air systems involve inherent hazards, and if pieces are not properly assembled and installed, end pieces could blow off, creating the potential for serious injury to those in the area, and pipe and joint breakage and air leaks may occur, exposing those in the area to the risk of injury from air under pressure or from falling or moving pipes or other parts of the system. Take particular care with installation of end caps and wall brackets.

Piping

General

SmartPipe aluminum pipe is supplied ready for use. No particular preparation (cutting, deburring, chamfering, etc.) is required unless the tube is cut.

Thanks to the rigidity of SmartPipe aluminum pipe, temperature-related expansion/contraction is reduced to a minimum. The SmartPipe network retains its straightness, and hence its performance, over time (reduction of pressure drop caused by surface friction).

SmartPipe aluminum pipe is calibrated and fits perfectly with all SmartPipe components. Each connection is automatically secured and seated, which minimizes corrosion to the internal surface.

SmartPipe has a protective powder coating (Qualicoat certified) and is thus protected from external corrosion, its color allows the network to be immediately identified and gives a clean and uniform appearance.

Ø 16.5

Ø 25

Ø 40

Ø 50

Deburred and chamfered pipe

Ø 63

Pipe pre-drilled at each end with two 22 mm diameter holes, deburred and chamfered

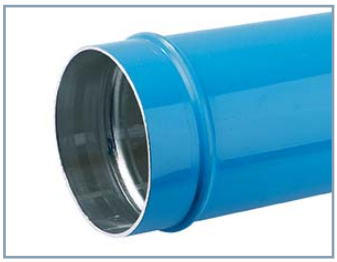
Ø 76

Pipe lugged at each end, deburred and chamfered

Ø 100

Pipe lugged at each end, deburred and chamfered

Ø 168



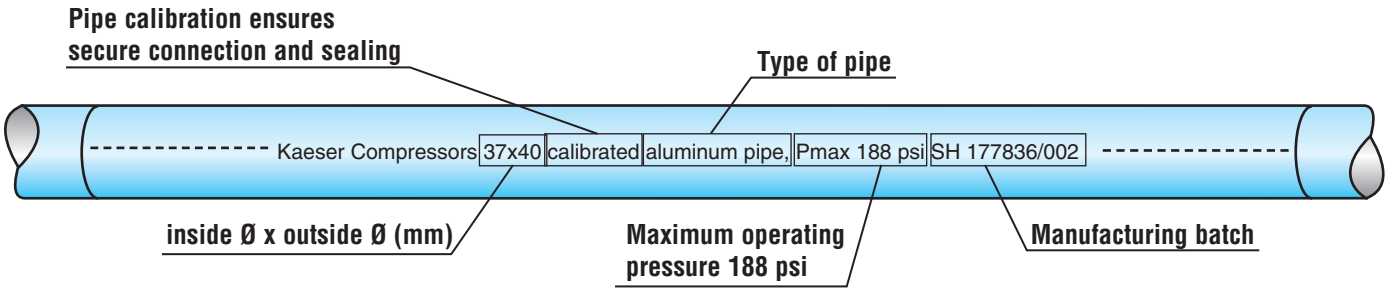
Pipe lugged at each end, deburred and chamfered

Piping

Marking

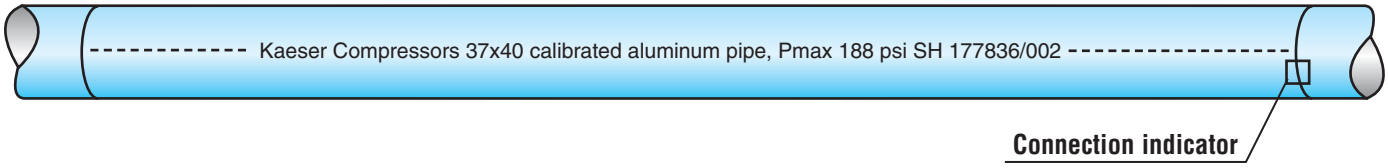
The transported fluid can be instantly identified by the color of the pipe

ex: Blue pipe -- compressed air network



Connection indicator

Only on Ø 16.5 - Ø 25 - Ø 40 aluminum pipe



Drilling locator

Mark lines for correct drilling

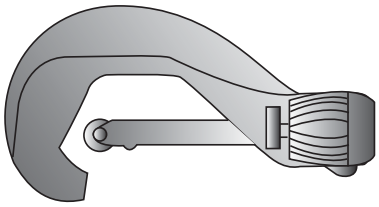
Only on Ø 16.5 - Ø 25 - Ø 40 - Ø 50 - Ø 63 aluminum pipe

Drilling locators are used to correctly position SmartPipe brackets onto the pipe.

There are two locators on each pipe. The second locator is used to position a second bracket perpendicular to the first.

Ø 16.5, 25, 40

Tools



Pipe cutter for aluminum pipe
ref. AN66980301

Chamfer tool for aluminum pipe
ref. AN66980401

Deburring tool for aluminum pipe
ref. AN66980402

Marking tool for aluminum pipe
ref. AN66980403

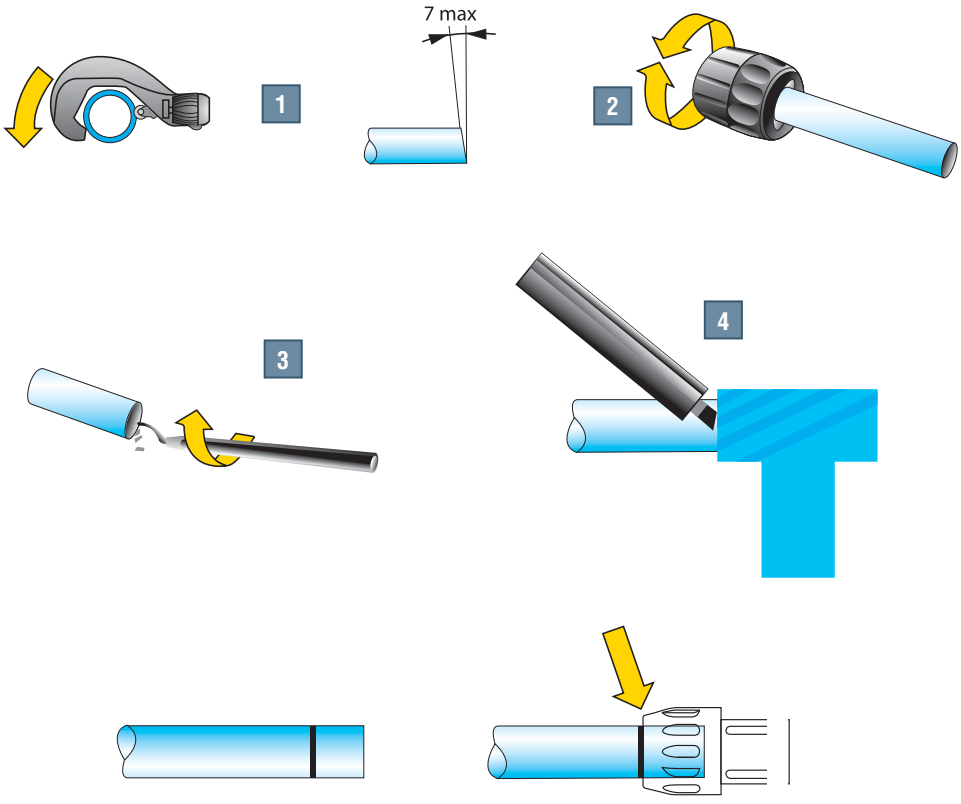
Procedure

1 Cutting the pipe:
- place the pipe in the pipe cutter
- position the blade onto the pipe
- rotate the pipe cutter around the pipe while gently tightening the wheel

2 Carefully chamfer the outer edges

3 Deburr the inner end of the pipe

4 Trace the connection indicator using the marking tool



Insertion Lengths

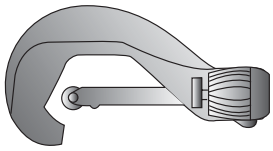
Pipe		End Cap 6625 Series
Ø	mm	mm
16.5	25	39
25	27	42
40	45	64

The insertion lengths for Ø 16.5, 25, and 40 connectors are 25 mm, 27 mm, and 45 mm respectively with the exception of the end cap, 6625 series, for which the insertion lengths are 39 mm, 42 mm, and 64 mm respectively. To ensure a secure connection, push the pipe into the fitting until it stops.

Piping

Ø 50, 63

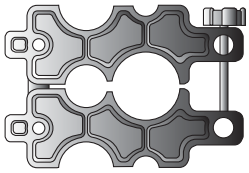
Tools



Pipe cutter for aluminum pipe
ref. AN66980301

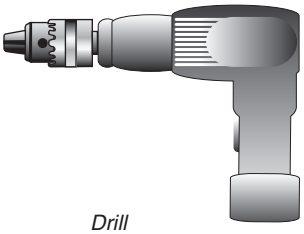
Chamfer
ref. AN66980401

Deburring tool for aluminum pipe
ref. AN66980402



Drilling jig for aluminum pipe
ref. AN66980102

Drilling tool for aluminum pipe
ref. AN66980201



Drill

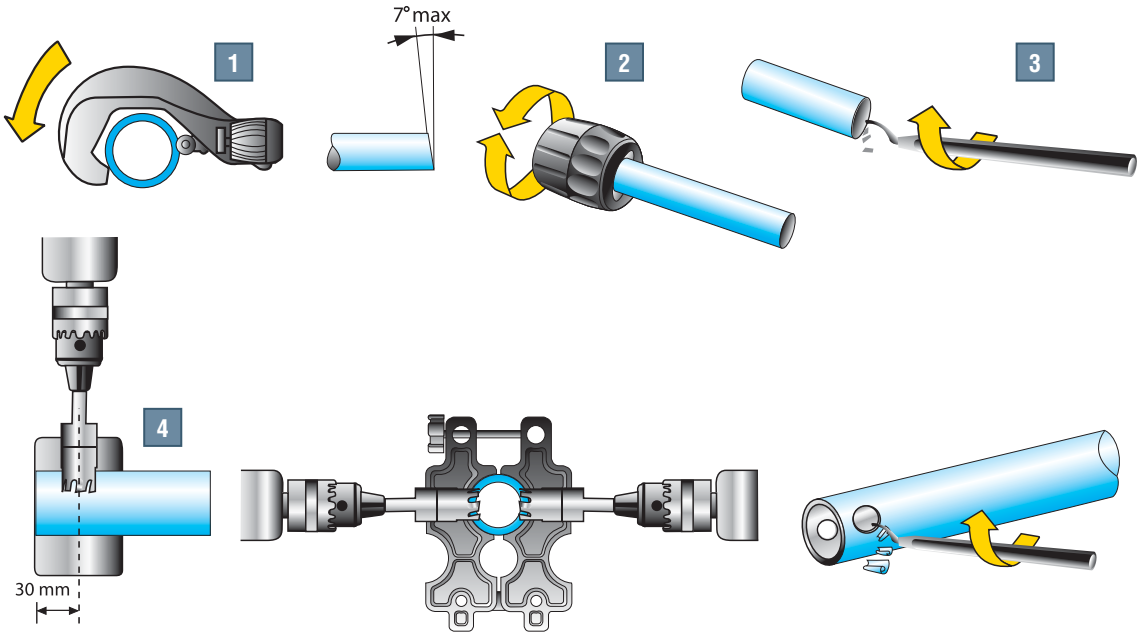
Procedure

1 Cutting the pipe:
- place the pipe in the pipe cutter
- position the blade onto the pipe
- rotate the pipe cutter around the pipe while gently tightening the wheel

2 Carefully chamfer the outer edges

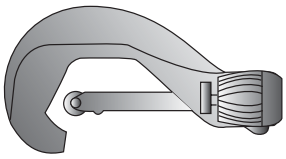
3 Deburr the inner end of the pipe

4 Drill the two clamp holes using the drilling jig and the Ø 22 mm drilling tool. Loosen the jig, release the pipe, then deburr both holes. Ensure that all outer and inner surfaces are smooth and clear of burrs and potential sharp edges.

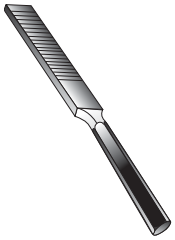


Ø 76, 100

Tools



Pipe cutter for aluminum pipe ref. AN66980301



File

Portable tool kit ref. ANEW010002 (110V)

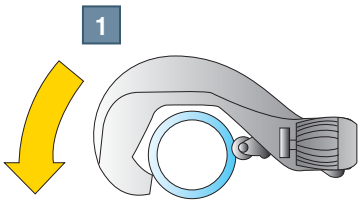
Pipe forming jaw set ret. ANEWO2L100 (Ø 76) OR (anew02l300 (Ø 100)

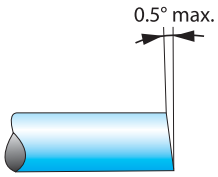
Procedure

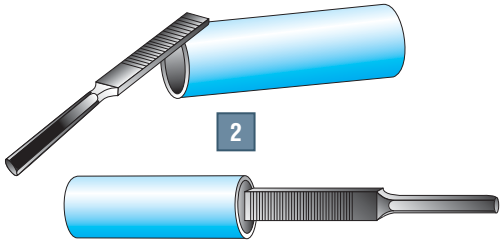
1 Cutting the pipe:
- place the pipe in the pipe cutter
- position the blade onto the pipe
- rotate the pipe cutter around the pipe while gently tightening the wheel

2 Carefully deburr and chamfer the outer edges of the pipe with a file

3 Create the lugs for Ø 76 or Ø 100 pipe



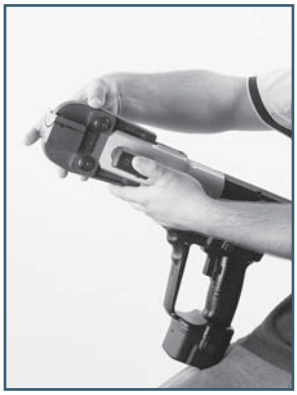




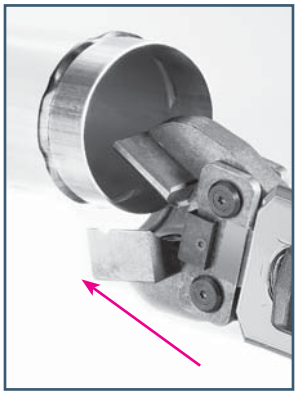
3

*Open the retaining pin at the front of the machine by pressing the jaw release button**

Place the jaws in the housing



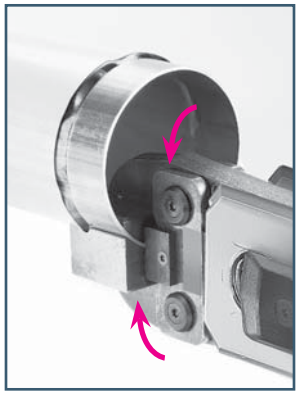
Lock in position by closing the retaining pin



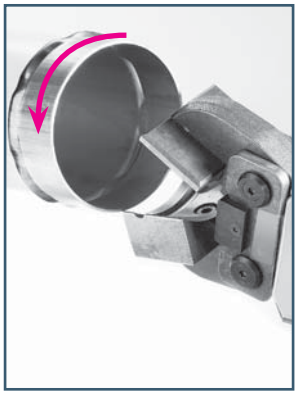
Manually open the jaws of the clamp and insert the aluminum pipe into the clamp as far as it will go

Piping

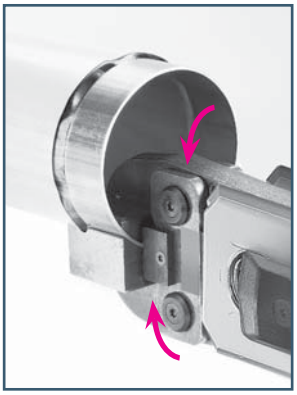
3 *Continued*



Manually open the jaws of the clamp and insert the aluminum pipe into the clamp as far as it will go



Release the jaws. Press the trigger and crimp the tube until a 'snap' sound is heard



Renew the operation until the required minumum number of lugs for each diameter is achieved.

