

SmartPipe™

PRODUCT CATALOG AND INSTALLATION GUIDE



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™?

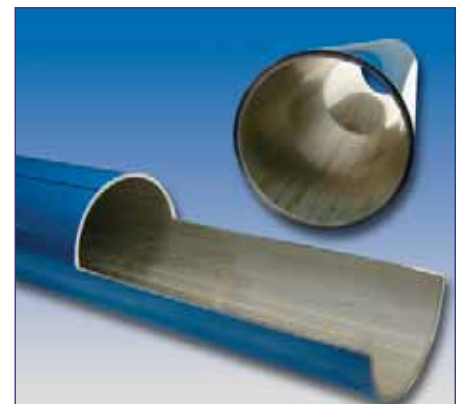
Ease of Installation

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

Optimum flow and air quality

SmartPipe's smooth calibrated aluminum construction has a low friction coefficient, 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.

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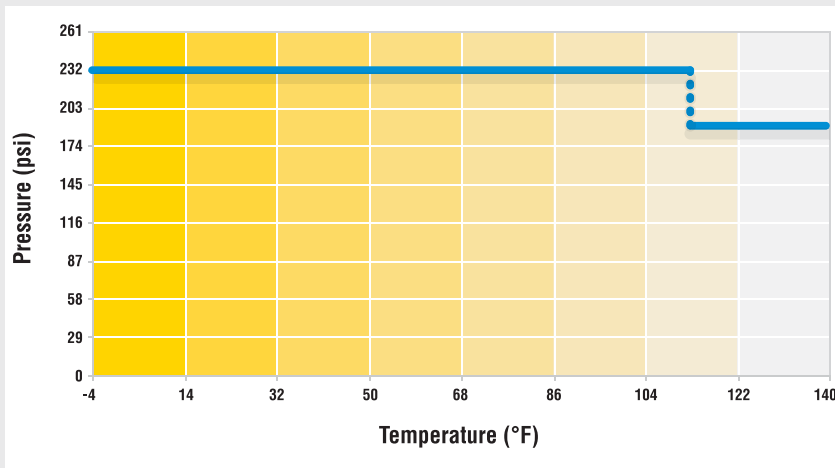
Technical Specifications

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

Maximum working pressure versus operating temperature



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

16.5 mm O.D.	=	1/2" ID
25 mm O.D.	=	7/8" ID
40 mm O.D.	=	1-1/2" ID
63 mm O.D.	=	2-1/2" ID
76.2 mm O.D.	=	3" ID
101.6 mm O.D.	=	4" ID



Sizing

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

Flow Rate (cfm)	Equivalent Length (feet)									
	50	150	300	400	500	1000	2000	2500	3500	5000
10	16.5	16.5	16.5	16.5	16.5	25	25	25	25	25
30	16.5	25	25	25	25	25	40	40	40	40
50	25	25	25	25	40	40	40	40	40	40
75	25	25	40	40	40	40	40	40	63	63
100	25	40	40	40	40	40	63	63	63	63
150	25	40	40	40	40	63	63	63	63	63
250	40	40	40	63	63	63	63	63	76	76
500	40	63	63	63	63	76	76	100	100	100
750	63	63	63	76	76	76	100	100	100	100*
900	63	63	76	76	76	100	100	100	100*	100*
1000	63	63	76	76	76	100	100	100	100*	100*

Pipe size recommended based on 115 psi and 2% (2.5 psi) pressure drop.

*Over 2% pressure drop.

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 clean 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).

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



Component Material Specifications

Part No. Prefix	Ø 16.5, 25, & 40 mm	Ø 63 mm	Part No. Prefix	Ø 76 & 100 mm	
AN1013A	6063TS Powder coated aluminum		ANTA16	Powder coated aluminum	
AN1016A	6063TS Powder coated aluminum		ANTA16	Powder coated aluminum	
AN1001E Air	Hose and coating: Black SBR Reinforcement: Synthetic braiding		ANEW05	Seal: EPDM	
AN1001E Vacuum	Hose and coating: Black SBR / NBR Reinforcement: spiral steel wire		ANFP01	Hose and coating: Black SBR / NBR Reinforcement: spiral steel wire	
AN4002	Polyamide with fiberglass	Body: Polyamide with fiberglass Nut: Treated aluminum	ANRP01	Body and Pushing Ring: Polyamide with fiberglass Seal: NBR	
AN4088 - AN4099	Body: Treated brass Nut: Engineering grad plastic	—	ANRR01	Clamp: Treated steel Cartridge: Polyamide with fiberglass Seal: NBR	
AN6602 - AN6604	Polyamide with fiberglass	Treated aluminum	ANRR61		
AN6605	Body: Treated brass Nut: Polymer HR / NBR	Body: Treated brass Nut: Treated aluminum / NBR	ANRX02	Stainless steel 304	
AN6606	Polyamide with fiberglass	Treated aluminum	ANRX12		
AN6612			ANRX04		
AN6621	Treated aluminum	—	ANRX23		
AN6625	Polyamide with fiberglass	Treated aluminum	ANRX24		
AN6651	Body: Treated brass Nut: Polyamide with fiberglass	—	ANRX64		
AN6663	Body: Polyamide with fiberglass Nut: Brass		ANRX66		
AN6662	Polyamide with fiberglass	Polymer HR	ANRX30		
AN6666	Body: Treated aluminum Nut: Polyamide with fiberglass	Treated aluminum	ANVR02		Body: Iron Disc and Shaft: Stainless steel
AN6676	Polyamide with fiberglass	Body: Treated brass Nut: Polymer HR	ANVR03		Nickel-plated brass
AN6683 - AN6684	Body: Treated brass Nut: Polyamide with fiberglass	—	Bracket	Zinc steel - Rubber EPDM	
AN6687 - AN6688	Treated brass	—			
ANEA98	Body: Treated iron Nut: Plated brass	—			
ANRA69	Polyamide with fiberglass	—			
ANRA65	Body: Polyamide with fiberglass Nut: Brass	—			
AN6697	Polyamide with fiberglass	Polyamide with fiberglass			
AN0169 Adaptor	Brass	—			
Quick-connect Coupler	Body: Polymer HR / Zamac Sleeve: Polymer HR Spring and Ball Bearings: Stainless Steel		Seal: Nitrile Probe: Treated steel		
Anti-whiplash Strap	Steel				

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

SmartPipe Technology

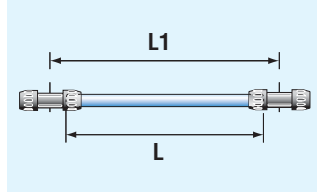
The innovative technology of SmartPipe combines lightweight yet durable aluminum piping with reliable and leak free fittings. These components are designed for easy and rapid assembly. The result is a complete compressed air distribution system that costs less to install and is easy to change, but meets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

<p>Ø 16.5 Ø 25 Ø 40</p>	<p>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.</p>	
<p>Ø 63</p>	<p>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 clamp ring for a solid connection.</p>	
<p>Ø 76 Ø 100</p>	<p>76 and 100 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.</p>	

Ø 16.5, 25, 40

Rigid Aluminum Pipe

SmartPipe Aluminum Pipe



Ø OD (mm)	Ø ID (in.)	Part No.	L1 (ft.)	L	Weight (lb.)
16.5	1/2	AN1013A17040	10	9' 9¼"	1.4
25	7/8	AN1016A25040	20	19' 9¾"	4.2
40	1½	AN1016A40040	20	19' 8¼"	6.2

6698 Anti-whiplash Strap

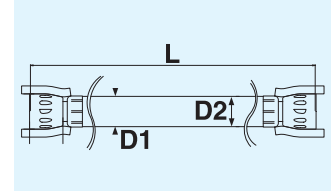


Prevents whiplash should SmartPipe flexible hose be disconnected while under pressure. Conforms to ISO 4414 safety standard.

Part No.	Weight (lb.)
AN66989903	0.47

Flexible Hose

1001E Flexible Hose



Ø D1 (mm)	Ø D2 (in.)	Part No.	L	Min Bend Radius (in.)	For Use with SmartPipe Pipe Diameter	Wt. (lb.)
38	7/8	AN1001E25001	1' 4"	4	25	1.20
		AN1001E25003	5'			3.28
		AN1001E25004	6' 7"			4.40
54	1 1/2	AN1001E40002	3' 3"	16	40	4.57
		AN1001E40004	6' 7"			7.32
		AN1001E40005	9' 10"			8.82

Use part number AN66989903, anti-whiplash.

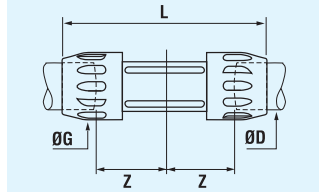
Refer to page 53 and 57 for band radius and proper installation.



Ø 16.5, 25, 40

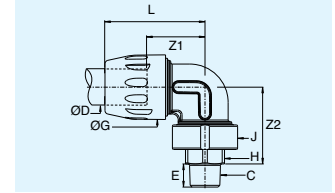
Pipe-to-pipe and Threaded Connectors

6606 Pipe-to-pipe Connector



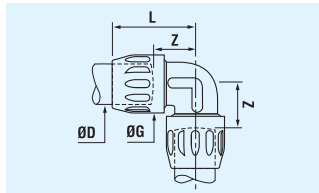
ØD (mm)	Part No.	ØG (mm)	L (mm)	Z (mm)	Weight (lb.)
16.5	AN66061700	34.0	120.5	33.0	0.16
25	AN66062500	44.5	151.5	48.0	0.28
40	AN66064000	67.0	205.0	57.0	0.76

6609 Male Threaded 90° Elbow, NPT



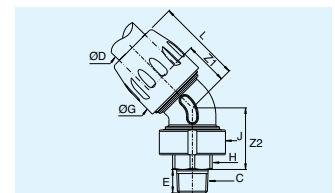
ØD (mm)	C (NPT)	Part No.	E (mm)	H (mm)	ØG (mm)	ØJ (mm)	L (mm)	Z1 (mm)	Z2 (mm)	Wt. (lb.)
16.5	1/4"	AN66091714	14	17	34	34	58	31	41	0.25
	1/2"	AN66091722	15	23	34	34	58	31	46.5	0.29
25	1/2"	AN66092522	15	27	44.5	45.5	69.5	40.5	53	0.49
	3/4"	AN66092528		27						0.52
	1"	AN66092535	16	36						0.65
40	1"	AN66094035	16	41	67	68.5	107	62	81	75
	1 1/4"	AN66094043	21.5	50						1.72
	1 1/2"	AN66094050	24.5	50						1.79
	2"	AN66094044	23	60						2.04