Note: To calibrate, run the jaw through its full cycle without the pipe.

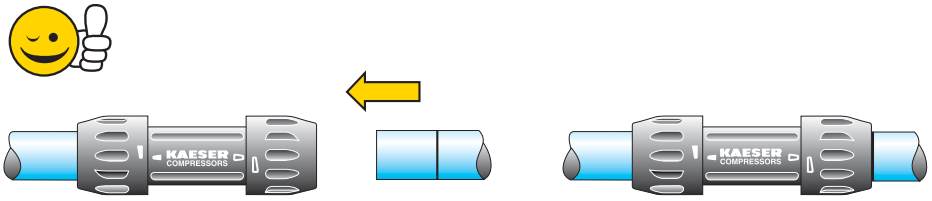
Minimum number of lugs

Ø 3"	Ø 4"	Ø 6"
5	6	10

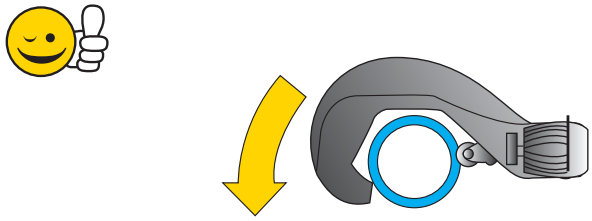
IMPORTANT! DO NOT OVERLAP THE LUGS.

Piping Do's

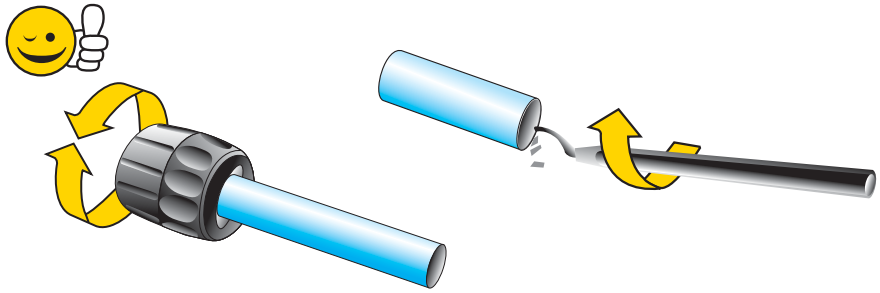
Connection:
Push to connect.



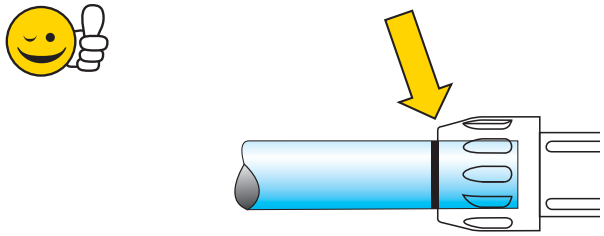
Use a pipe cutter.



Carefully chamfer and deburr the pipe after cutting or drilling.

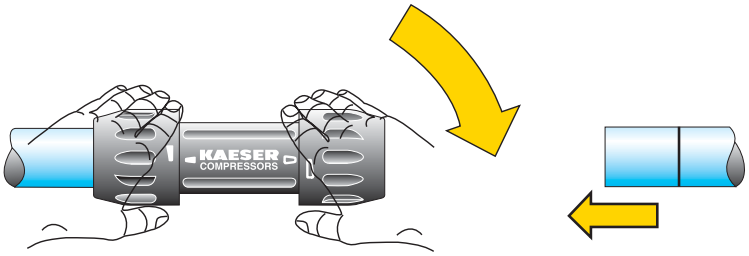


Check that the pipe is correctly positioned in the connector.

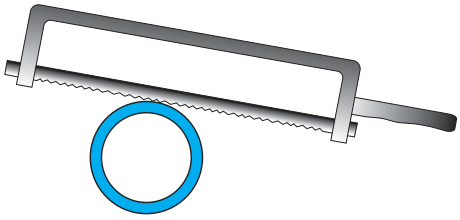


Piping Don’ts

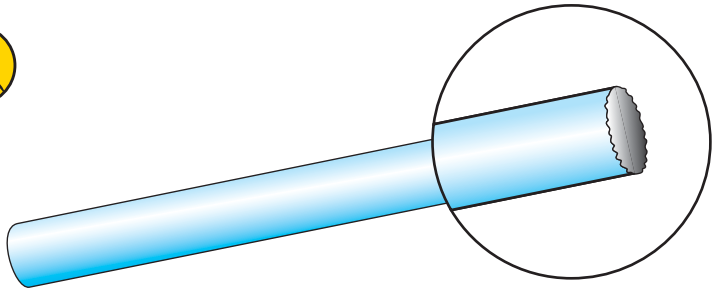
Connection:
Don’t loosen before connection



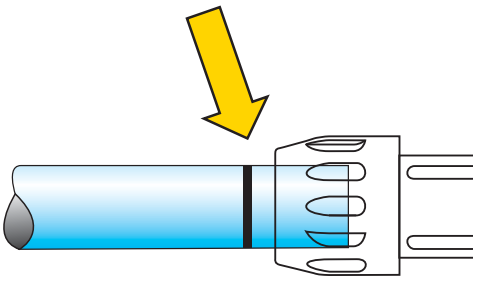
Don’t cut pipe with a saw.



Don’t leave pipe end rough after cutting it.



Don’t push the pipe in only part way.

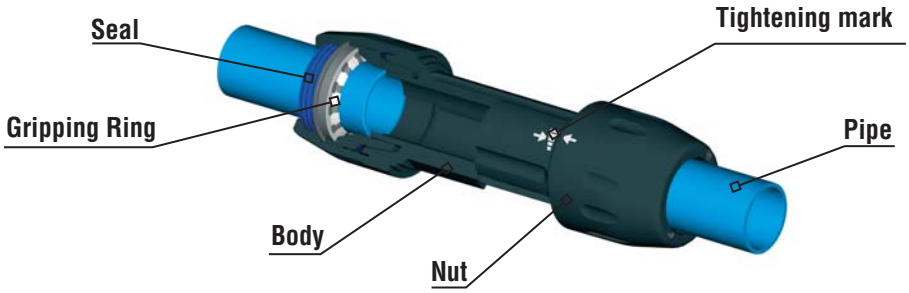


Connectors

General

Ø 16.5, 25, 40

Instant connection by means of a gripping ring



The Ø 16.5 - Ø 25 - Ø 40 connectors instantly connect to SmartPipe aluminum pipe. Simply insert the pipe into the connector up to the connector insertion mark. The internal gripping ring is then automatically secured and the connection is complete.

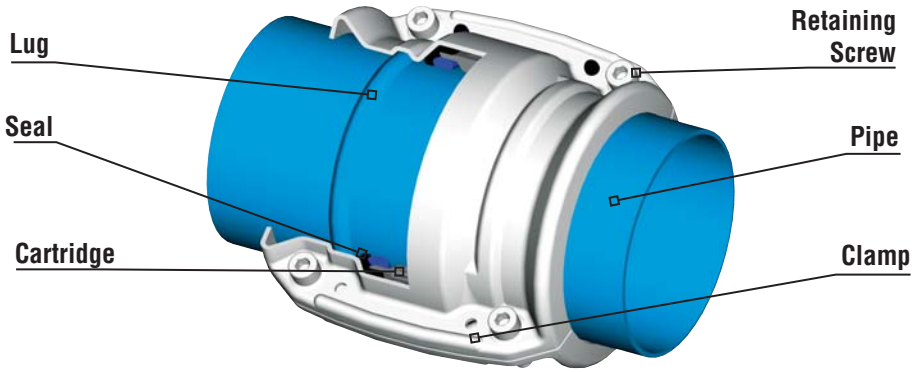
Ø 50, 63

Double clamp quick-fit connection

The Ø 50 and Ø 63 connectors are quickly secured to SmartPipe aluminum pipe by means of a double clamp, which makes the connector fully integrated with the pipe. Connection is achieved by simply tightening the nut.

Ø 76, 100, 168

Clamp quick-fit connection



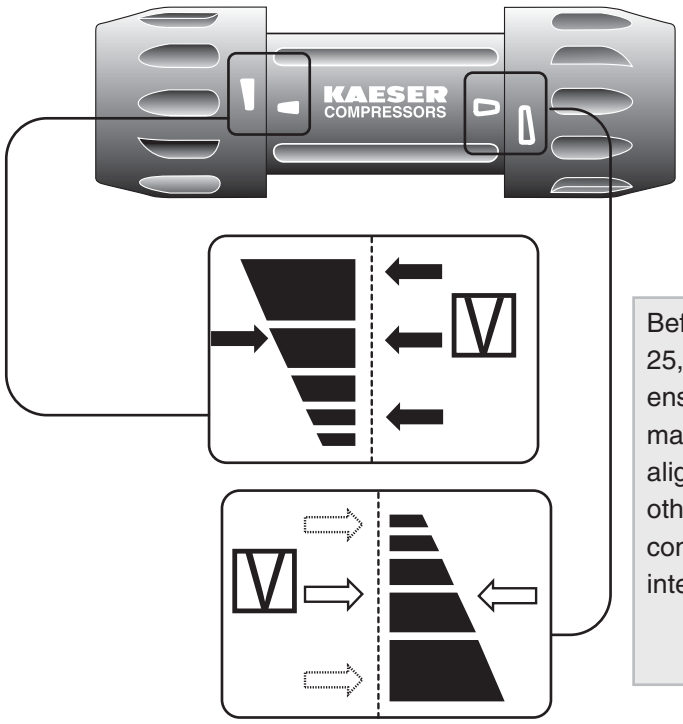
The Ø 76, Ø 100, and Ø 168 clamps secure instantly to SmartPipe aluminum pipe. Simply position the formed pipe within the SmartPipe cartridge, which acts as a seal. Close the SmartPipe clamp to secure the connection and finally tighten the four retaining screws.

Ø 16.5, 25, 40

Pre-assembled tightening indicators for connectors

There is no need to loosen the nuts prior to joining Ø 16.5, Ø 25, and Ø 40 connectors to SmartPipe aluminum pipe. Do not use pipe wrench to tighten fittings!

There are important visual markings on the bodies and nuts of SmartPipe Ø 16.5, Ø 25, and Ø 40 connectors. These are represented by solid and empty arrows and indicate the optimum torque. When assembling SmartPipe connectors, the nuts are tightened to a pre-defined torque on the body of the connector. This torque guarantees the seal and safety of each connection.



Before using Ø 16.5, Ø 25, or Ø 40 connectors, ensure that the arrow marks are correctly aligned with each other. Note that the connector nuts are **NOT** interchangeable.

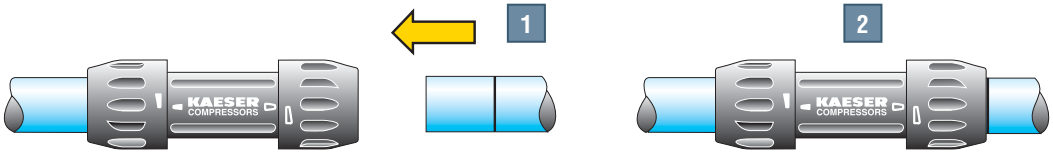
Connectors

Connection / Disconnection

Ø 16.5, 25, 40

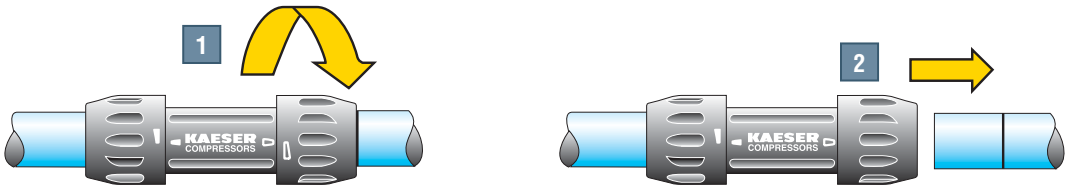
Connection

Simply insert the pipe into the connector up to the connection mark or when pipe bottoms out.



Disconnection

To disconnect, unscrew the nut by one half turn and remove the pipe.



Lateral dismantling: see page 58 of this guide.