6602 90° Elbow



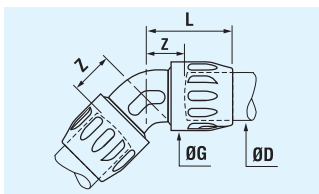
ØD (mm)	Part No.	ØG (mm)	L (mm)	Z (mm)	Weight (lb.)
16.5	AN66021700	34.0	58.0	31.0	0.15
25	AN66022500	44.5	68.0	40.0	0.24
40	AN66024000	67.0	107.0	62.0	0.71

6619 Male Threaded 45° Elbow, NPT



ØD (mm)	C (NPT)	Part No.	E (mm)	H (mm)	ØG (mm)	ØJ (mm)	L (mm)	Z1 (mm)	Z2 (mm)	Wt. (lb.)
25	1/2"	AN66192522	15	27	44.5	45.5	61.5	32.5	42	0.47
	3/4"	AN66192528		27						0.50
	1"	AN66192535		16						36
40	1"	AN66194035	16	41	67	68.5	94	45	64	58.5
	1 1/4"	AN66194043	21.5	50						1.64
	1 1/2"	AN66194050	23	50						1.71
	2"	AN66194044	24.5	60						1.96

6612 45° Elbow

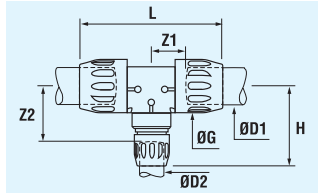


ØD (mm)	Part No.	ØG (mm)	L (mm)	Z (mm)	Weight (lb.)
25	AN66122500	44.5	57.0	29.0	0.25
40	AN66124000	67.0	90.0	45.0	0.84

Ø 16.5, 25, 40

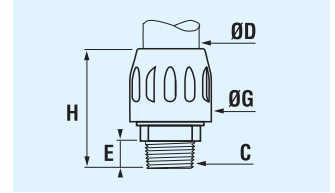
Pipe-to-pipe and Threaded Connectors

6604 Equal Tee



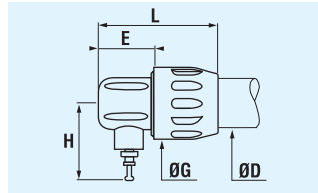
ØD1 (mm)	Part No.	ØG (mm)	H (mm)	L (mm)	Z1 (mm)	Z2 (mm)	Weight (lb.)
16.5	AN66041700	34.0	58.0	120.5	34.0	31.0	0.33
25	AN66042500	44.5	67.5	151.5	48.0	40.0	0.40
40	AN66044000	67.0	102.5	205.0	57.0	57.0	1.34

6605 Male Threaded Connector, NPT



ØD (mm)	C (NPT)	Part No.	E (mm)	ØG (mm)	H (mm)	Weight (lb.)
16.5	1/2"	AN66051722	15.0	34.0	68.0	0.26
25	1/2"	AN66052522	15.0	44.5	70.5	0.60
	3/4"	AN66052528	15.0		71.5	0.73
	1"	AN66052535	16.0		71.5	0.44
40	1"	AN66054035	16.0	67.0	111.5	0.51
	1 1/4"	AN66054043	21.5		111.5	0.97
	1 1/2"	AN66054050	23.0		111.5	1.36
	2"	AN66054044	24.5		114.5	3.11

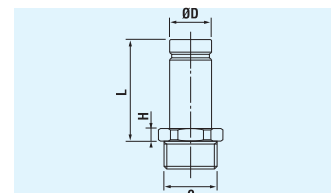
6625 Vented End Cap



ØD (mm)	Part No.	E (mm)	ØG (mm)	H (mm)	L (mm)	Weight (lb.)
16.5	AN66251700	25.5	34.0	45.5	62.5	0.21
25	AN66252500	33.0	44.5	47.0	75.0	0.21
40	AN66254000	34.5	67.0	55.0	98.5	0.40

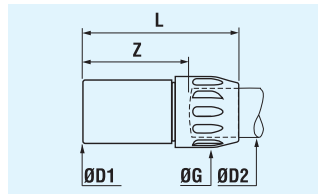
16.5 mm: supplied with LF3000 6 mm plug. Models Ø 25, 40 and 63: supplied with LF 3000 5/16" (8 mm) plug.

6621 Male Threaded Adapter, NPT



ØD (mm)	C (NPT)	Part No.	L (mm)	H (mm)	Weight (lb.)
16.5	1/2"	AN66211722	42.2	5.0	0.07
25	1/2"	AN66212522	49.0	7.0	0.11
	3/4"	AN66212528			0.11
	1"	AN66212535			0.15
40	1 1/4"	AN66214043	73.7	8.0	0.34
	1 1/2"	AN66214050	75.7	10.0	0.44

6666 Plug-in Reducer

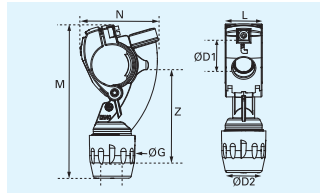


ØD1 (mm)	ØD2 (mm)	Part No.	ØG (mm)	Z (mm)	L (mm)	Weight (lb.)
25	16.5	AN66661725	34.0	50.0	77.0	0.16
40	25	AN66662540	44.5	71.5	99.0	0.26

Ø 16.5, 25, 40

Quick Assembly Brackets

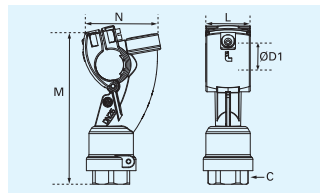
6662 Quick Assembly Bracket



ØD1 (mm)	ØD2 (mm)	Part No.	M (mm)	ØG (mm)	L (mm)	N (mm)	Z (mm)	Wt. (lb.)
25	16.5	AN66622517	139.5	34	36	63.5	82	0.22
	25	AN66622500	134	44.5			74	0.26
40	16.5	AN66624017	154	34	37.5	76.5	89	0.30
	25	AN66624025	149.5	44.5			82	0.34

To drill SmartPipe pipe, use drilling tools AN6698201 and AN66980202.

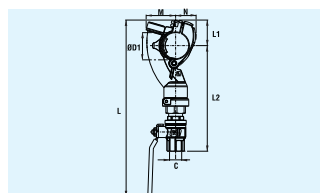
6663 Quick Assembly Mini-bracket with Female Thread, NPT



ØD1 (mm)	Part No.	C (NPT)	M (mm)	L (mm)	N (mm)	Weight (lb.)
25	AN66632522	1/2"	117.5	36	63.5	0.26
40	AN66634022		132	37.5	76.5	0.34

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

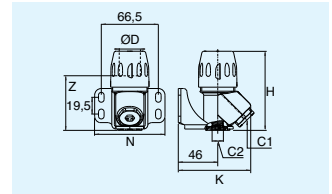
6668 Quick Assembly Mini-bracket with Ball Valve, NPT



ØD1 (mm)	Part No.	C (NPT)	L (mm)	L1 (mm)	L2 (mm)	M (mm)	N (mm)	Wt. (lb.)
25	AN66682522	1/2"	256	32	155	40	23	0.95
40	AN66684022		270	39	162	45	31	0.96

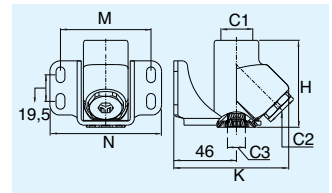
Wall Brackets

6640 1 Port 45° Wall Bracket, NPT



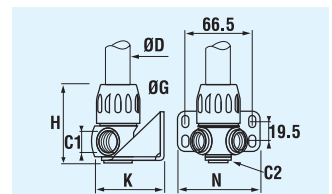
Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H (mm)	Z (mm)	K (mm)	N (mm)	Wt. (lb.)
16.5	AN66401722	1/2"	1/4"	89.5	63.5	84.5	82	1.16
25	AN66402522			92.5				

6642 1 Port 45° Threaded Wall Bracket, NPT



Ø (mm)	Part No.	C1 (NPT)	C2 (NPT)	C3 (NPT)	H (mm)	K (mm)	M (mm)	N (mm)	Wt. (lb.)
16.5 25	AN66422222	1/2"	1/2"	1/4"	64	84.5	66.5	82	1.06

6684 2 Port 90° Wall Bracket, NPT

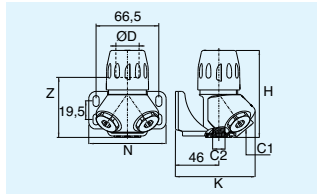


Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	G (mm)	H (mm)	K (mm)	N (mm)	Wt. (lb.)
16.5	AN66841722	1/2"	1/4"	34	65	74.5	82	0.90
25	AN66842522			44.5	81			1.10

Ø 16.5, 25

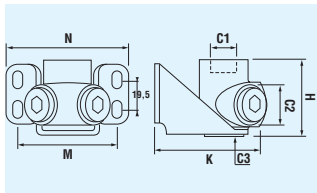
Wall Brackets

6689 2 Port 45° Wall Bracket, NPT



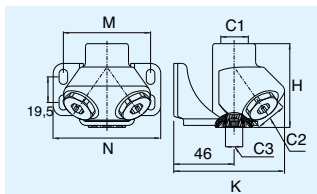
Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H (mm)	Z (mm)	K (mm)	N (mm)	Wt. (lb.)
16.5	AN66891722	1/2"	1/4"	89.5	63.5	84.5	82	1.47
25	AN66892522			92.5				1.49

6688 2 Port 90° Threaded Wall Bracket, NPT



Ø (mm)	Part No.	C1 (NPT)	C2 (NPT)	C3 (NPT)	H (mm)	K (mm)	M (mm)	N (mm)	Wt. (lb.)
16.5 25	AN66882222	1/2"	1/2"	1/4"	48	72.5	66.5	82	1.0

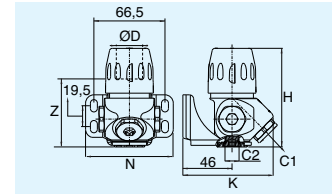
6691 2 Port 45° Threaded Wall Bracket, NPT



Ø (mm)	Part No.	C1 (NPT)	C2 (NPT)	C3 (NPT)	H (mm)	K (mm)	M (mm)	N (mm)	Wt. (lb.)
16.5 25	AN66912222	1/2"	1/2"	1/4"	64	84.5	66.5	82	1.39