Note: when using end caps (AN6625 series)

The insertion length is greater for end caps than for other SmartPipe connectors. The connection mark should be applied to the pipe by means of a marker and tape measure using the following values:

Ø 16.5: 39 mm
Ø 25: 42 mm
Ø 40: 64 mm

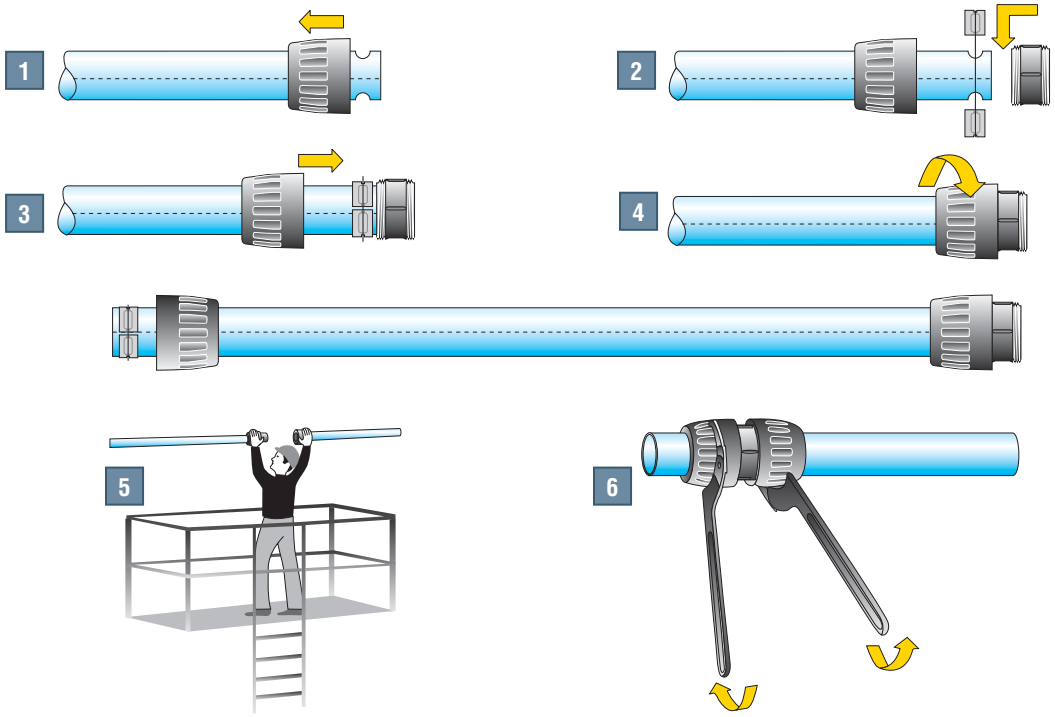
Connectors

Connection / Disconnection

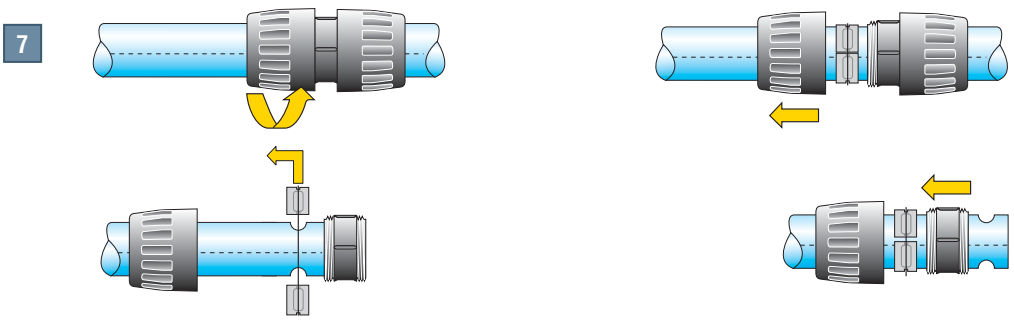
Ø 50, 63

1. Unscrew one of the connector nuts and fit over the pipe
2. Position the double clamp ring in the appropriate housings (two holes at the end of the pipe)
3. Bring the nut towards the body, which were previously positioned at the end of the pipe, until it stops against the double clamp
4. Tighten the nut by hand
5. Bring the two pipes together
6. Complete the assembly by 1/2 rotation with SmartPipe tightening spanners (ref. AN66980503)
7. To disconnect, perform the same operations in reverse order

Connection



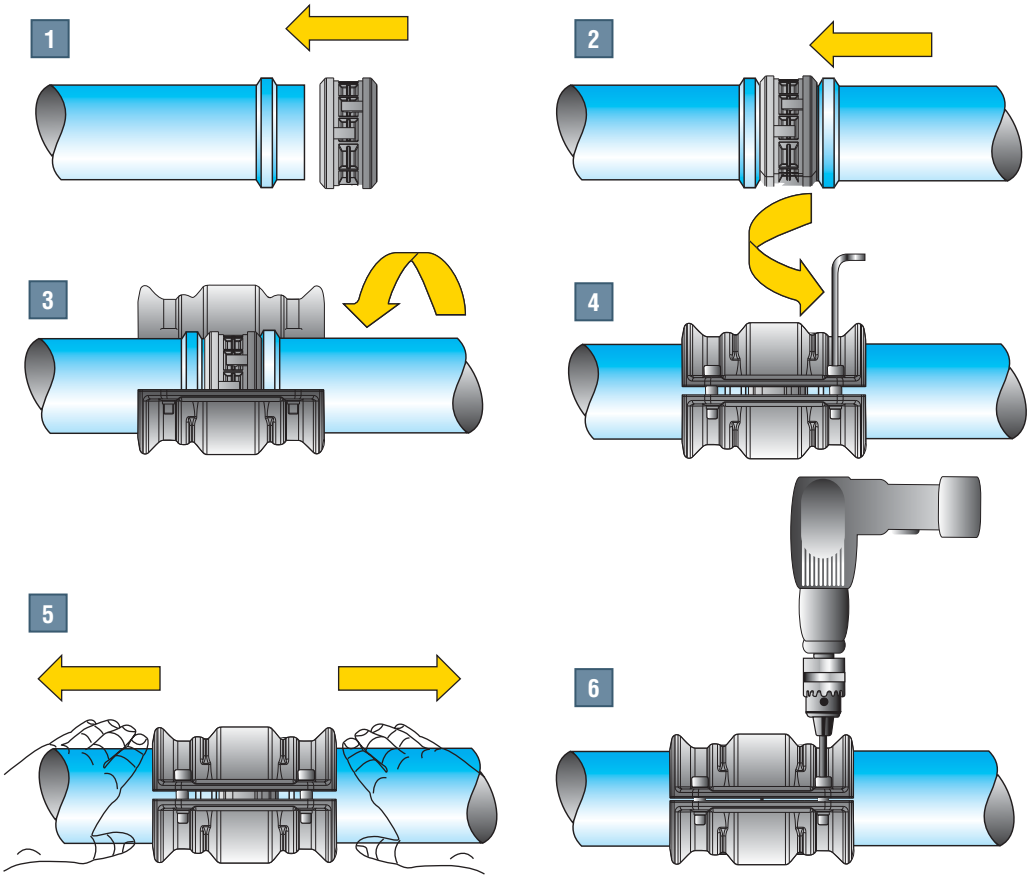
Disconnection



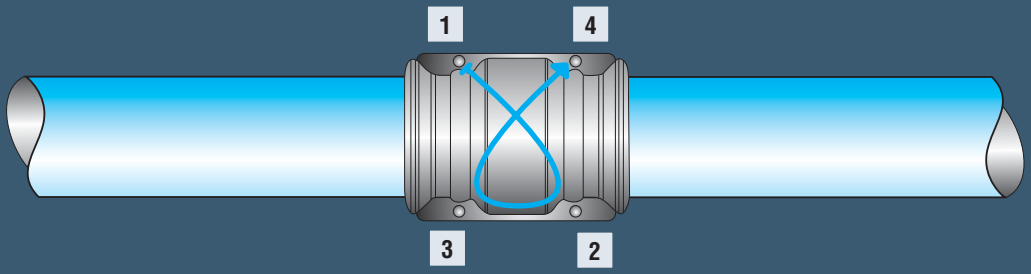
Lateral dismantling: see page 58 of this guide.

Ø 76, 100, 168

1. Slip the cartridge over the end of the first pipe fully up to the shoulder
2. Bring the second pipe to the cartridge and slide fully up to the shoulder
3. Position the clamp over the cartridge / pipe assembly
4. Hand tighten the pre-fitted screws with an Allen key
5. Pull the pipes fully back towards the outside of the clamp
6. Fully tighten the clamp screws (maximum tightening torque: final closure of clamps)



For effective clamp sealing, screw tightening should be performed on alternate sides of the clamp as shown below:

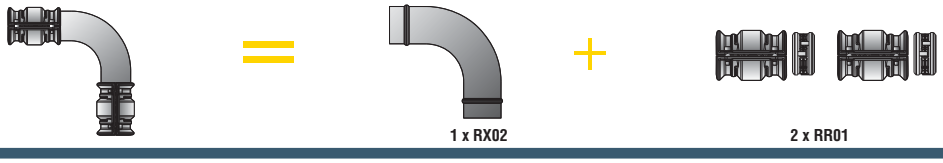


To disconnect, perform the same operations in reverse order.

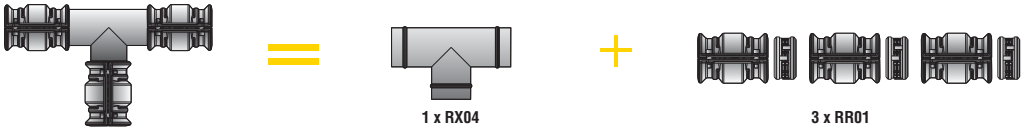
Practical Examples

Various Ø 76, Ø 100, and Ø 168 configurations

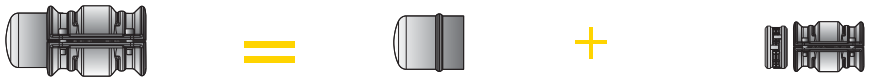
Changing direction with a 90° elbow



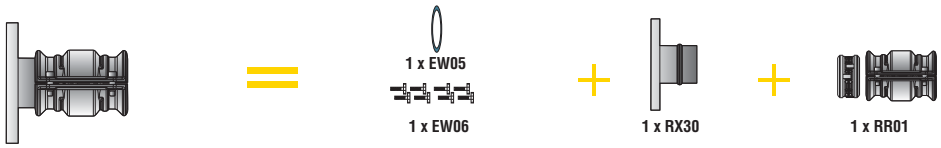
Changing direction with a tee piece



Connecting an end cap

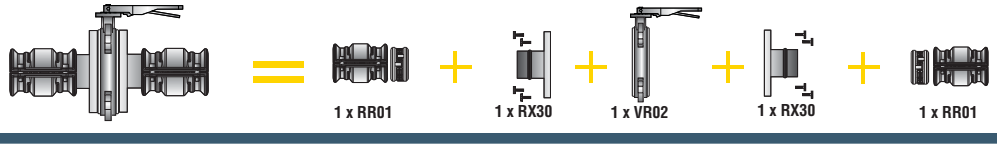


Connecting a circular flange and a connector

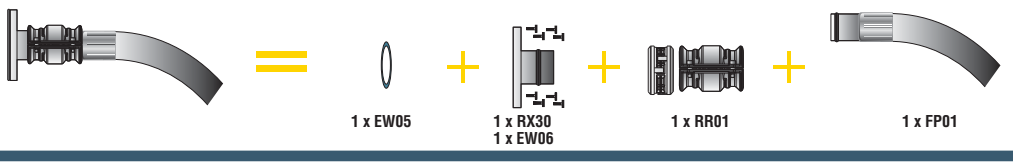


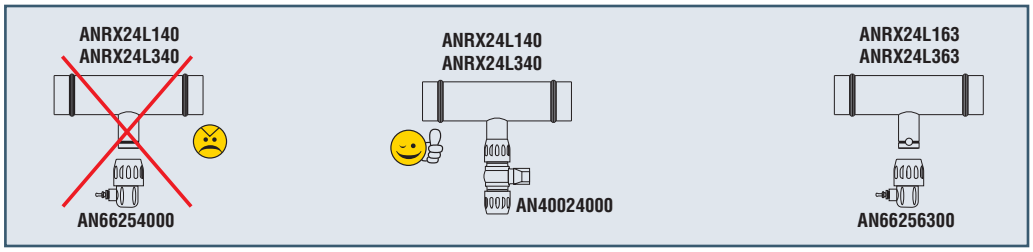
Reduction from Ø 100 to 76

Connecting a valve

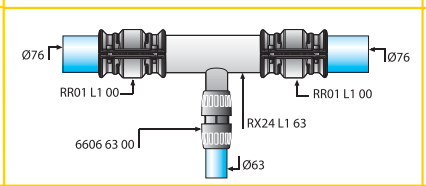
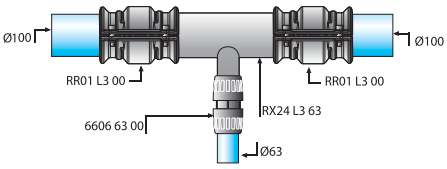
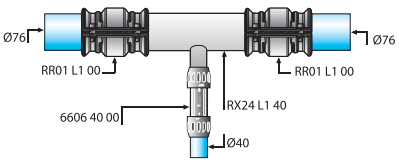
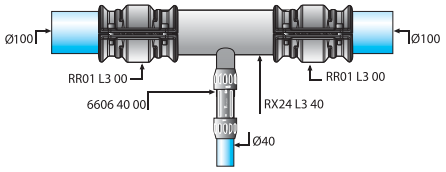
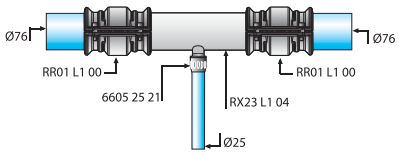
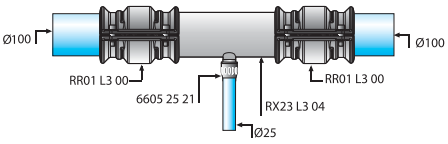
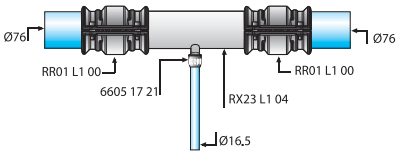
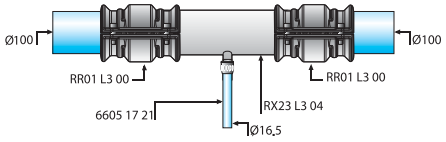


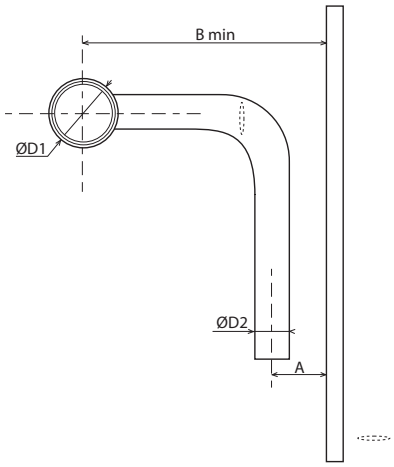
Connecting a flexible hose and a circular flange





Connecting Ø 76 or 100 piping to Ø 63, 40, 25, 16.5 piping

	Ø 76	Ø 100
Ø 50 63		
Ø 40		
Ø 25		
Ø 16.5		



Minimum pipe center-to-center mounting distances for Ø 76 and 100 tees

ØD1(mm)	ØD2(mm)	A(mm)	Bmin(mm)
100	100	90	470
100	76	80	410
100	63	90	327
100	40	46	225
100	25	46	215
100	16.5	46	200
76	76	80	420
76	63	90	314
76	40	46	212
76	25	46	202
76	16.5	46	187