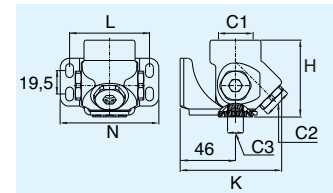
Wall Brackets Ball Valves

6696 3 Port 45° Wall Bracket, NPT



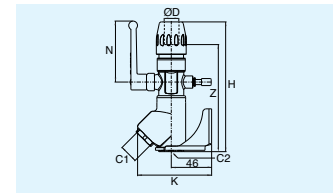
Ø (mm)	Part No.	C1 (NPT)	C2 (NPT)	H (mm)	Z (mm)	K (mm)	N (mm)	Wt. (lb.)
25	AN66962522	1/2"	1/4"	92.5	63.5	84.5	82	1.59

6636 3 Port Threaded Wall Bracket, NPT



Ø (mm)	Part No.	C1 (NPT)	C2 (NPT)	C3 (NPT)	H (mm)	K (mm)	M (mm)	N (mm)	Wt. (lb.)
25	AN66362822	3/4"	1/2"	1/4"	64	84.5	66.5	82	1.49

6679 1 Port 45° Wall Bracket with Ball Valve, NPT

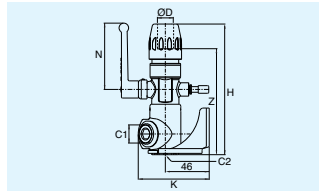


Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H (mm)	Z (mm)	K (mm)	N (mm)	Wt. (lb.)
16.5	AN66791722	1/2"	1/4"	148.5	123	84.5	69.5	1.92
25	AN66792522			173	142		108.5	3.37

Ø 16.5, 25, 40

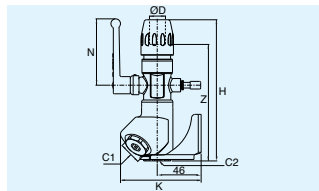
Wall Brackets Ball Valves

6675 2 Port 90° Wall Bracket with Ball Valve, NPT



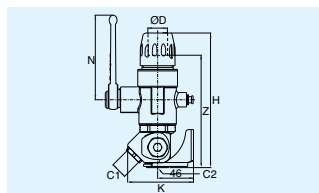
Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H (mm)	Z (mm)	K (mm)	N (mm)	Wt. (lb.)
16.5	AN66751722	1/2"	1/4"	137	111.5	74.5	69.5	1.76
25	AN66752522			163	132		108.5	3.21

6694 2 Port 45° Wall Bracket with Ball Valve, NPT



Ø OD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H (mm)	Z (mm)	K (mm)	N (mm)	Wt. (lb.)
16.5	AN66941722	1/2"	1/4"	148.5	123	84.5	69.5	2.23
25	AN66942522			173	142		108.5	3.69

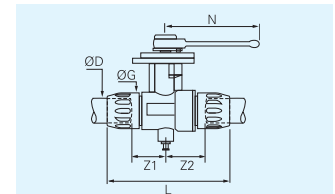
6638 3 Port 45° Wall Bracket with Ball Valve, NPT



ØD (mm)	Part No.	C1 (NPT)	C2 (NPT)	H (mm)	Z (mm)	K (mm)	N (mm)	Wt. (lb.)
25	AN66382522	1/2"	1/4"	173	142	84.5	108.5	3.82

Ball Valves Mounting Hardware

4099 Lockable Double Female, Vented

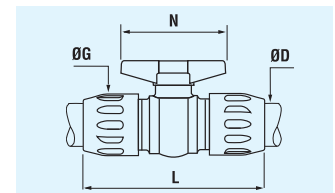


ØD (mm)	Part No.	ØG (mm)	L (mm)	N (mm)	Z1 (mm)	Z2 (mm)	Weight (lb.)
16.5	AN40991700	34	121	69	29	42	1.3
25	AN40992500	44.5	151.7	103.8	40	55	2.7

Model AN40991700 supplied with Ø6 mm plug.

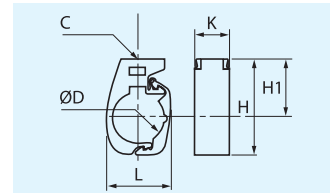
Model AN40992500 supplied with Ø8 mm plug.

4002 Double Female Valve



ØD (mm)	Part No.	ØG (mm)	L (mm)	N (mm)	Weight (lb.)
40	AN40024000	67	205	122	1.32

6697 Fixing Clip for Rigid Pipe



ØD (mm)	C (UNC)	Part No.	H1 (mm)	H (mm)	K (mm)	L (mm)	Weight (lb.)
16.5	1/4"	AN66971701	46	61	30	32.5	0.06
25	1/4"	AN66972501	46	61.5	30	38.5	0.07
40	1/4"	AN66974001	46	74.5	30	50	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

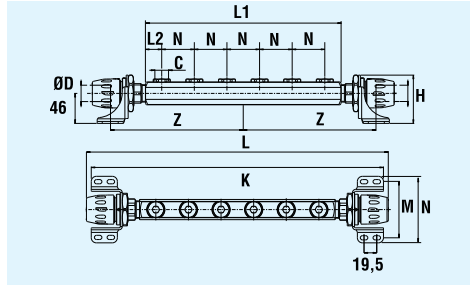
- Maximum 5 ft. space between clips for 10 ft. lengths of pipe
- Maximum 10 ft. space between clips for 20 ft. lengths of pipe

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 16.5, 25, 40

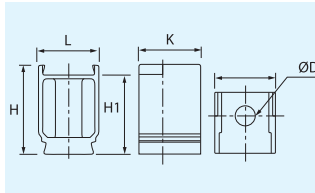
Mounting Hardware

6653 6 Port Manifold



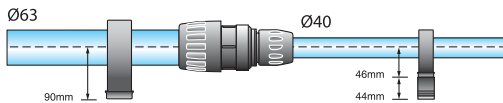
ØD (mm)	C (NPT)	Part No.	L (mm)	L1 (mm)	L2 (mm)	K (mm)	N (mm)	Z (mm)	H (mm)	M (mm)	Wt. (lb.)
25	1/2"	AN6653252206	463	300	25	448	50	204	74	86.5	5.07
40		AN6653402206	526	310	25	469	50	217	83	104.5	8.55

6697 Spacer

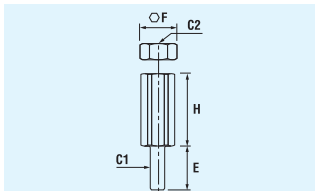


ØD (mm)	Part No.	H (mm)	H1 (mm)	K (mm)	L (mm)	Weight (lb.)
11	AN66970003	49.5	44	34	33	0.04

This spacer, in association 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



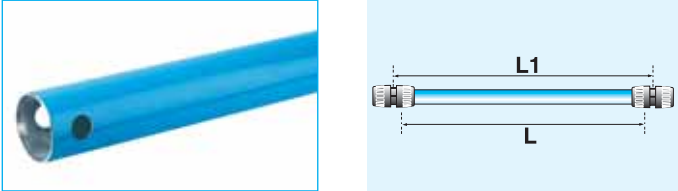
C1	C2 (UNC)	Part No.	E (mm)	F (mm)	H (mm)	Weight (lb.)
1/4"	3/8"	AN0169000500	16	13	30	0.12



Ø 63

Rigid Aluminum Pipe

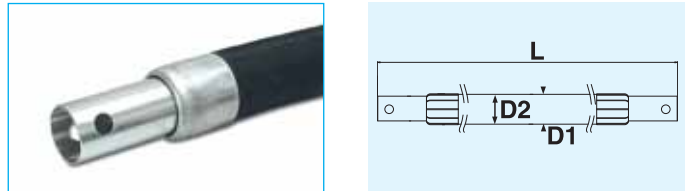
SmartPipe Aluminum Pipe



Ø OD (mm)	Ø ID (in.)	Part No.	L1 (ft.)	L (ft.)	Weight (lb.)
63	2 1/2	AN1016A6304	20	19' 7 1/8"	6.9

Flexible Hose

1001E 63 Flexible Hose



Ø D1 (mm)	Ø D2 (in.)	Part No.	L	Min Bend Radius (in.)	For Use with SmartPipe Pipe Diameter	Wt. (lb.)
79	2 1/2	AN1001E63008	4' 7"	12	63	8.64
		AN1001E63005	9' 10"	25		17.8
		AN1001E63006	13' 1"	25		23.6

Use part number AN66989903, anti-whiplash.
Refer to page 53 and 57 for band radius and proper installation.

6698 Anti-whiplash Strap



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

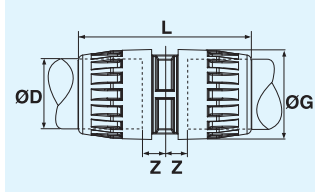
Part No.	Weight (lb.)
AN66989903	0.47



Ø 63

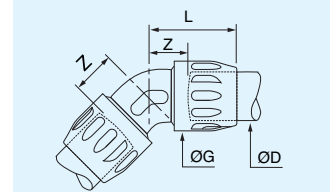
Pipe-to-pipe and Threaded Connectors

6606 Pipe-to-pipe Connector



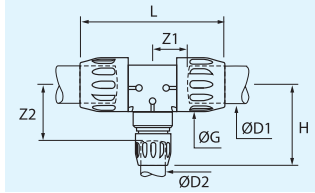
ØD (mm)	Part No.	ØG (mm)	L (mm)	Z (mm)	Weight (lb.)
63	AN66066300	91	171.5	25	1.81

6612 45° Elbow



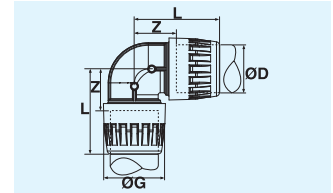
ØD (mm)	ØG (mm)	Part No.	L (mm)	Z (mm)	Weight (lb.)
63	91	AN66126300	100	61	1.20

6604 Reducing Tee



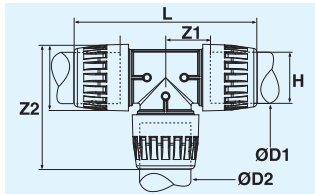
ØD1 (mm)	ØD2 (mm)	Part No.	ØG (mm)	H (mm)	L (mm)	Z1 (mm)	Z2 (mm)	Weight (lb.)
63	40	AN66046340	91	161	245	61	116	3.31