Minimum pipe center-to-center mounting distances for Ø 76 and 100 brackets

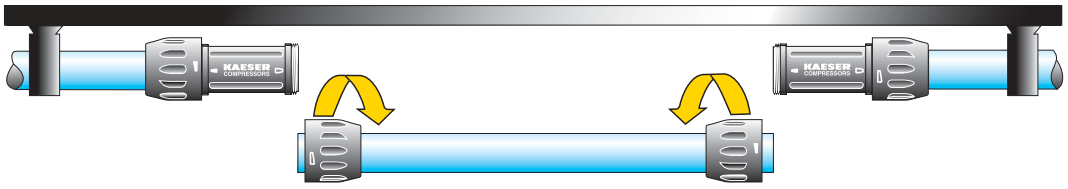
ØD1(mm)	ØD2(mm)	A(mm)	Bmin(mm)
100	25	46	250
76	25	46	240

Practical Examples

Lateral Dismantling

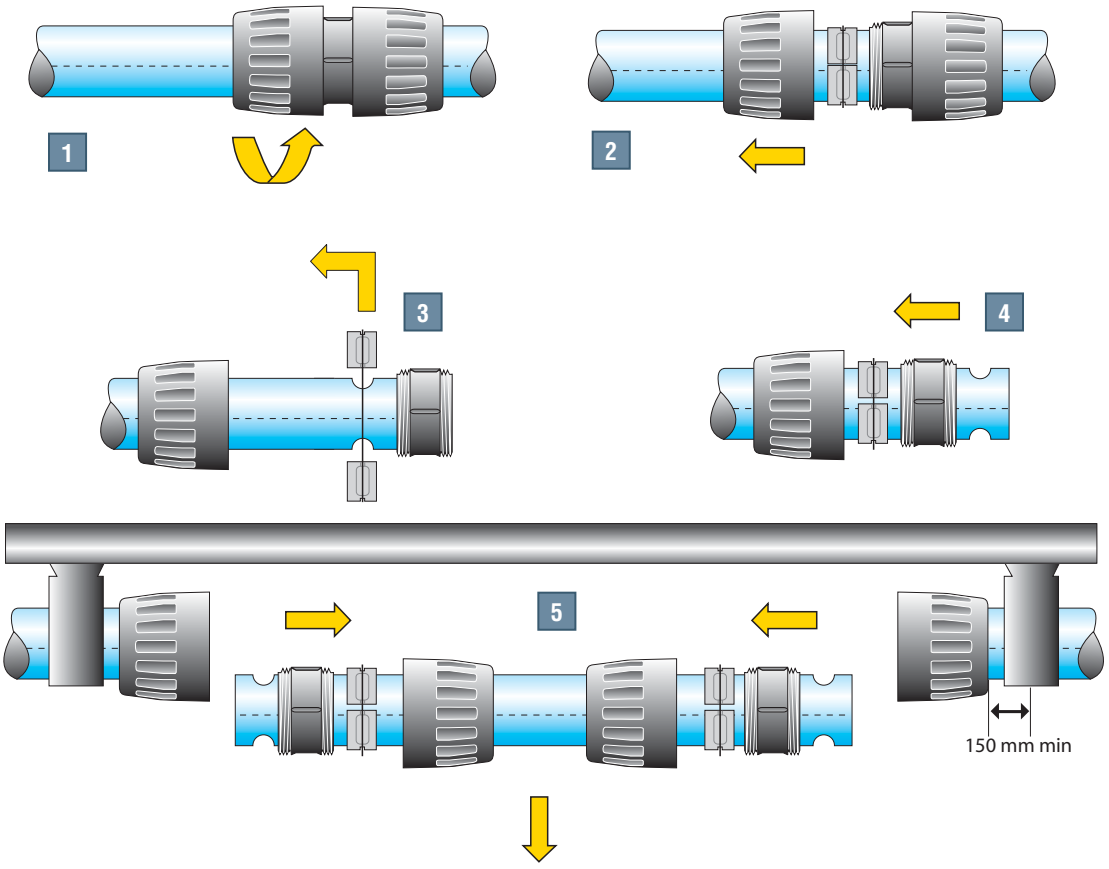
Ø 16.5, 25, 40

Loosen the nuts located on the side of the pipe to be removed and slide them along the pipe. Remove the pipe.



Ø 50, 63

1. Loosen the connector nuts on the ends of the pipe to be removed
2. Slide them along the pipe
3. Remove the clamp rings from their housings
4. Slide the clamps and the connector body along the pipe which is to be removed
5. Repeat the operation at the other end of the pipe and laterally remove the pipe, complete with the assembly components

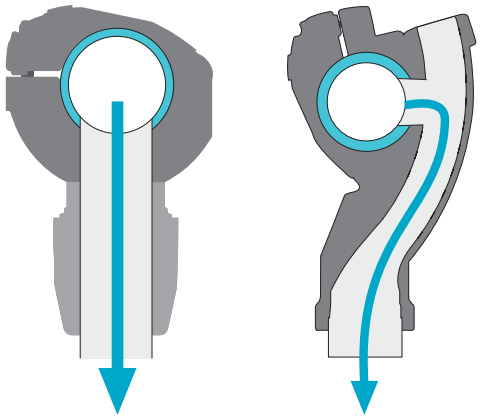


Quick Assembly Brackets

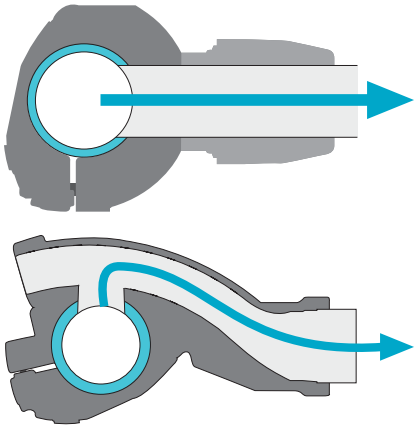
General

The easy addition of a new drop or bypass onto an existing length of pipe is an important consideration of any air pipe system. SmartPipe quick assembly brackets are designed for this very purpose, without the need to cut the pipe. A “swan neck” built into the brackets retains condensate water in the main line. Thanks to its small size, the SmartPipe quick assembly bracket facilitates new additions in the tightest places and can be used for connecting horizontal branch lines and vertical drops.

Vertical Drop

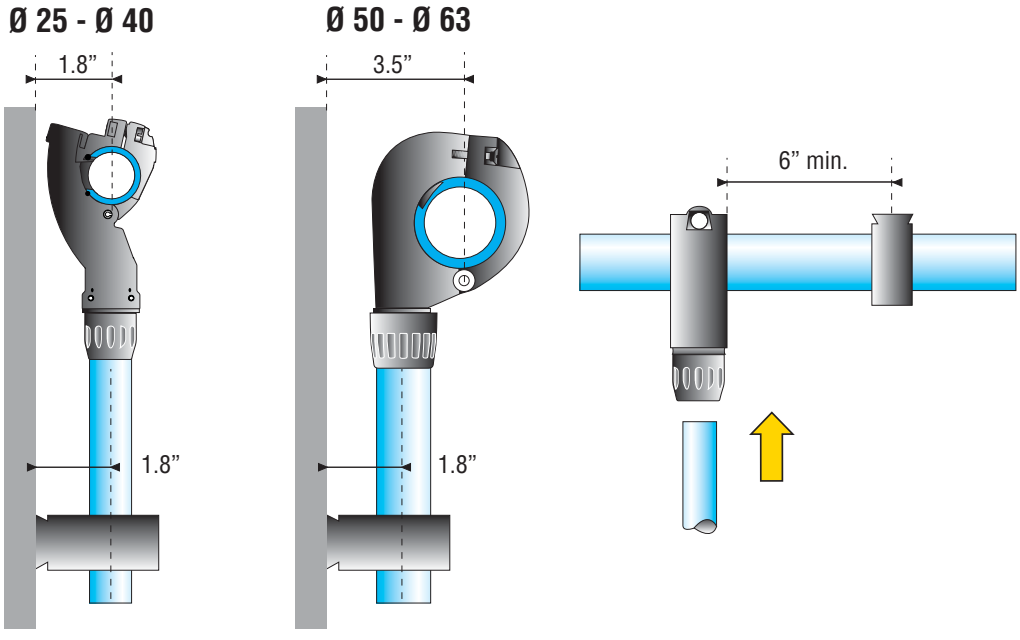


Horizontal Branch Line



Specific instructions for fitting a bracket

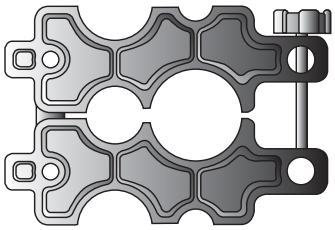
For the Ø 25 and Ø 40 SmartPipe quick assembly brackets, the pipe center to wall distance is equal to the bracket center to wall distance, i.e. 1.8”. For the Ø 50 and Ø 63 SmartPipe quick assembly brackets, the pipe center to wall distance is 3.5”. Furthermore, SmartPipe clips should be fitted at a distance of at least 6” from a quick assembly bracket in order to allow for the expansion / contraction of aluminum pipe.



Fitting a bracket to Ø 25 and Ø 40 pipe

Tools required

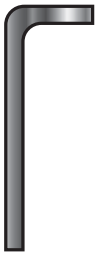
Drilling tool for aluminum pipe ref. AN66980202 or AN66980201



Drilling jig for aluminum pipe ref. AN66980101

Deburring tool for aluminum pipe ref. AN66980402

Permanent marker pen



Allen key/flat head screwdriver

Procedure

1 Mark the pipe at the desired position for the bracket, using the same locator mark when several takeoff points need to be aligned uniformly. Place the drilling jig in a vice or on the floor. To drill a hole in Ø 40 pipe, remove the retaining bolt in the jig using an Allen key and place the pipe in the jig. The locator mark on the pipe should be aligned with the appropriate guide marks on the side of the jig. Two guide lines on either side of the jig provide a rapid indication of whether the pipe is correctly positioned (the guide lines match the locator marks on the pipe). Close the jig and drill a hole using the appropriate drilling tool:

- Ø 25: Ø 16 hole > ref. AN66980202 drilling tool
- Ø 40: Ø 22 hole > ref. AN66980201 drilling tool

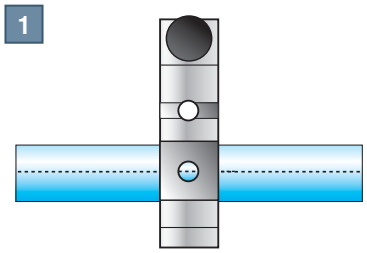
Recommended rotation speed: 650 rpm

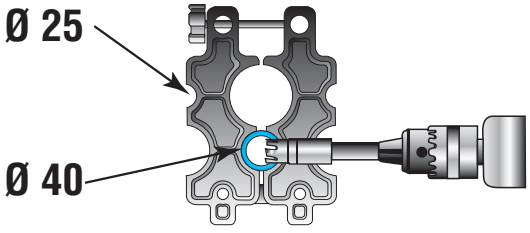
Note: Drill without lubrication.

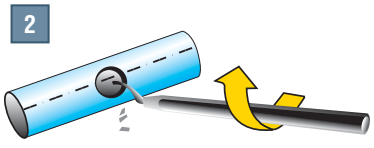
2 Release the pipe, remove any chips, and deburr the circular hole. Repeat the operation for the number of brackets that you wish to fit.

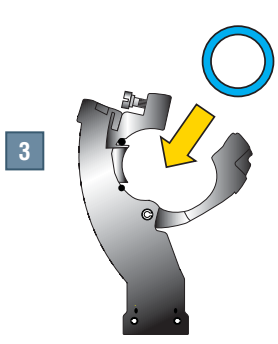
3 Position the quick assembly bracket using its location pin

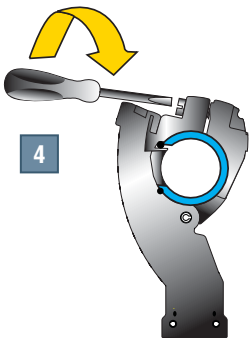
4 Tighten the screw
Remark: The jig's second drilling guide corresponds to the minimum distance for fitting two adjacent brackets.







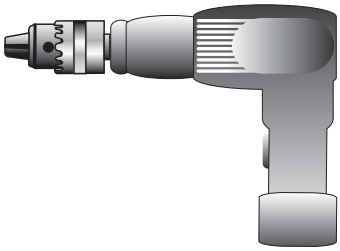




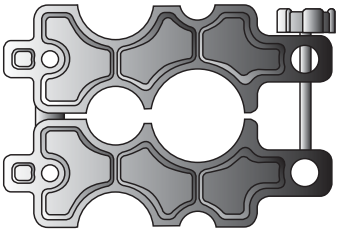
Fitting a bracket on Ø 50 and Ø 63 pipe

Tools required

Drilling tool for aluminum pipe ref. AN66980201



Drill



Drilling jig for aluminum pipe ref. AN66980101

Deburring tool for aluminum pipe ref. AN66980402

Permanent marker pen

Procedure

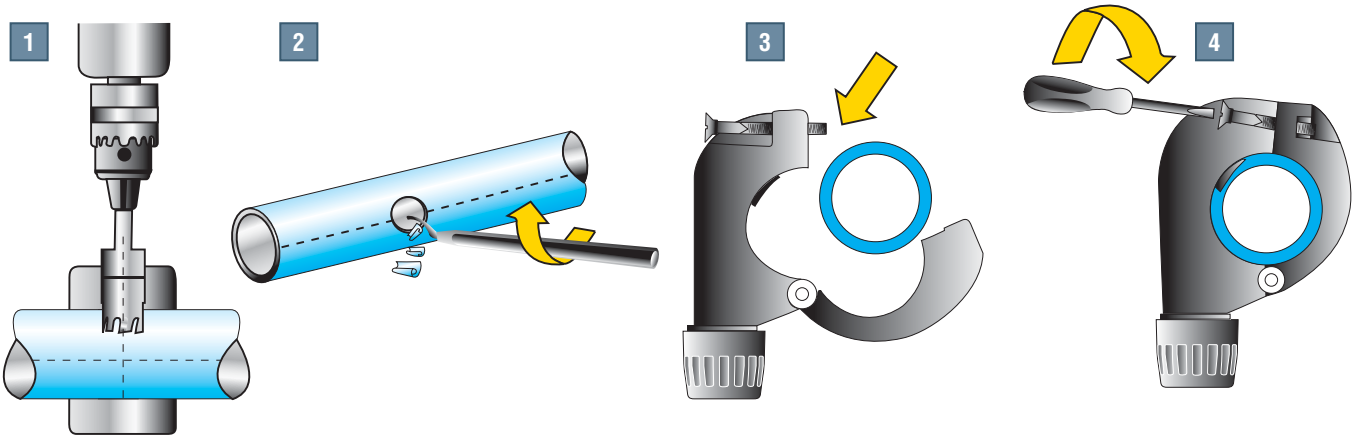
1 Mark the pipe at the desired position for the bracket. The mark should be placed on one of the locator marks so that multiple brackets are correctly aligned, when several take-off points are required. Place the Ø 63 drilling jig in a vice or on the floor and place the pipe in the jig. Ensure that the line marked on the pipe is centered within the drilling guide: two marks on either side of the jig's upper side provide a rapid indication of the pipe's positioning. Tighten the locking clamp to secure the pipe and drill using the Ø 22 drilling tool. Recommended rotation speed: 650 rpm.

Note: Drill without lubrication.

2 Loosen the locking clamp and release the pipe, remove any chips, and deburr the hole. Repeat the operation for the number of brackets that you wish to fit.

3 Position the quick assembly bracket using its location hole

4 Tighten the screw

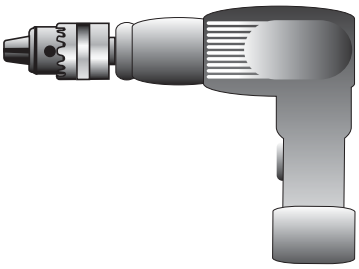


Fitting a bracket on Ø 76, 100, and 168 pipe

Tools required

Drilling tool for aluminum pipe ref. ANEW090030

Deburring tool for aluminum pipe ref. AN66980402

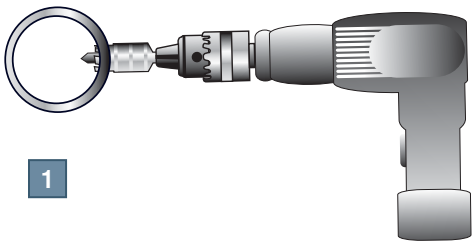


Drill

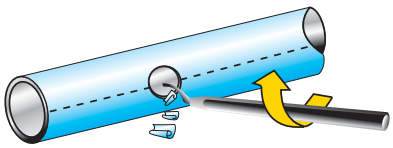
Procedure

1. Drill the aluminum pipe at the desired position using drilling tool ref. ANEW090030
2. Carefully deburr the pipe
3. Position bracket ref. ANRR61 and fully tighten the two screws
4. Screw on male adapter ref. AN66212535

Note: Use adapter ref. AN66212535 in combination with bracket ref. ANRR63 to create a Ø 25 take-off point from Ø 76 or Ø 100 pipe.



1



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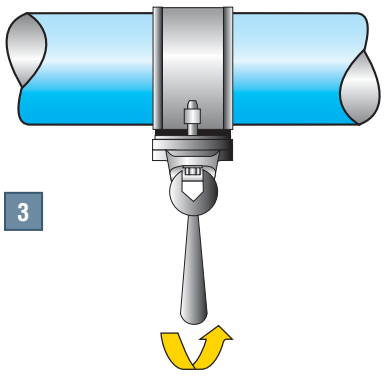

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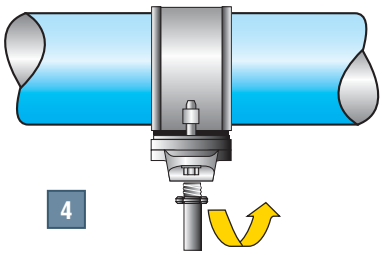
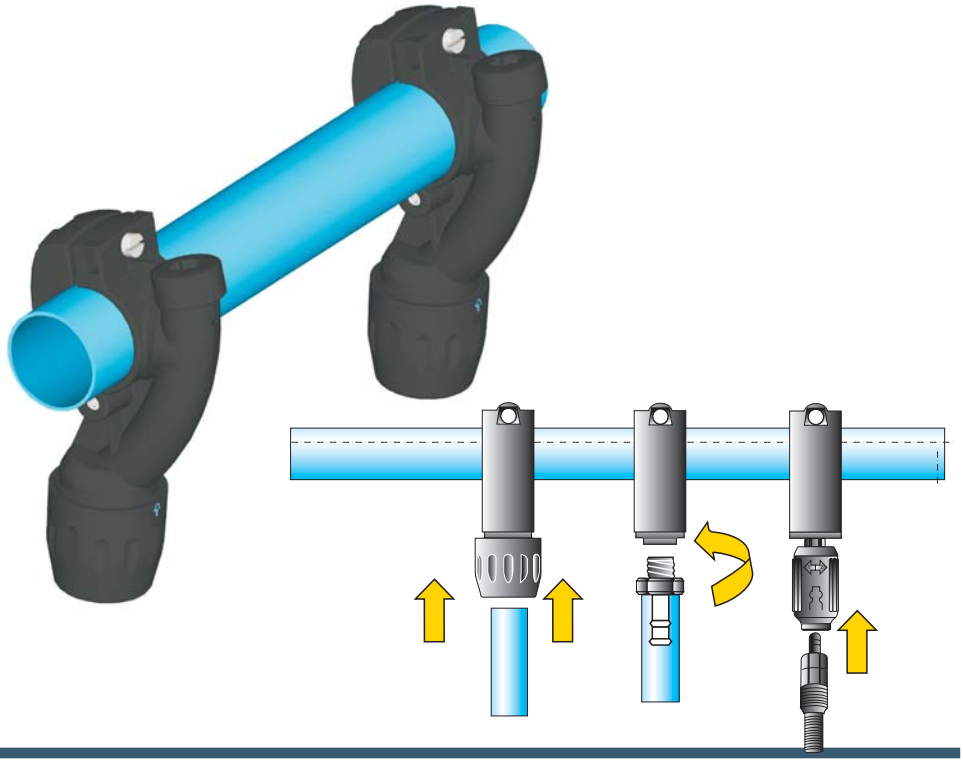


4

Quick Assembly Brackets

Practical Examples



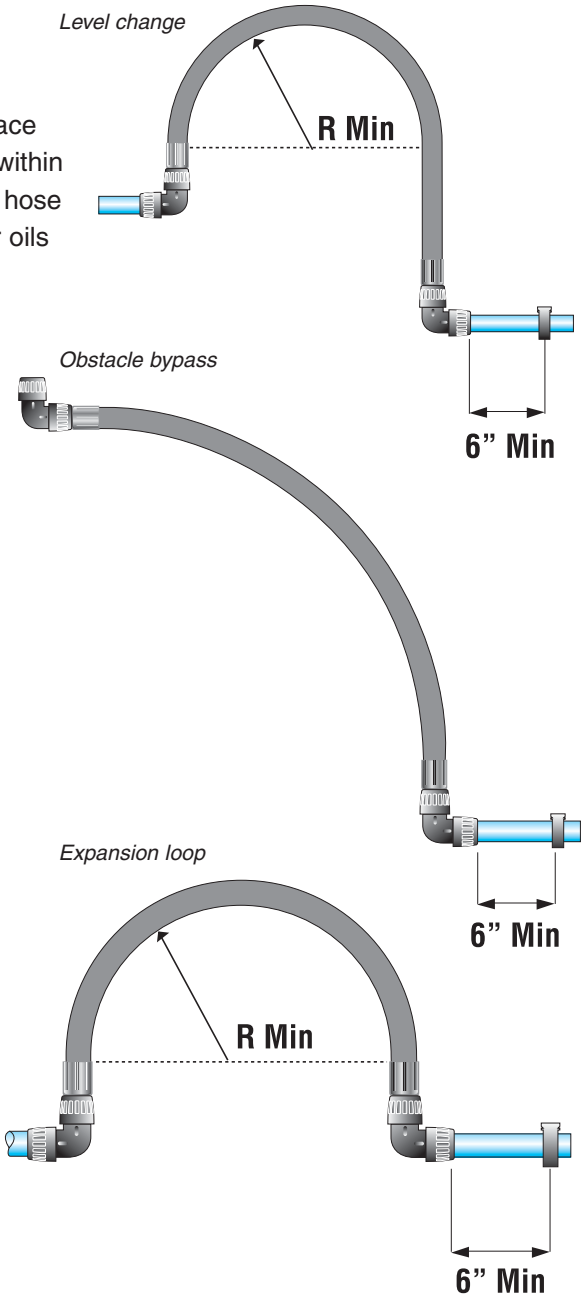
Creating vertical and horizontal take-off points and adding a vertical bracket using the same locator mark

Adding an off-set bracket using 2 locator marks

Flexible Hose

General

SmartPipe flexible hose can be easily connected to other SmartPipe components and can be rapidly installed without prior preparation or cutting. Thanks to its small bend radius, it requires minimum space and avoids mechanical stress within the system. SmartPipe flexible hose is resistant to both compressor oils and fire.



Ø (in.)	Ø (mm)	Length (in.)	SmartPipe	R Min (in.)
7/8	25	22	AN1001E250001	4
		59	AN1001E250003	
		79	AN1001E250004	
		22	AN1001E25V0001	3
		59	AN1001E25V0003	
		79	AN1001E25V0004	
1-1/2	40	45	AN1001E400002	16
		79	AN1001E400004	
		118	AN1001E400005	
		37	AN1001E40V0007	6
		79	AN1001E40V0004	
		118	AN1001E40V0005	
2	50	39	AN1001E500009	11
		78	AN1001E500004	
2-1/2	63	55	AN1001E630008	12
		118	AN1001E630005	26
		157	AN1001E630006	
		118	AN1001E63V05	10
		157	AN1001E63V06	
3	76	59	ANFP01L101	14
		79	ANFP01L102	
4	100	79	ANFP01L301	18
		118	ANFP01L303	

Safety

Anti-whiplash straps

In order to avoid the risk of whiplash accidents, Kaeser recommends the use of anti-whiplash straps, which are placed on either side of the connection. If SmartPipe flexible tube is exposed to tear, the anti-whiplash assembly prevents it from snaking (safety device in accordance with ISO 4414 standard).

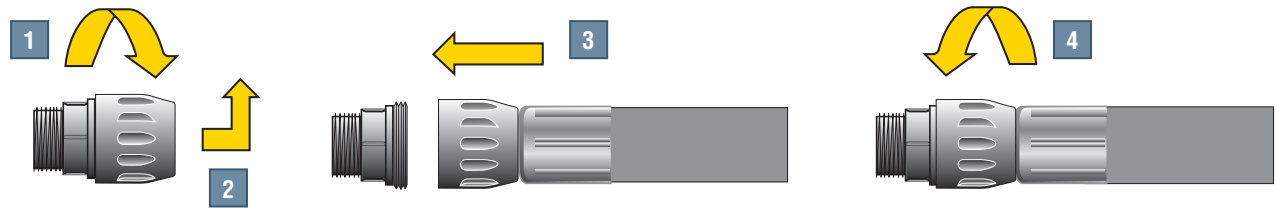
Part No.	Weight (lb.)
AN66989903	0.47

Network Connection

Ø 16.5, 25, 40

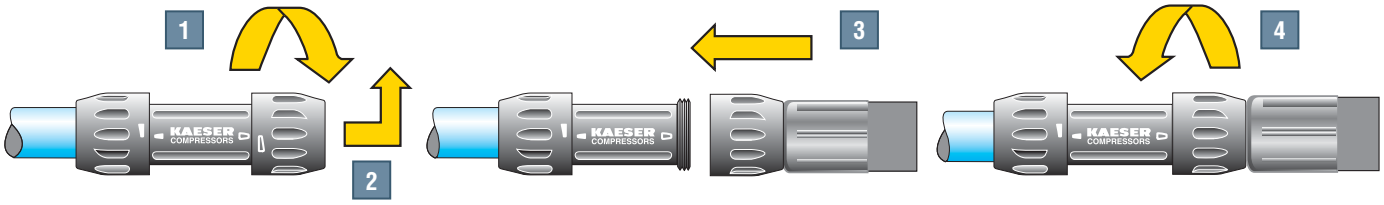
Using a male stud fitting

1. Loosen the nut on the stud fitting
2. Remove it
3. Move the swaged end of the hose onto the exposed stud thread
4. Tighten the nut



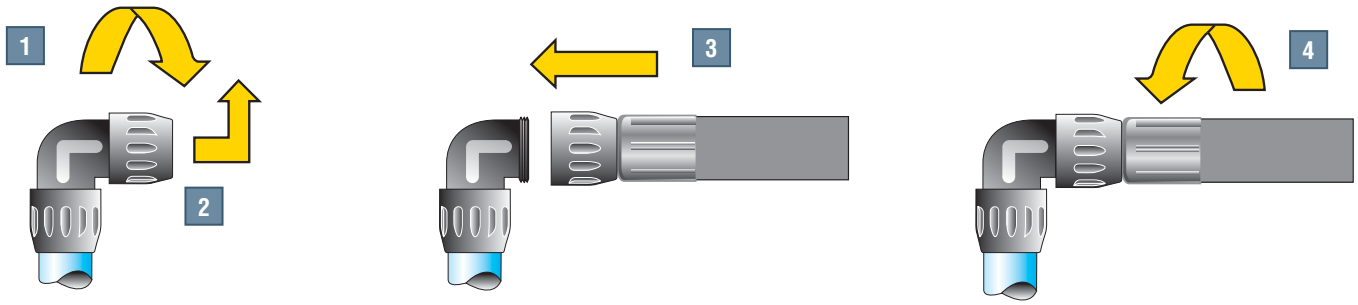
Using a pipe-to-pipe connector

1. Loosen the nut on the connector fitting
2. Remove it
3. Move the swaged end of the hose onto the connector thread
4. Tighten the nut



Using a 90° elbow

1. Loosen the nut on the elbow
2. Remove it
3. Move the swaged end of the hose onto towards the elbow thread
4. Tighten the nut