6602 90° Elbow



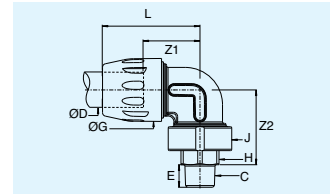
ØD (mm)	ØG (mm)	Part No.	L (mm)	Z (mm)	Weight (lb.)
63	91	AN66026300	122	61	2.17

6604 Equal Tee



ØD (mm)	Part No.	G (mm)	H (mm)	L (mm)	Z1 (mm)	Z2 (mm)	Weight (lb.)
63	AN66046300	91	122	245	61	61	2.98

6609 Male Threaded 90° Elbow, NPT

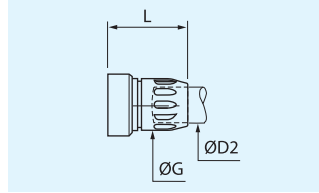


ØD (mm)	C (NPT)	Part No.	E (mm)	H (mm)	ØG (mm)	ØJ (mm)	L (mm)	Z1 (mm)	Z2 (mm)	Wt. (lb.)
63	2½"	AN66096341	20	70	91	91	124	61	104	4.04
	3"	AN66096346	25	80					106	6.01

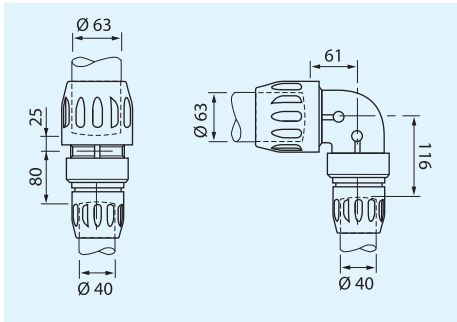
Ø 63

Pipe-to-pipe and Threaded Connectors

6666 Plug-in Reducer

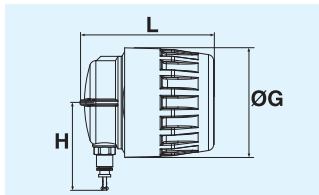


ØD1 (mm)	ØD2 (mm)	Part No.	ØG (mm)	L (mm)	Weight (lb.)
63	40	AN66664063	67	112.5	1.90



Connection (pipe engagement) dimensions

6625 Vented End Cap

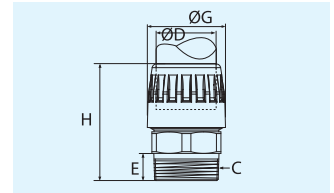


ØD (mm)	Part No.	E (mm)	ØG (mm)	H (mm)	L (mm)	Weight (lb.)
63	AN66256300	31	91	74	111	1.0

Model Ø 25, Ø 40, and Ø 63: supplied with 5/16" (8 mm) plug.

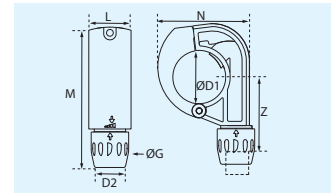
Quick Assembly Brackets

6605 Male Threaded Connector, NPT



ØD (mm)	Part No.	C (NPT)	E (mm)	ØG (mm)	H (mm)	Weight (lb.)
63	AN66056344	2"	20	91	118.5	2.30
	AN66056341	2½"	25		130.5	3.00
	AN66056346	3"	27		140.0	4.90

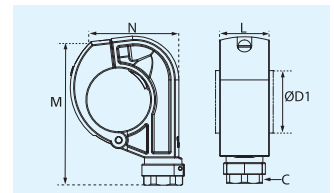
6662 Quick Assembly Bracket



ØD1 (mm)	ØD2 (mm)	Part No.	M (mm)	ØG (mm)	L (mm)	N (mm)	Z (mm)	Wt. (lb.)
63	25	AN66626325	166.5	44.5	50	108.5	75	0.70

To drill SmartPipe pipe, use drilling tool AN66980202.

6663 Quick Assembly Mini-bracket with Female Thread, NPT



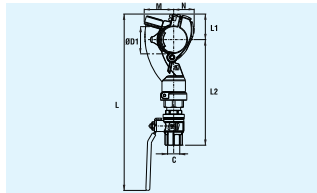
ØD1 (mm)	Part No.	C (NPT)	M (mm)	L (mm)	N (mm)	Wt. (lb.)
63	AN66636328	3/4"	138.9	50	98.5	1.10

Supplied with brass plug. To drill SmartPipe pipe, use drilling tool AN66980202.

Ø 63

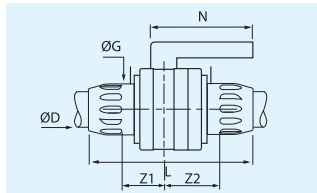
Ball Valve

6668 Quick Assembly Mini-bracket with Ball Valve, NPT



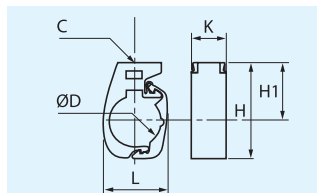
ØD1 (mm)	Part No.	C (NPT)	L (mm)	L1 (mm)	L2 (mm)	M (mm)	N (mm)	Wt. (lb.)
63	AN66686322	1/2"	275	63	142	60	48	1.51
	AN66686328	3/4"	297	63	146	60	48	1.72

4012 Lockable Double Female Valve



ØD (mm)	Part No.	G (mm)	L (mm)	N (mm)	Z1 (mm)	Z2 (mm)	Weight (lb.)
63	AN40126300	91	278	185	84	98	5.42

6697 Fixing Clip for Rigid Pipe



ØD (mm)	C (UNC)	Part No.	H1 (mm)	H (mm)	K (mm)	L (mm)	Weight (lb.)
63	3/8"	AN66976301	90	127.5	30	73.5	0.18

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.

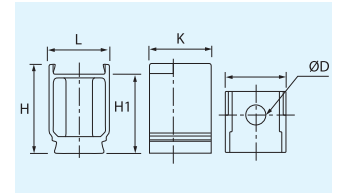
Example

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

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.

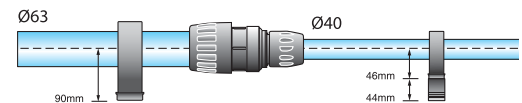
Mounting Hardware

6697 Spacer



ØD (mm)	Part No.	H (mm)	H1 (mm)	K (mm)	L (mm)	Weight (lb.)
11	AN66970003	49.5	44	34	33	0.4

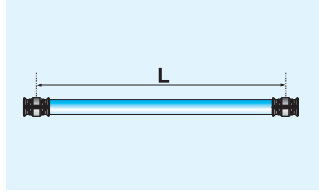
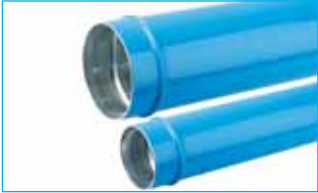
This spacer, used with a SmartPipe clip, allows consistent alignment of pipes when different diameters of pipe are used in the same run.



Ø 76, 100

Rigid Aluminum Pipe

SmartPipe

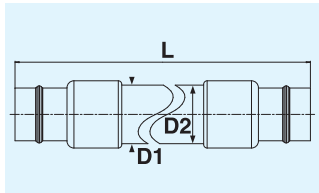


Ø OD (mm)	Ø ID (in.)	Part No.	L1 (ft.)	Weight (lb.)
76.3	3	ANTA16L104	20	17
101.5	4	ANTA16L304	20	25.7



Flexible Hose

FP01 Flexible Hose



Ø D1 (mm)	Ø D2 (in.)	Part No.	L	Min Bend Radius (in.)	For Use with SmartPipe Pipe Diameter	Weight (lb.)
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.

Refer to page 53 and 57 for bend radius and proper installation.

6698 Anti-whiplash Strap



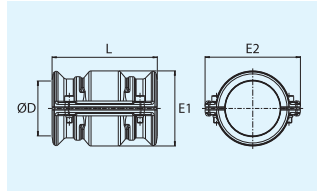
Prevents whiplash should SmartPipe flexible hose be disconnected while under pressure. Conforms to ISO 4414 safety standard.

Part No.	Weight (lb.)
AN66989903	0.47

Ø 76, 100

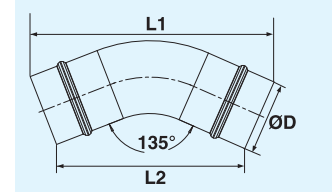
Pipe-to-pipe and Threaded Connectors

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



Ø OD (mm)	Part No.	L (mm)	E1 (mm)	E2 (mm)	Weight (lb.)
76	ANRR01L100	146	104	132	2.33
100	ANRR01L300		128	157	3.06

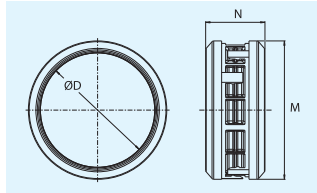
RX12 45° Elbow



Ø OD (mm)	Part No.	L1 (mm)	L2 (mm)	Weight (lb.)
76	ANRX12L100	235.5	151.4	2.21
100	ANRX12L300	271.4	184.3	3.86

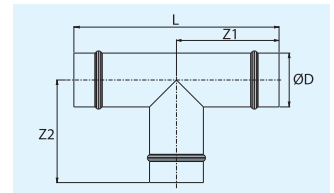
Use two connectors ANRR01 to connect 45° elbow ANRX12 to SmartPipe pipe.

RP01 Cartridge (spare part)



Ø OD (mm)	Part No.	M (mm)	N (mm)	Weight (oz.)
76	ANRP01L100	88.7	51.4	8.3
100	ANRP01L300	123	52.7	10.2

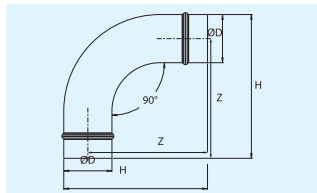
RX04 Equal Tee



Ø OD (mm)	Part No.	L (mm)	Z1 (mm)	Z2 (mm)	Weight (lb.)
76	ANRX04L100	290	145	145	2.32
100	ANRX04L300	310	155	135	3.97

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

RX02 90° Elbow



Ø OD (mm)	Part No.	H (mm)	Z (mm)	Weight (lb.)
76	ANRX02L100	227	189	2.21
100	ANRX02L300	278	221	3.86

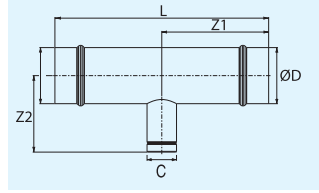
Use two connectors ANRR01 to connect 90° elbow ANRX02 to SmartPipe pipe.



Ø 76, 100

Pipe-to-pipe and Threaded Connectors

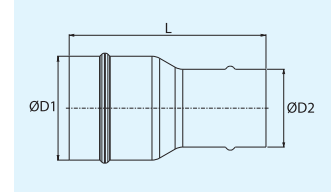
RX24 Reducing Tee



ØD1 (mm)	ØD2 (mm)	Part No.	L (mm)	Z1 (mm)	Z2 (mm)	Weight (lb.)
76	40	ANRX24L140	290	145	104	2.01
	63	ANRX24L163			163	2.29
100	40	ANRX24L340	310	155	116.5	3.46
	63	ANRX24L363			175.8	3.75

Use two connectors ANRR01 to connect reducing tee 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.

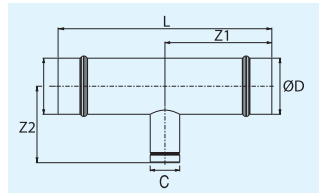
RX64, RX66 Plug-in Reducer



ØD1 (mm)	Part No.	ØD2 (mm)	L (mm)	Weight (lb.)
76	ANRX64L163	63	230	1.26
	ANRX64L363		250	1.76
100	ANRX66L3L1	76	192.5	1.57

Use one connector ANRR01 to connect plug-in reducer ANRX64 to SmartPipe pipes Ø 76 or Ø 100 and one pipe-to-pipe connector AN6606 to connect to SmartPipe pipe Ø 63.

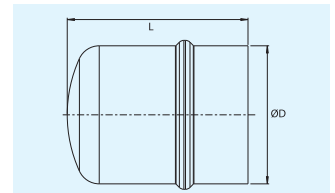
RX20 Threaded Tee



ØD (mm)	Part No.	C (NPT)	L (mm)	Z1 (mm)	Z2 (mm)	Weight (lb.)
76	ANRX20L1N04	1/2"	290	145	63	1.92
100	ANRX20L3N04		310	155	75.8	6.35

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

RX25 End Cap



ØD (mm)	Part No.	L (mm)	Weight (lb.)
76	ANRX25L100	99.6	0.71
100	ANRX25L300	107.4	1.17

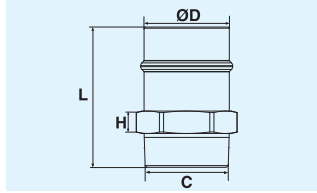
Use one connector ANRR01 to connect end cap ANRX25 to SmartPipe pipe.



Ø 76, 100

Pipe-to-pipe and Threaded Connectors

RR21 Male Threaded Adapter, NPT



Ø OD (mm)	Part No.	C (NPT)	L (mm)	H (mm)	Weight (lb.)
76	ANRR21L1N20	2½"	125	20	2.00
	ANRR21L1N24	3"			2.35

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

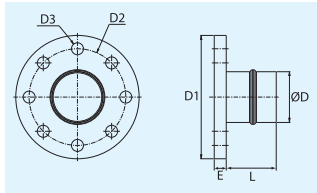
EW06 Flange Bolt Kit



Part No.	C (UNC)	L (mm)	Weight (lb.)
ANEW060001	5/8"	60	0.8*

*Contains eight bolts and eight nuts.

RX30, RX31 Flange Adaptor

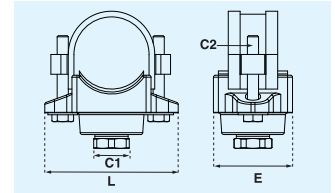


ØD (mm)	DN (mm)	Part No.	D1 (mm)	D2 (mm)	D3 (mm)	E (mm)	L (mm)	Weight (lb.)
76	65	ANRX30L100	185	145	18	10	75	7.05
	80	ANRX31L100*	200	160				7.05
100	100	ANRX30L300	220	180	18	10	75	12.0
		ANRX31L300*						12.0

*ANRX31 dimensions conform to ANSI standards.

Quick Assembly Direct Feed Brackets

RR63 Simple Reducing Bracket



ØD (mm)	Part No.	C1 (NPT)	C2 (mm)	E (mm)	L (mm)	Weight (lb.)
76	ANRR63L1N08	1"	M12	50	137	4.15
100	ANRR63L3N08			80		4.25

Supplied with Ø 25 - 1" adaptor (AN66212535).
To drill SmartPipe pipe, use drilling tool ANEW090030.

EW05 Flange Gasket

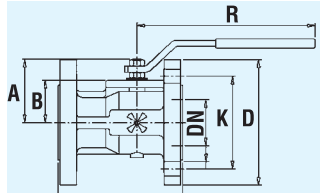


ØD (mm)	Part No.	For use with Flange Reference	Weight (lb.)
76	ANEW05L100	ANRX30L100	0.06
100	ANEW05L300	ANRX30L300	0.11

Ø 76, 100

Ball Valve

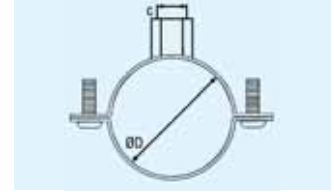
VR01 Ball Valve



ØD (mm)	DN (mm)	Part No.	A (mm)	B (mm)	D (mm)	L (mm)	K (mm)	R (mm)	Wt. (lb.)
76	65	ANVR01L100*	102	75	185	170	145	320	24.3
100	100	ANVR01L300*	136	104	220	190	180	380	43.4

DN Flange Adaptors are required
76 mm ANRX30L100; 100 mm ANRX30L300

EX01 Pipe Mounting Bracket



ØD (mm)	Part No.	C (UNC)	Weight (oz.)
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

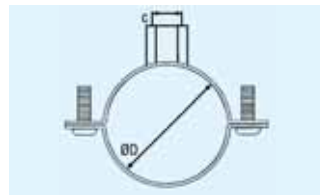
- Maximum 5 ft. space between brackets for 10 ft. lengths of pipe
- Maximum 10 ft. space between brackets for 20 ft. lengths of pipe

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.

Ø 76, 100

Mounting Hardware

ER01 Rubber Insulated Pipe Mounting Bracket



ØD (mm)	Part No.	C (UNC)	Weight (lb.)
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.

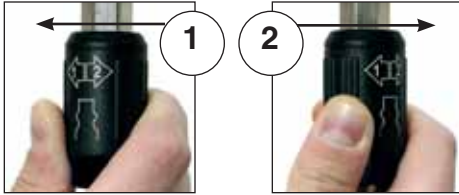
Example

- 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.



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.

ISO B 1/4" Body

Male NPT



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

ISO B 1/4" Body

Male Plug NPT



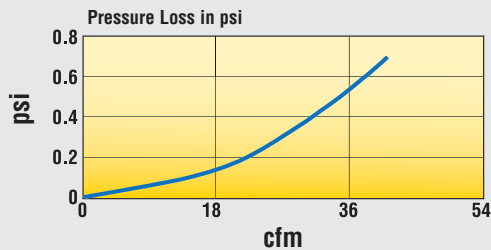
Part No.	NPT
ANCA84U1N02	1/4"
ANCA84U1N03	3/8"

Female Plug NPT

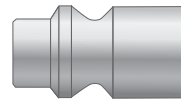


Part No.	NPT
ANCA83U1N02	1/4"
ANCA83U1N03	3/8"

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

Composite Quick-Connect Couplers and Plugs



ISO B 3/8" Body

Male NPT



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

ARO 1/4" Body

Male NPT



Part No.	NPT
ANCP05A1N03	3/8"
ANCP05A1N04	1/2"

ISO B 3/8" Body

Male Plug NPT



Part No.	NPT
ANCA84U2N02	1/4"
ANCA84U2N03	3/8"

ARO 1/4" Body

Male Plug NPT



Part No.	NPT
ANCA84A1N02	1/4"
ANCA84A1N03	3/8"

Female Plug NPT

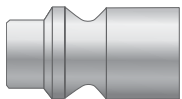


Part No.	NPT
ANCA83U2N02	1/4"
ANCA83U2N03	3/8"

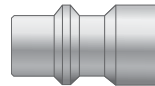
Female Plug NPT



Part No.	NPT
ANCA83A1N02	1/4"
ANCA83A1N03	3/8"



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



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

Installation Tools

6698 Tool Case

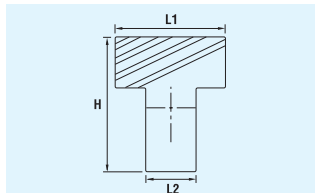


Part No.	For SmartPipe	H (mm)	L (mm)	I (mm)	Weight (lb.)
AN66980003	Ø 16.5 - 25 - 40 - 63 mm	315	290	105	13.0

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

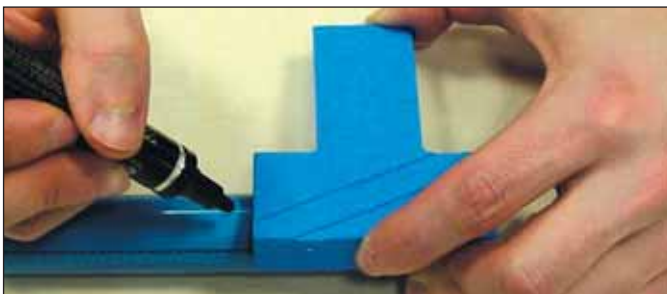
- Drilling fixtures AN66980101 and AN66980102
- Drilling tools AN66980201 and AN66980202
- Cutter for pipe AN66980301
- Chamfer tool AN66980401
- Deburring tool AN66980402
- Set tightening spanners (2) AN66980503
- Marking tool AN66980403

6698 Marking Tool for Aluminum Pipe

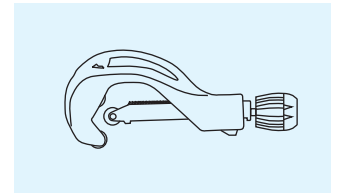


Part No.	For SmartPipe	H (mm)	L1 (mm)	L2 (mm)	Weight (oz.)
AN66980403	Ø 16.5 - 25 - 40 mm	88	73	33	0.38

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.

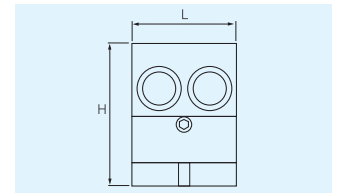


6698 Pipe Cutter



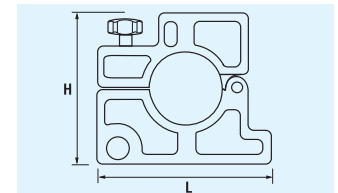
Part No.	For SmartPipe	L (mm)	H (mm)	Weight (oz.)
AN66980301	Ø 16.5 - 25 - 40 - 63 mm	230	98	28.8
ANEW080001	Ø 63 - 76 - 100 mm	360	155	31.5

6698 Drilling Fixture for Rigid Aluminum Pipe



Part No.	For SmartPipe	H (mm)	L (mm)	Weight (lb.)
AN66980101	Ø 16.5 - 25 - 40 mm	120	80	1.90

After drilling, deburr and clean the pipe.