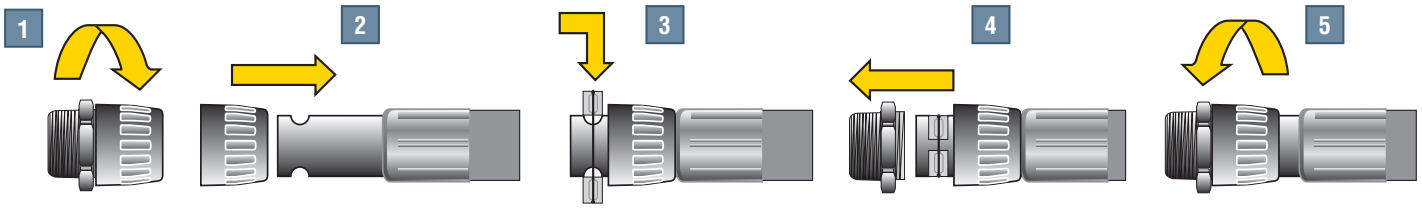


Flexible Hose

Ø 50, 63

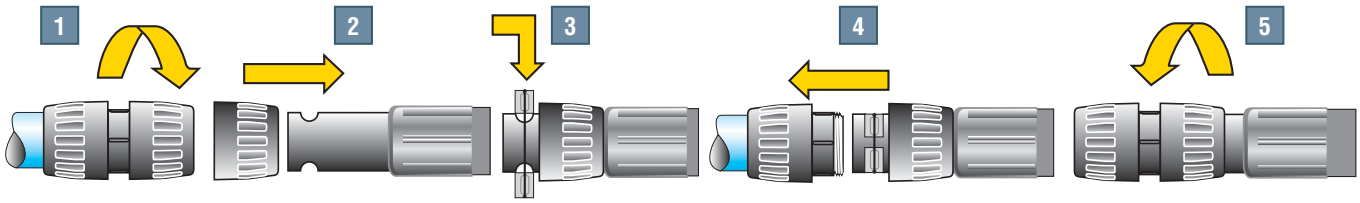
Using a male threaded fitting

1. Loosen the nut on the stud fitting and remove it
2. Place the nut over the swaged end of the flexible hose
3. Place the pipe connector clamps in the housings on the hose
4. Slide the nut forward to the end of the flexible hose and assemble onto the male thread
5. Tighten the nut using the Ø 63 spanner set



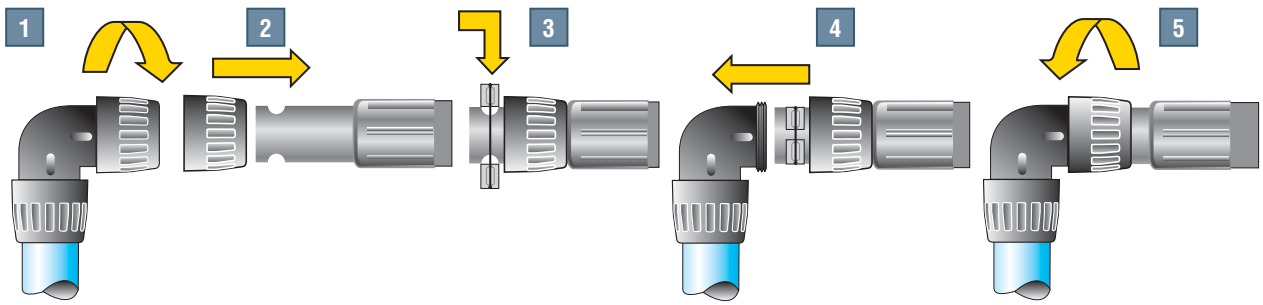
Using a pipe-to-pipe connector

1. Loosen the nut on the connector and remove it
2. Fit it over the swaged end of the flexible hose
3. Place the pipe connector clamps in the housings on the hose
4. Slide the nut forward to the end of the flexible hose, until it touches the clamps
5. Tighten the nut using the Ø 63 spanner set



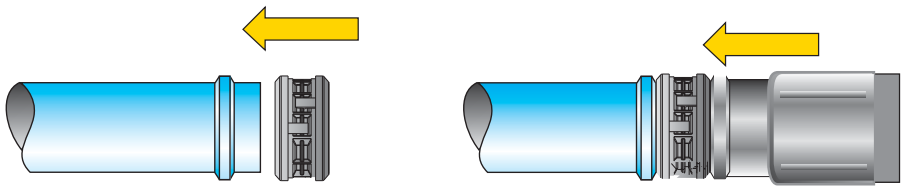
Using a 90° elbow

1. Loosen the nut on the elbow and remove it
2. Fit it over the swaged end of the flexible hose
3. Place the elbow clamps in the housings on the hose
4. Slide the nut forward to the end of the flexible hose, until it touches the clamps
4. Tighten the nut using the Ø 63 spanner set

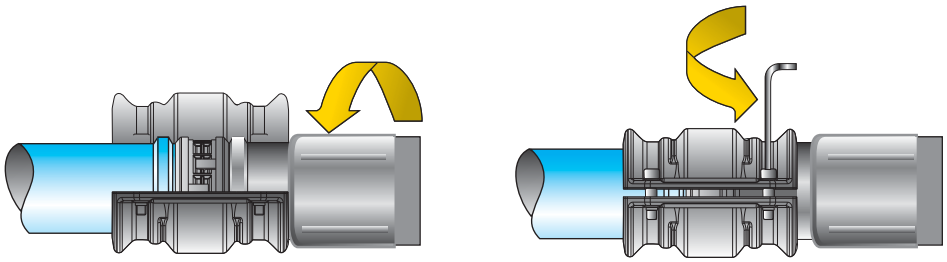


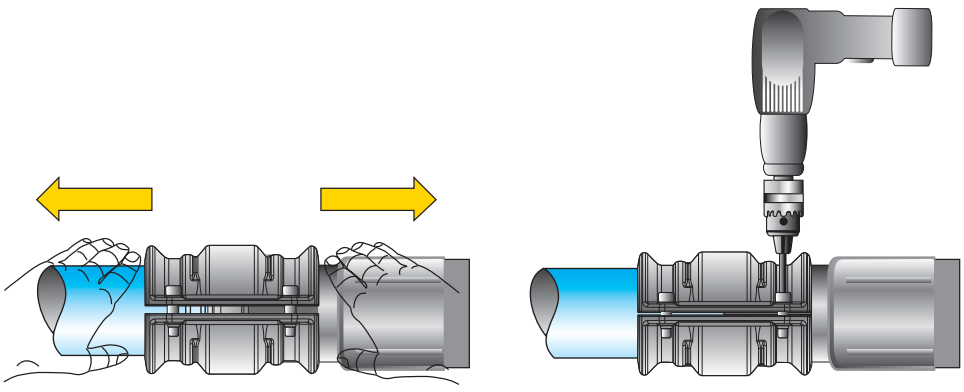
Ø 76, 100, 168

System Connection



Using a steel clamp

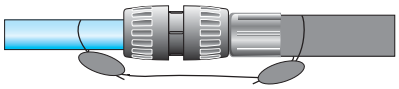


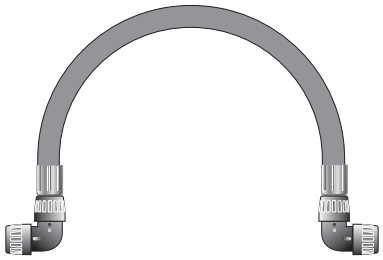


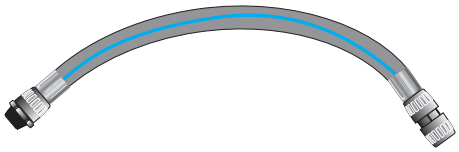
Flexible Hose

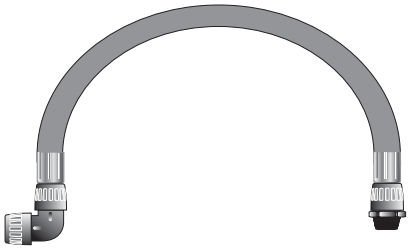
Do's and Don'ts

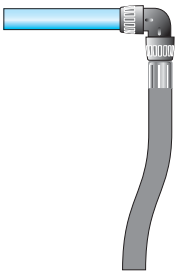
Do's

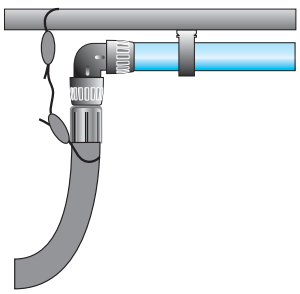




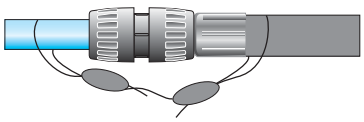


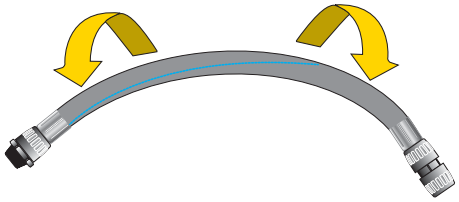


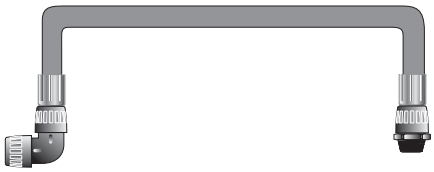


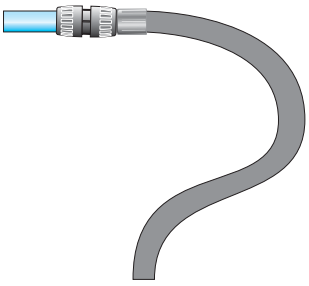


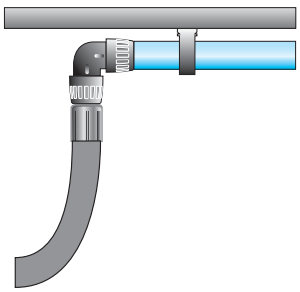
Don'ts







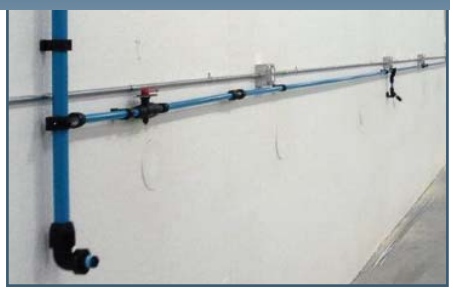




Mounting Hardware

SmartPipe Attachments

Ø 16.5, 25, 40, 50, and 63



Fixing Clips

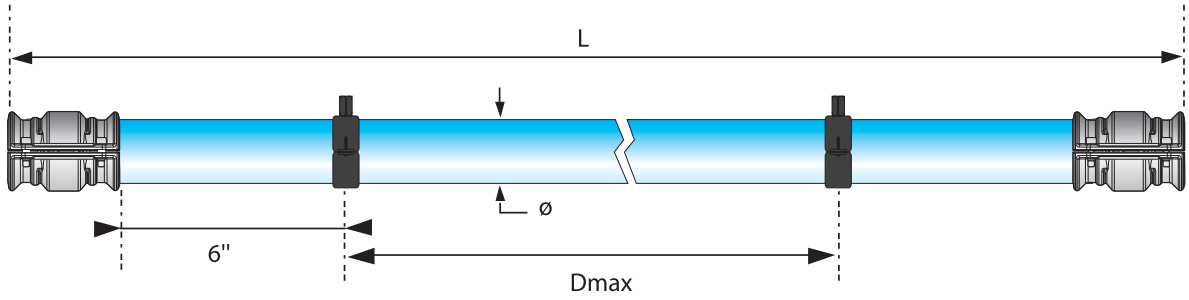
SmartPipe fixing clips are designed to bear a maximum weight of 44 lbs. However, to ensure good stability of the network, we recommend the use of at least 2 clips per pipe.

Example

- Maximum 5 ft. space between clips for 10 ft. lengths of pipe
- Maximum 10 ft. space between clips for 20 ft. lengths of pipe

Use only this clip for fixing SmartPipe rigid pipe, all other type of pipe clips are to be avoided. Fix the clip to a rigid support (U-channel, cable tray) to allow for expansion while retaining the pipe.

Ø	L (ft.)	Dmax (ft.)
16.5	10	8
25	20	10
40	20	10
50	20	10
63	20	10



Properties

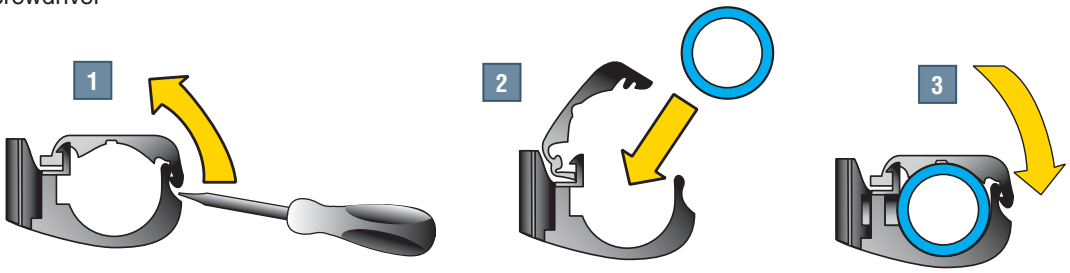
SmartPipe fixing clips for Ø16.5, 25, and 40: 1/4" UNC nuts
SmartPipe fixing clips for Ø 50 and 63 systems: 3/8" UNC nuts

Procedure

1 Place the clip as required and open it using a screwdriver

2 Insert the pipe into the clip

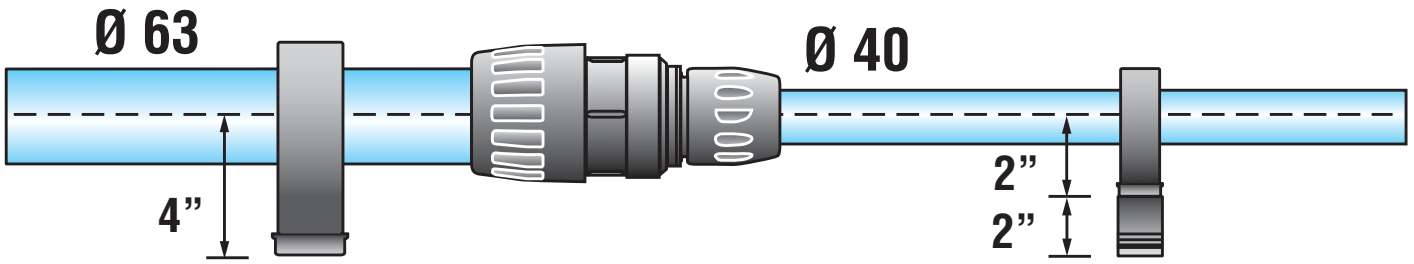
3 Close the clip



Mounting Hardware

Spacer

The SmartPipe AN66970003 spacer is used for aligning SmartPipe pipe of different diameters.