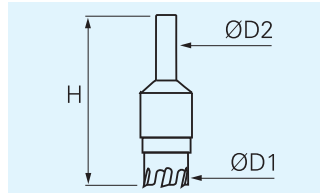


Part No.	For SmartPipe	H (mm)	L (mm)	Weight (lb.)
AN66980102	Ø 63 mm	134	155	3.81

After drilling, deburr and clean the pipe.

Installation Tools

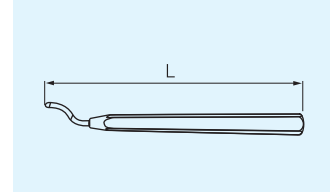
6698 Drilling Tool for Rigid Aluminum Pipe



Part No.	For SmartPipe	ØD1 (mm)	ØD2 (mm)	H (mm)	Weight (lb.)
AN66980202	Ø 25 mm	16	12	71	0.33

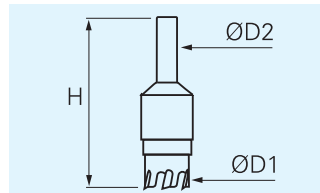
Drilling tool AN66980202 allows the installation of Ø 25 SmartPipe brackets. Can be used with all types of drills.

6698 Deburring Tool for All Aluminum Pipe



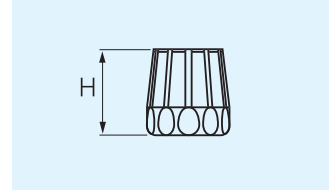
Part No.	L (mm)	Weight (lb.)
AN66980402	140	0.01

6698 Chamfer Tool for Aluminum Pipe



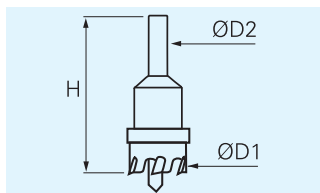
Part No.	For SmartPipe	ØD1 (mm)	ØD2 (mm)	H (mm)	Weight (lb.)
AN66980201	Ø 40 - 63 mm	22	12	71	0.33

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.



Part No.	For SmartPipe	H (mm)	Weight (lb.)
AN66980401	Ø 16.5 - 25 - 40 mm	64	0.80

Spanner Wrenches for Ø 63 mm fittings



Part No.	For SmartPipe	ØD1 (mm)	ØD2 (mm)	H (mm)	Weight (lb.)
ANEW090030	Ø 76 - 100 mm	30	12	71	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.



Part No.	Weight (lb.)
AN66980503	1.68 ea.

This set includes two tightening spanners.

Installation Tools (76 and 100 mm only)

Portable Tool Kit

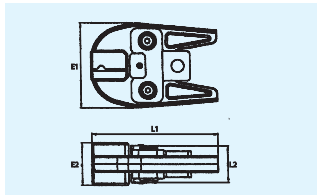


Part No.	V	Weight (lb.)
ANEW010002	110	20.9

This case contains: one portable tool, one 14V battery and battery charger. Does not include forming jaws.



Forming Jaws for Portable Tool



ØD	Part No.	E1	E2	L1	L2	Weight (lb.)
76	ANEW02L100	103	52	154	46	5.7
100	ANEW02L300		71			6.2

14V Battery for Portable Tool



Part No.	V	Weight (lb.)
ANEW030001	110	1.48

Minimum number of lugs

5

76 mm OD

6

100 mm OD

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 in-line pipe diameter 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

Ø 16.5



Ø 25



Ø 40



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

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

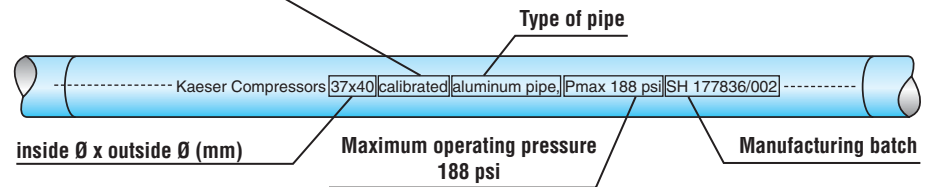
Thanks to the rigidity of SmartPipe aluminum pipe, temperature-related expansion/contraction is reduced to a minimum. The SmartPipe network retains its straightness, and hence its performance, over time (reduction of pressure drop caused by surface friction).

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.

Marking

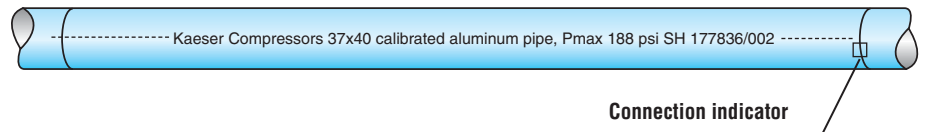
Pipe calibration ensures secure connection and sealing



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 63 aluminum pipe



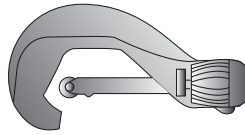
Drilling locators are used to correctly position SmartPipe brackets onto the pipe.

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

Piping

Ø 16.5, 25, 40

Tools



Pipe cutter for aluminum pipe
ref. AN66980301



Chamfer tool for aluminum pipe
ref. AN66980401

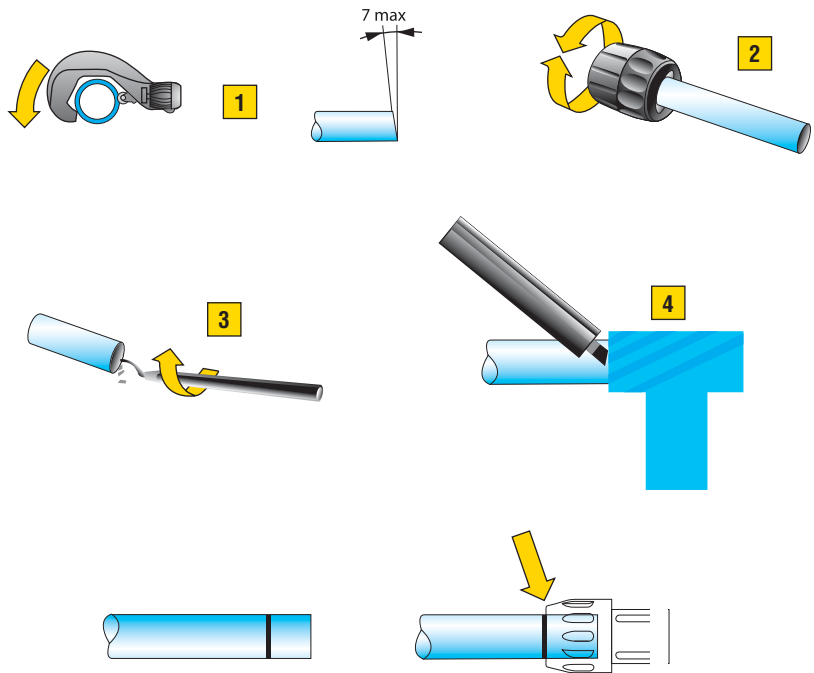


Deburring tool for aluminum pipe
ref. AN66980402



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

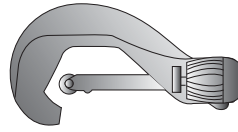
Insertion Lengths

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

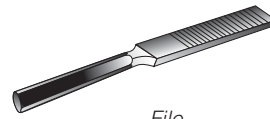
The insertion lengths for Ø 16.5, 25, and 40 connectors are 25 mm, 27 mm, and 45 mm respectively with the exception of the end cap, 6625 series, for which the insertion lengths are 39 mm, 42 mm, and 64 mm respectively. To ensure a secure connection, push the pipe into the fitting until it stops.

Ø 63

Tools



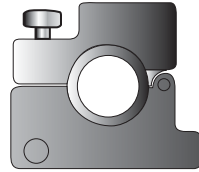
Pipe cutter for aluminum pipe ref. AN66980301



File



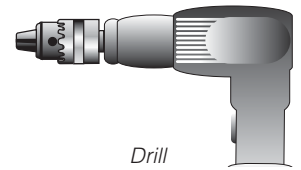
Deburring tool for aluminum pipe ref. AN66980402



Drilling jig for aluminum pipe ref. AN66980102

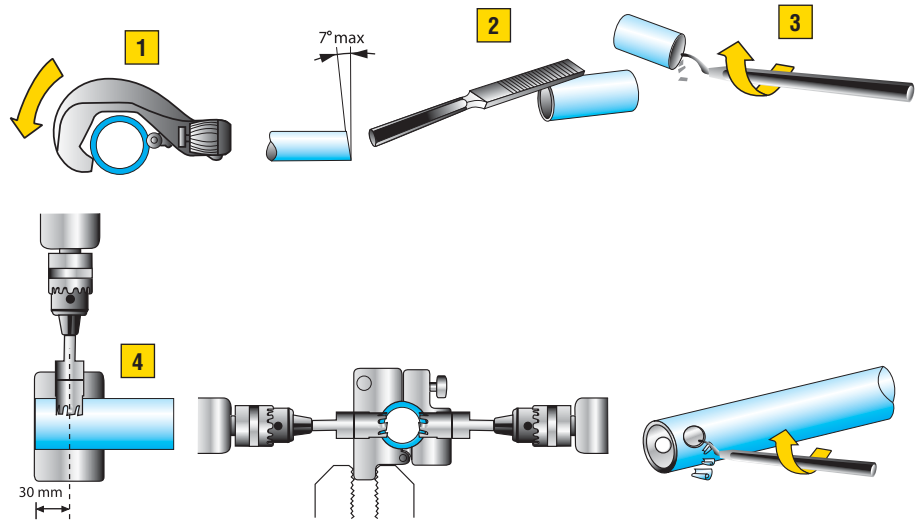


Drilling tool for aluminum pipe ref. AN66980201



Drill

Procedure



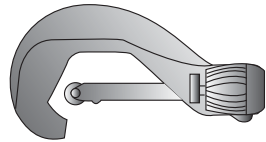
- 1** Cutting the pipe:
 - place the pipe in the pipe cutter
 - position the blade onto the pipe
 - rotate the pipe cutter around the pipe while gently tightening the wheel
- 2** Carefully chamfer the outer edges
- 3** Deburr the inner end of the pipe

- 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.

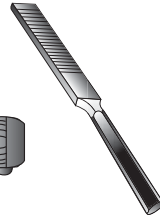
Piping

Ø 76, 100

Tools



Pipe cutter for aluminum pipe
ref. ANEW080001



File

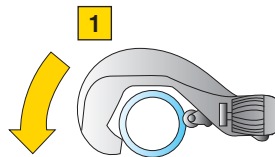


Portable tool kit ref.
ANEW010002 (110V)

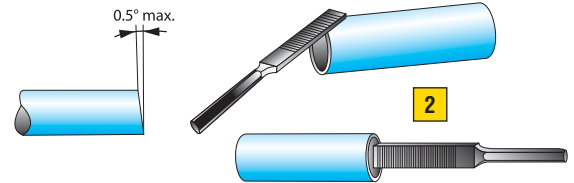


Pipe forming jaw set ref.
ANEW02L100 (Ø 76) or
ANEW02L300 (Ø 100)

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 and inner edges of the pipe with a file

3



- 3** Creating the lugs for Ø 76 or Ø 100 cut pipe

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

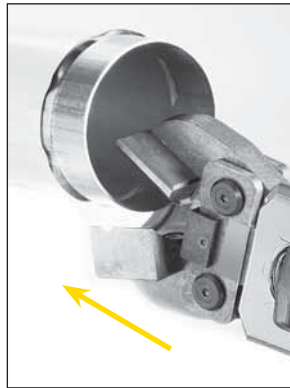
Place the jaws in the housing

Lock in position by closing the retaining pin

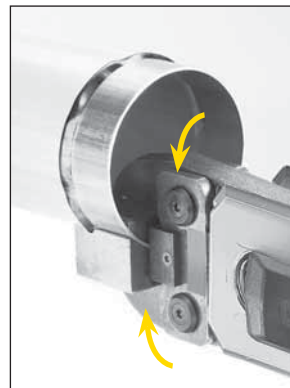
Note: To calibrate, run the jaw through its full cycle without the pipe.

Procedure continued

3



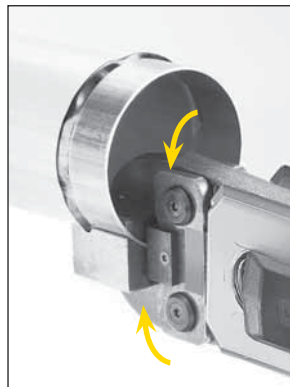
Manually open the jaws of the clamp and insert the aluminum pipe into the clamp as far as it will go



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

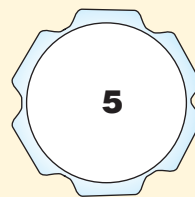


Re-open the two jaws to remove the pipe and rotate the pipe slightly

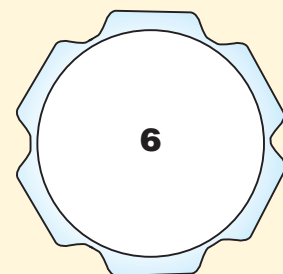


Renew the operation until the required minimum number of lugs for each diameter is achieved

Minimum number of lugs



76 mm OD

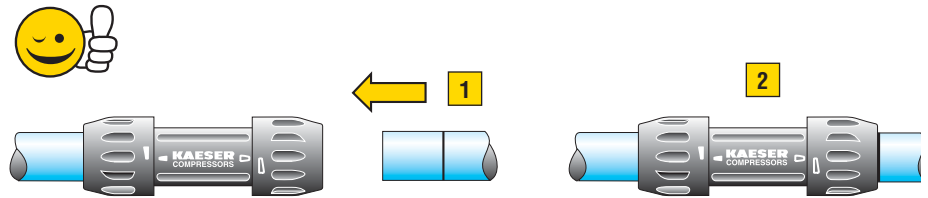


100 mm OD

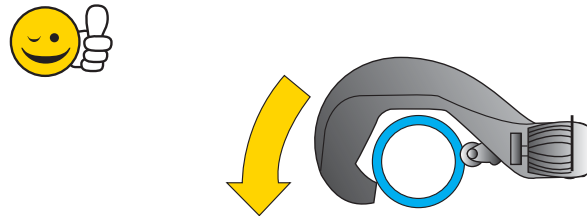
Important: Do not overlap the lugs!

Piping Do's

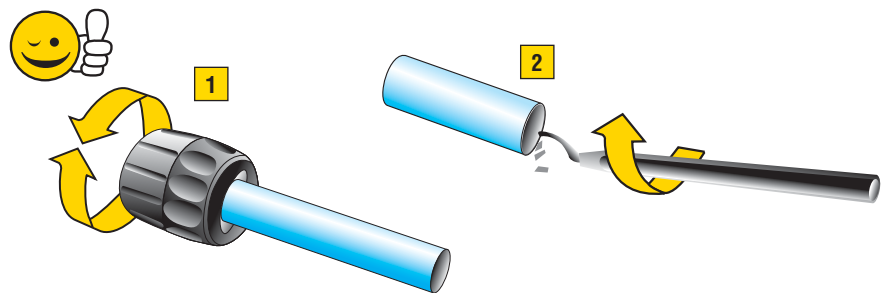
Connection *Push to connect*



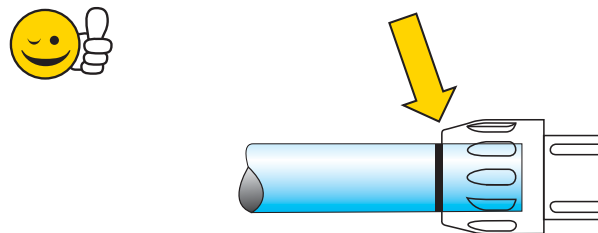
Use a pipe cutter



Carefully chamfer and deburr the pipe after cutting or drilling

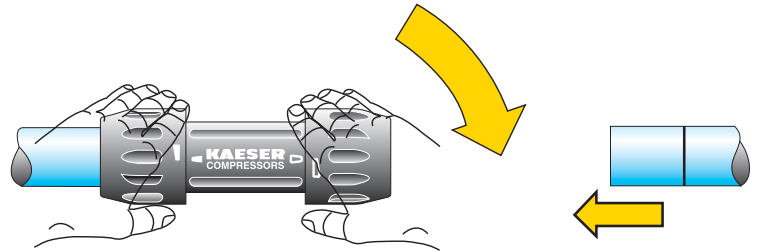


Check that the pipe is correctly positioned in the connector

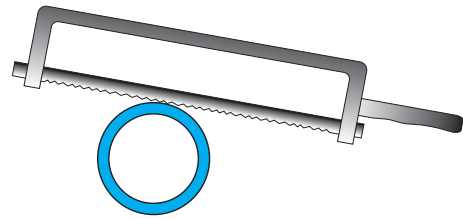


Piping Dont's

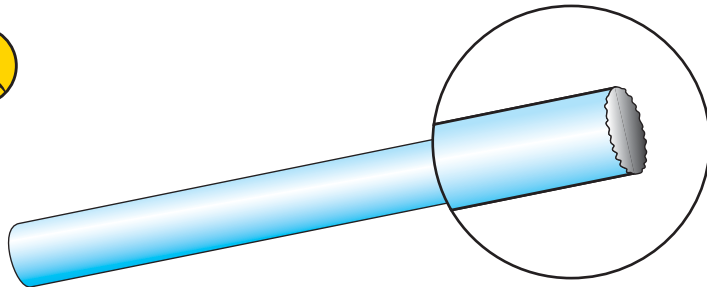
Connection
Don't loosen before connection



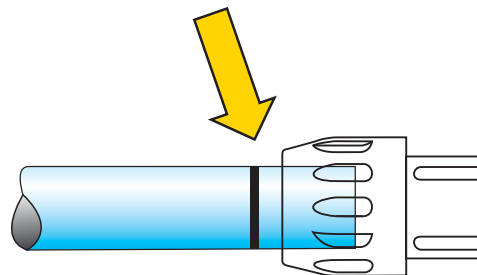
Don't cut pipe with a saw



Don't leave pipe end rough after cutting it



Don't push the pipe in only part way

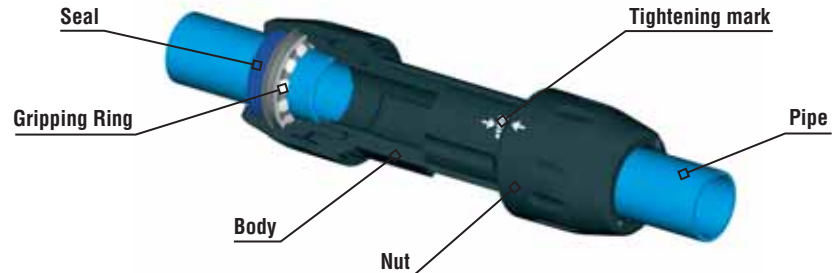


Connectors

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.

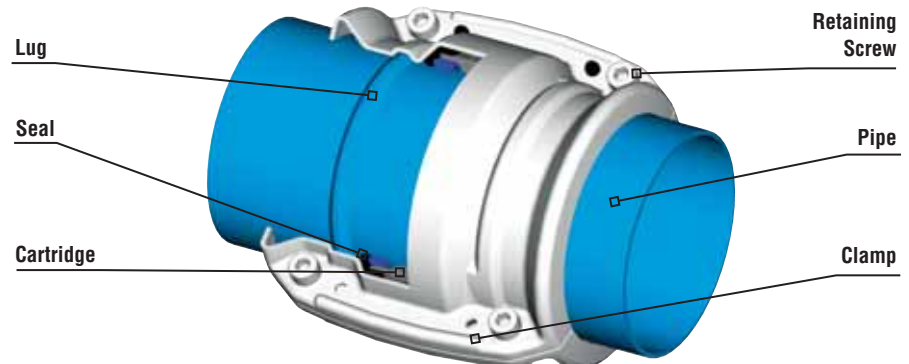
Double clamp quick-fit connection



Ø 63

The 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.