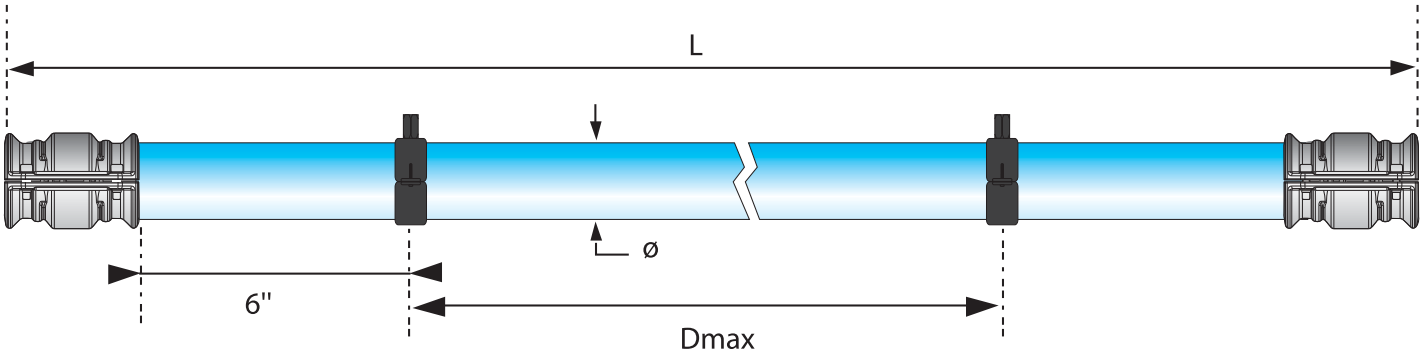


Ø 76, 100, and 168

Fixing Clips

To ensure good network stability, we recommend the use of at least two fixing clips per length of pipe. SmartPipe fixing clips for Ø 76 through Ø 168 networks: 3/8” UNC thread.

Ø (in.)	Ø (mm)	L (ft.)	Dmax (ft.)
3	76	20	16
4	100		
6	168		



Mounting Hardware and Acceptable Mounting Methods

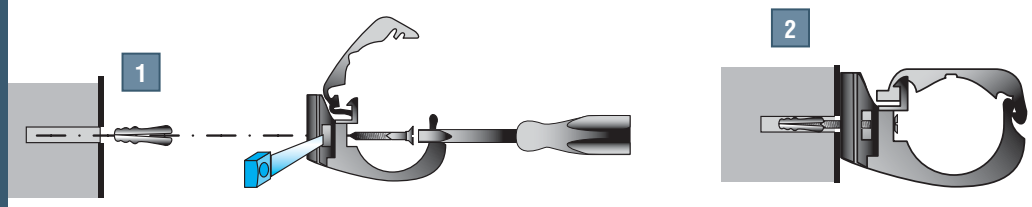
Supporting a SmartPipe System

Directly onto a wall

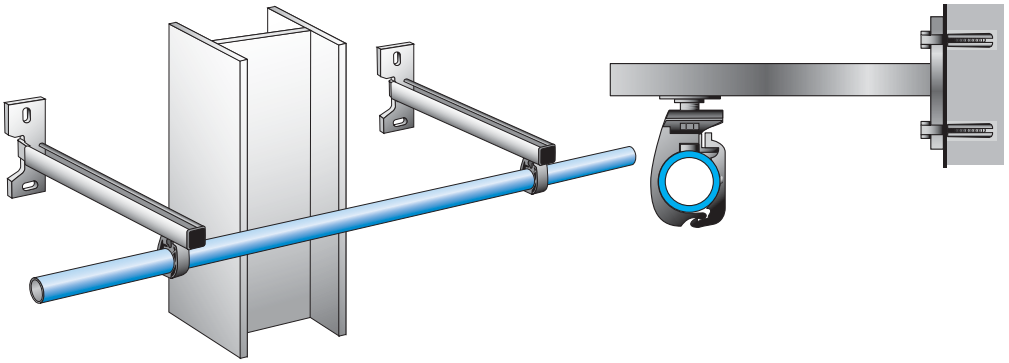
Offset from a wall

1 Remove the nut at the base of the pipe clip using a screwdriver and insert the screw by passing it through the clip

2 Tighten the screw

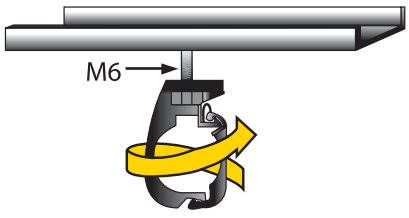


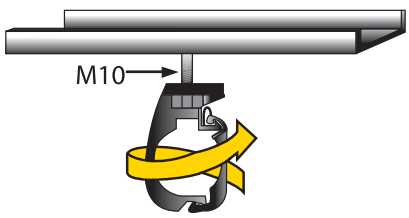
U-channel type mounting bracket

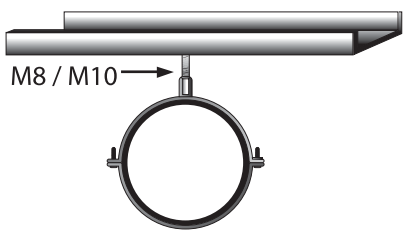


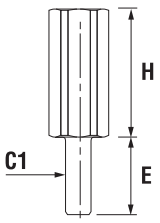
U-channel assemblies are used to offset networks and to bypass obstacles.

Threaded rod adapter







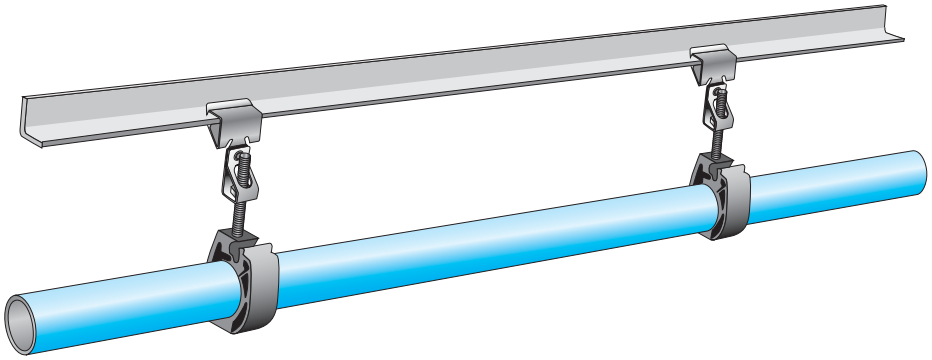


The SmartPipe threaded rod adaptor allows Ø 16.5, Ø 25, and Ø 40 SmartPipe pipe clips to be easily suspended under 3/8” UNC threaded rod.

Mounting Hardware and Acceptable Mounting Methods

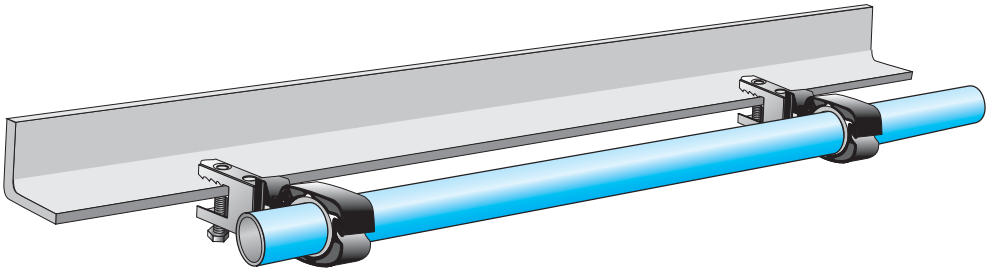
On a metal beam

Push-on type beam clamps



Using beam clamps

Screw type beam clamps



Expansion / Contraction

In order to compensate for the effects of expansion and contraction due to variations in temperature, any fluctuations in the length of the SmartPipe aluminum pipe network should be calculated.

L: length of SmartPipe straight line to be installed (meters)

ΔT: difference between temperature when installing and maximum operating temperature (°C)

ΔL: line length variation (mm)

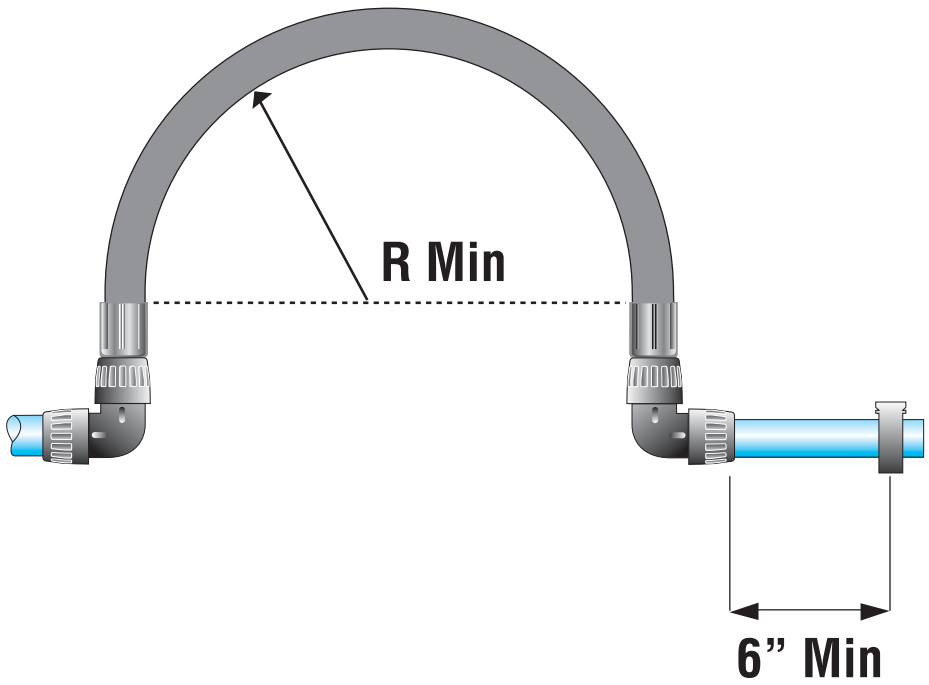
For SmartPipe aluminum pipe networks:

$$\frac{\Delta L = (a \times L)}{1} + \frac{(0.024 \times L \times \Delta T)}{2}$$

1 - Expansion related to pipe retraction in the connector

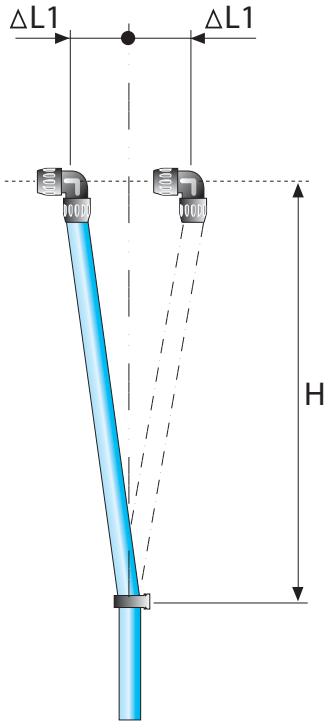
2 - Expansion related to temperature variations

	Ø 16.5	Ø 25	Ø 40	Ø 50	Ø 63	Ø 76	Ø 100
10' Pipe	a = 0.06	a = 0.20	a = 0.40	a=0.56	a = 0.73	a = 1.0	a = 1.0
20' Pipe	--	a = 0.10	a = 0.20	a=0.29	a = 0.38	a = 0.50	a = 0.50



Using a an elbow

In addition to expansion loops, changes of direction are another method of compensating for expansion and contraction.



Ø 16.5, 25, 40, 50, 63

H = 2.46’	ΔL1 = 0.6”
H = 4.92’	ΔL1 = 1.2”

Ø 76, 100, 168

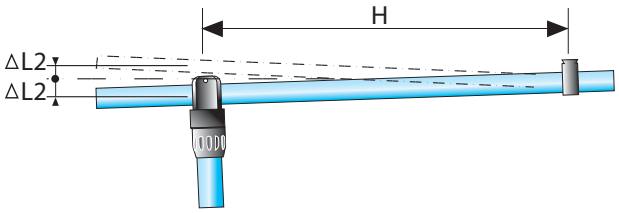
H = 2.46’	ΔL1 = 3/8”
H = 4.92’	ΔL1 = 6/8”

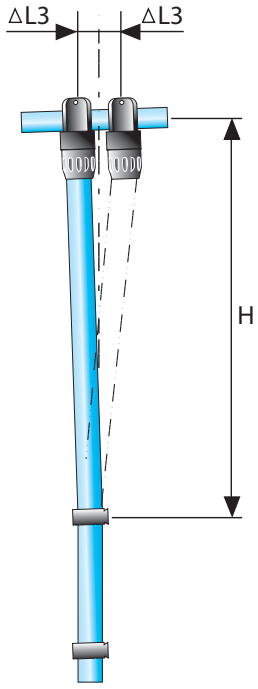
Using a quick assembly bracket

The length variation ΔL, calculated for the SmartPipe line, must always be equal to or less than ΔL2 and ΔL3. If this is not the case, then an expansion loop, using SmartPipe flexible hose, must be added.

Ø1 (mm)	Ø2 (mm)	H (ft.)	ΔL2 (in.)	ΔL3 (in.)
25	16.5	5	1/2	1
	25			
40	16.5			
	25			
50	16.5			
	25			
63	25			

Ø 16.5, 25, 40, 50, 63



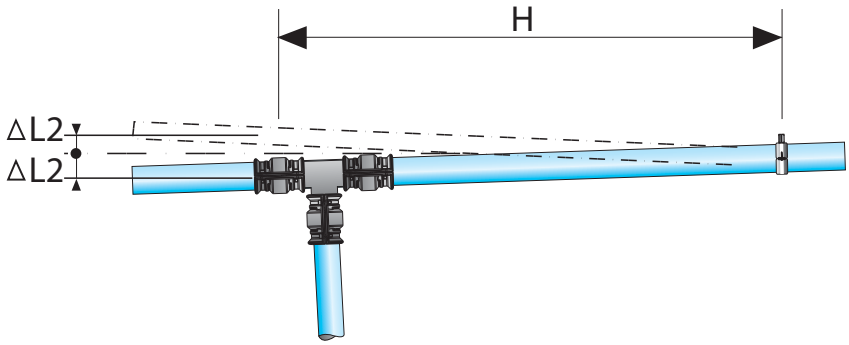


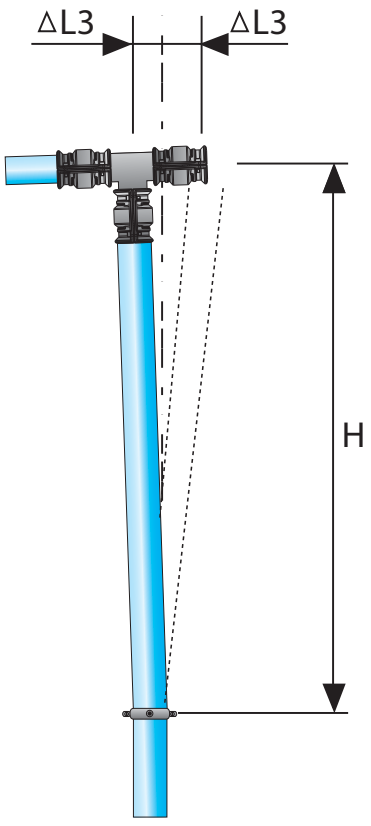
Expansion / Contraction

Ø 76, 100, 168

Changing direction with a tee

Ø (in.)	Ø (mm)	H (ft.)	ΔL2 Max. (in.)	ΔL3 Max. (in.)
3	76	2-1/2	3/8	3/8
4	100			
6	168			

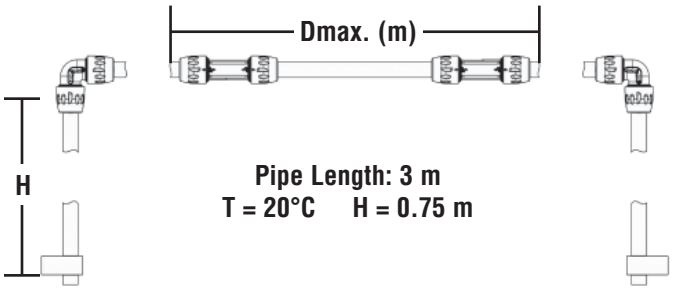




Expansion / Contraction

Examples

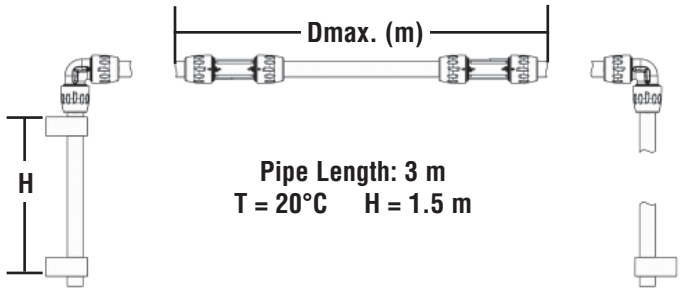
Example 1



Maximum distance, without expansion loop, from a fixed point dependant on SmartPipe diameter (2 elbows).

Ø SmartPipe	½	7/8	1½	2	2½	3	4
Dmax. (m)	50	40	30	24	24	15	15

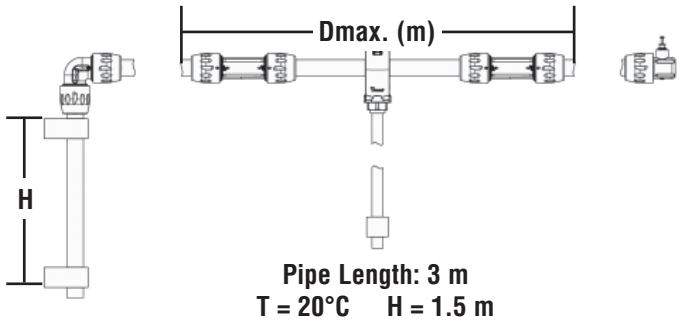
Example 2



Maximum distance, without expansion loop, dependant on SmartPipe diameter (2 elbows - 1 fixed point).

Ø SmartPipe	½	7/8	1½	2	2½	3	4
Dmax. (m)	50	40	30	24	24	15	15

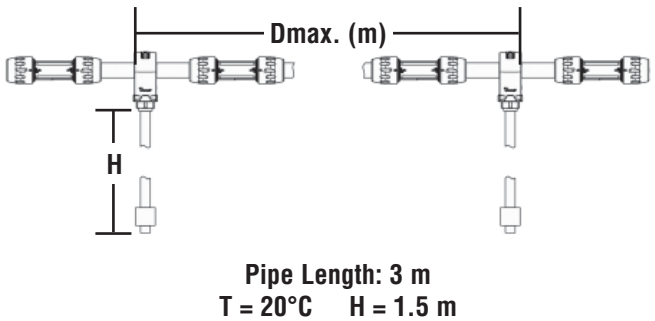
Example 3



Maximum distance for fitting a bracket, without expansion loop, dependant on SmartPipe diameter (1 elbow - 1 bracket).

Ø SmartPipe	½	7/8	1½	2	2½	3	4
Dmax. (m)	48	38	30	25	25	7.5	7.5

Example 4



Maximum distance for fitting a bracket, without expansion loop, dependant on SmartPipe diameter (2 brackets).

Ø SmartPipe	½	7/8	1½	2	2½	3	4
Dmax. (m)	80	70	55	40	40	15	15

Conversion Charts

Length

Millimeter (mm)	Meter (m)	Inches (in.)	Feet (ft.)	Yard (yd.)
10	0.01	0.39	0.03	0.01
20	0.02	0.79	0.07	0.02
30	0.03	1.18	0.10	0.03
40	0.04	1.57	0.13	0.04
50	0.05	1.97	0.16	0.05
60	0.06	2.36	0.20	0.07
70	0.07	2.76	0.23	0.08
80	0.08	3.15	0.26	0.09
90	0.09	3.54	0.30	0.10
100	0.10	3.94	0.33	0.11
150	0.15	5.91	0.49	0.16
200	0.20	7.87	0.66	0.22
250	0.25	9.84	0.82	0.27
300	0.30	11.81	0.98	0.33
350	0.35	13.78	1.15	0.38
400	0.40	15.75	1.31	0.44
450	0.45	17.72	1.48	0.49
500	0.50	19.69	1.64	0.55
550	0.55	21.65	1.80	0.60
600	0.60	23.62	1.97	0.66
700	0.70	27.56	2.30	0.77
800	0.80	31.50	2.62	0.87
900	0.90	35.43	2.95	0.98
1000	1.00	39.37	3.28	1.09

Conversion Charts

Pressure

Bar	Kilo Pascal (KPa)	Atmosphere (atm.)	psi	Torr (mm Hg)
1	100	0.99	14.50	750
2	200	1.97	29.00	1500
3	300	2.96	43.50	2250
4	400	3.95	58.00	3000
5	500	4.93	72.50	3750
6	600	5.92	87.00	4500
7	700	6.91	101.50	5250
8	800	7.90	116.00	6000
9	900	8.88	130.50	6750
10	1000	9.87	145.00	7500
11	1100	10.86	159.50	8250
12	1200	11.84	174.00	9000
13	1300	12.83	188.50	9750
14	1400	13.82	203.00	10,500
15	1500	14.80	217.50	11,250
16	1600	15.79	232.00	12,000
20	2000	19.74	290.00	15,000

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Flow Rate

liters per second (l/s)	liters per minute (l/min)	cubic meters per minute (m^3/min.)	cubic meters per hour (m^3/h)	cubic feet per minute (cfm)
10	600	0.60	36	21
20	1200	1.20	72	42
30	1800	1.80	108	64
40	2400	2.40	144	85
50	3000	3.00	180	106
60	3600	3.60	216	127
70	4200	4.20	252	148
80	4800	4.80	288	169
90	5400	5.40	324	191
100	6000	6.00	360	212
150	9000	9.00	540	318
200	12,000	12.00	720	424
250	15,000	15.00	900	530
300	18,000	18.00	1080	635
350	21,000	21.00	1260	741
400	24,000	24.00	1440	847
450	27,000	27.00	1620	953
500	30,000	30.00	1800	1059
550	33,000	33.00	1980	1165
600	36,000	36.00	2160	1271
700	42,000	42.00	2520	1483
800	48,000	48.00	2880	1694
900	54,000	54.00	3240	1906
1000	60,000	60.00	3600	2118

Air Consumption Values

Tools	Typical cfm Consumption at an Operating Pressure of 6 bar (90 psi)
Small process controls, instrumentation, pneumatic logic units	4
Paint spray gun, small impact wrench, light/medium drill, blowgun	5 to 18
Polisher, screwdriver	25
Sheet metal cutter, large impact wrench, automatic plane	28
Small automatic machines, miscellaneous tooling	32
Large tool, power machines, and associated equipment	36
Air hoist, grinder	74

Part Numbers Index

KAESER COMPRESSORS

Built for a lifetime.™

Warranty

SmartPipe™

Kaeser Compressors, Inc. herein referred to as "Kaeser," warrants that the Kaeser SmartPipe™ delivered hereunder will be free of defects in material and workmanship for a period of two (2) years from date of purchase of the products.

Kaeser does not warrant the design, assembly or installation of the system, but only the components as stated herein. Kaeser is not responsible for improper design, assembly or installation, or for any modifications of the Kaeser products.

Should any failure to conform with the above warranties occur during the specified period under normal use, and the components have been proven to Kaeser's satisfaction to have been properly stored, assembly and installation guidelines properly followed, installation, repair or relocation of the components have been done only by a properly trained and qualified installer, no alteration, misuse or abuse of, or damage to any of the Kaeser components has occurred and there has been no operation beyond the designed range and pressure or other misuse or mishandling has occurred, then Kaeser shall, with prompt notice by purchaser, correct such non-conformities at its option either by repair or replacement (DAP Kaeser's directed delivery point) or by refund of the purchase price of the non-conforming components. Return of components to such delivery point as Kaeser may direct pursuant to this paragraph shall be at purchaser's risk and expense. Kaeser warrants any components replaced pursuant to the above warranty, under normal use, to be free from defects in workmanship and material for a period of ninety (90) days after the shipment of such replaced components or for a period ending on the expiration of the original component warranty, whichever is longer. Unless otherwise expressly agreed, Kaeser shall not be responsible for labor charges, loss or damage resulting from improper operation, maintenance or repairs made by personnel other than those authorized in writing by Kaeser, or damage to equipment caused by the use of non-authorized replacement parts.

Replacement or refund (whichever Kaeser determines, in its sole discretion, to provide) shall be Kaeser's sole obligation and purchaser's exclusive remedy for any nonconformity, noncompliance, defect or deficiency in components furnished hereunder, and shall be conditioned upon purchaser's return of the defective components to Kaeser (DAP Kaeser's directed delivery point, or, for goods to be shipped from outside the United States, DDP Kaeser's directed delivery point (as that later shipping term is defined Incoterms® 2010)), if Kaeser requires such return. This exclusive remedy will not be deemed to have failed of its essential purpose so long as Kaeser is willing to provide replacement or refund. THE EXPRESS WARRANTY CONTAINED HEREIN IS EXCLUSIVE AND IN LIEU OF ALL OTHER REPRESENTATIONS AND WARRANTIES, EXPRESSED OR IMPLIED, AND KAESER EXPRESSLY DISCLAIMS AND EXCLUDES ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, AND ANY WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OF TRADE.

AUTHORIZATION FROM THE SERVICE DEPARTMENT IS NECESSARY BEFORE MATERIAL IS RETURNED TO THE FACTORY OR IN-WARRANTY REPAIRS ARE MADE.

Product Warranty-Registration

In order for Kaeser Compressors, Inc. to properly handle warranty or other service requests, please **register online at www.kaeser.com/warranty.**

LIMITATION OF LIABILITY

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KAESER COMPRESSORS

Built for a lifetime.™

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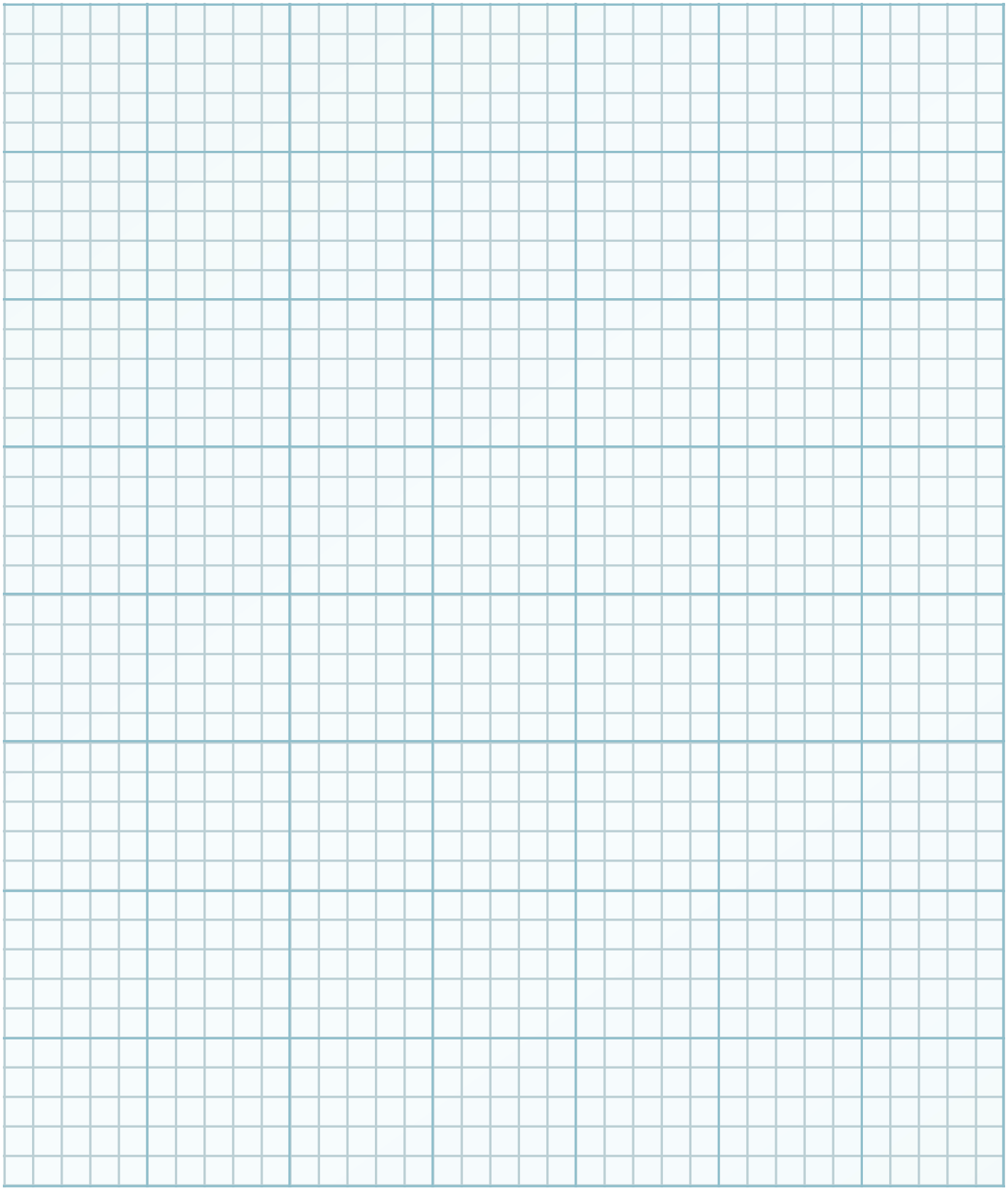
System Sketch and Notes



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With innovative products and services, Kaeser Compressors' experienced consultants and engineers help customers to enhance their competitive edge by working in close partnership to develop progressive system concepts that continuously push the boundaries of performance and compressed air efficiency. Every Kaeser customer benefits from the decades of knowledge and experience gained from hundreds of thousands of installations worldwide and over ten thousand formal compressed air system audits.

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