Clamp quick-fit connection



Ø 76, 100

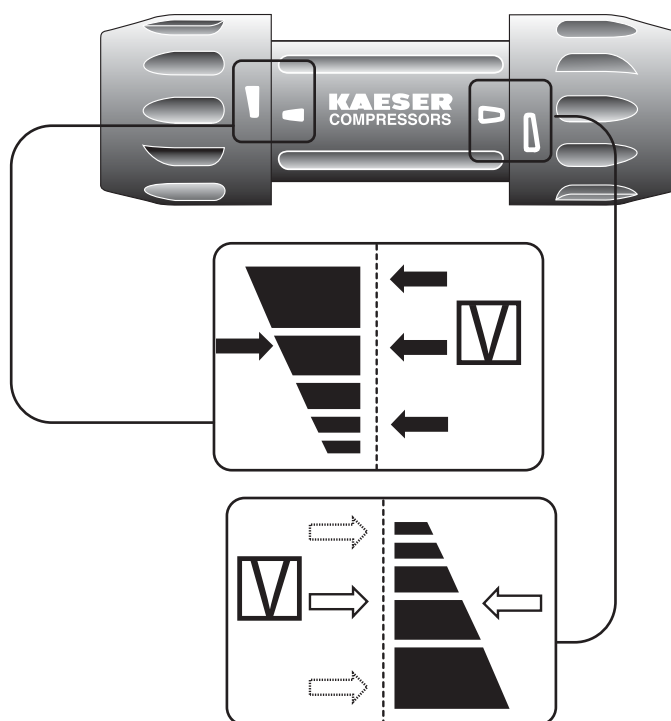
The Ø 76 and Ø 100 clamps secure instantly to SmartPipe aluminum pipe. Simply position the formed pipe within the SmartPipe cartridge, which acts as a seal. Close the SmartPipe clamp to secure the connection and finally tighten the four retaining screws.

Pre-assembled tightening indicators for Ø 16.5, 25, and 40 connectors

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.

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!

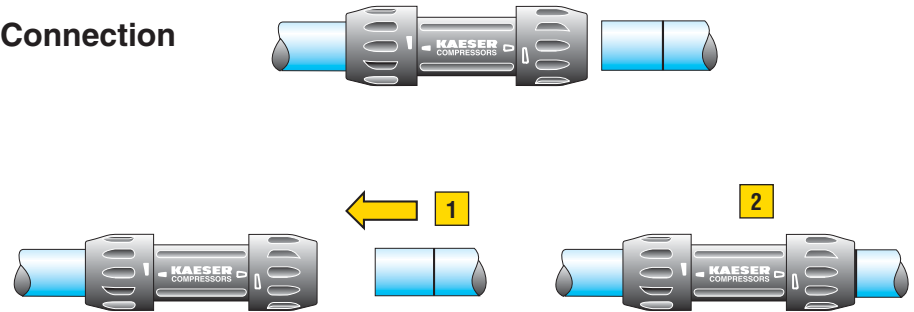


Before using Ø 16.5, Ø 25 or Ø 40 connectors, ensure that the arrow marks are correctly aligned with each other. Note that the connector nuts are **not** interchangeable.

Connectors

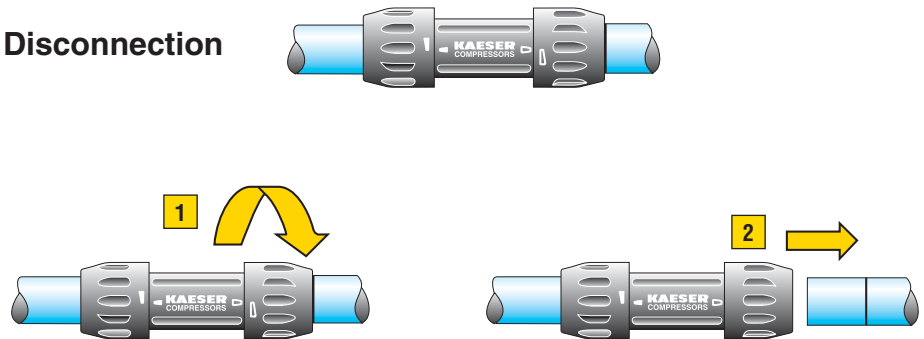
Connection / Disconnection

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 47 of this guide.

Ø 16.5, 25, 40

Note: when using end caps (AN6625 series)

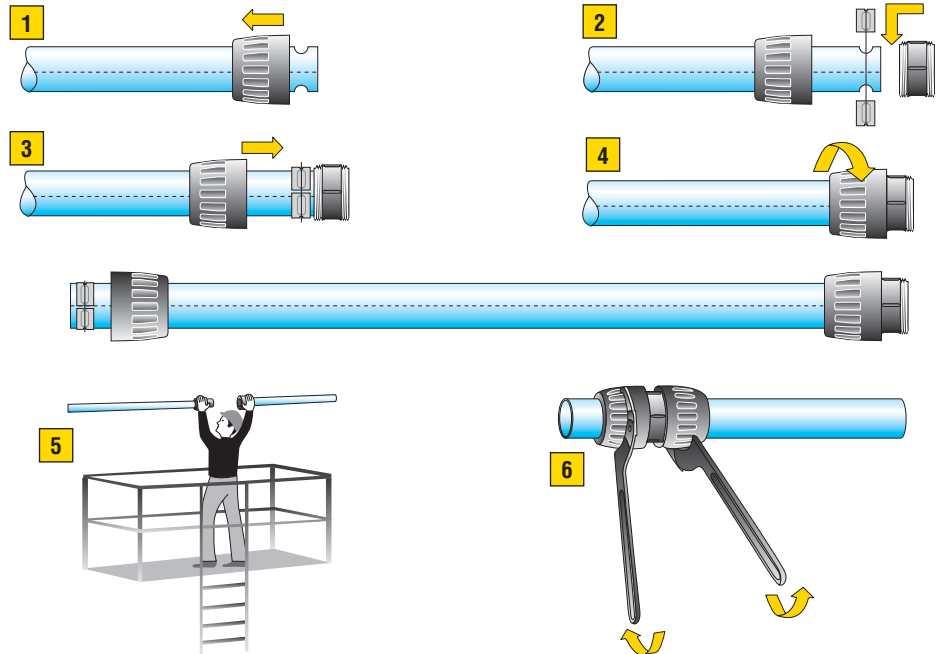
The insertion length is greater for end caps than for other SmartPipe connectors. The connection mark should be applied to the pipe by means of a marker and tape measure, using the following values:

- Ø 16.5: 39 mm
- Ø 25: 42 mm
- Ø 40: 64 mm

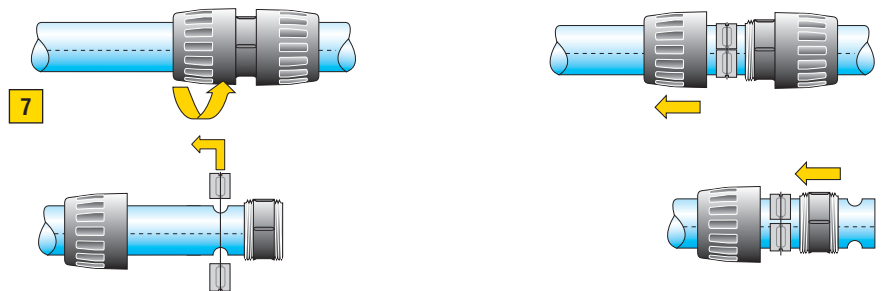
Connection / Disconnection

Ø 63

Connection



Disconnection



- 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

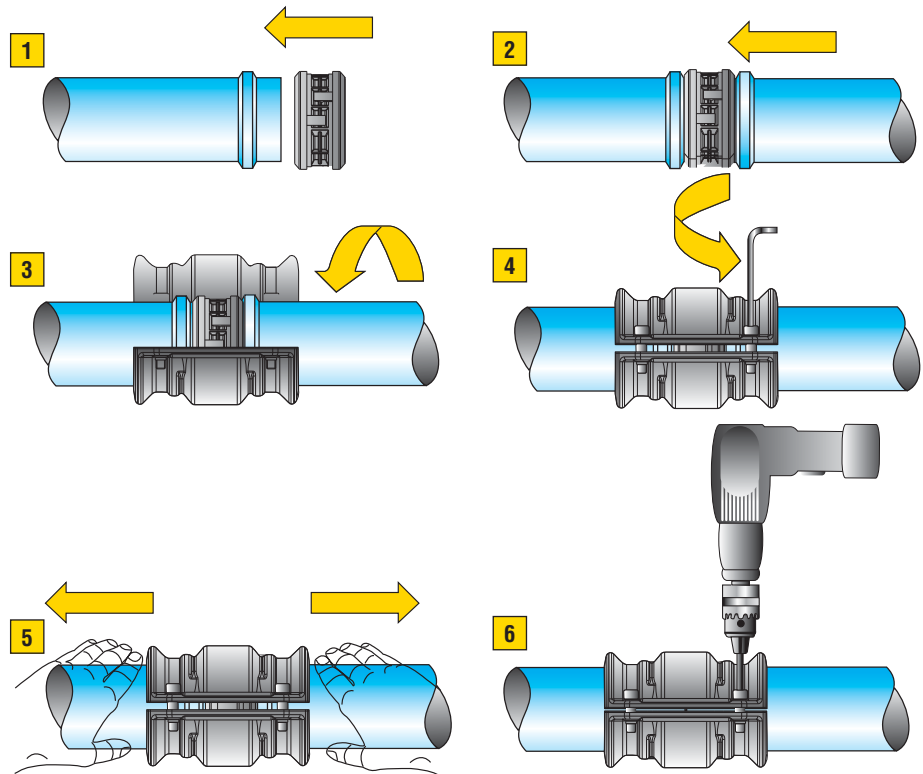
- 4** Tighten the nut by hand
- 5** Bring the two pipes together
- 6** Complete the assembly by 1/2 rotation with SmartPipe tightening spanners ref. AN66980503
- 7** To disconnect, perform the same operations in reverse order

Lateral dismantling: see page 47 of this guide.

Connectors

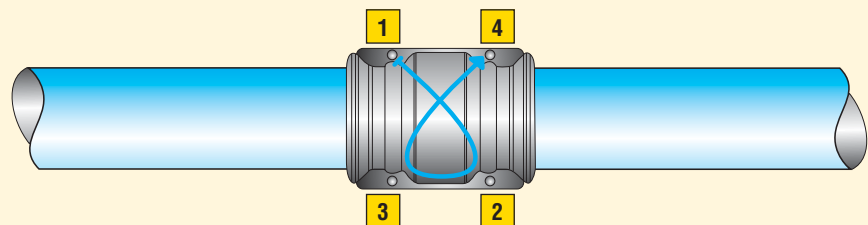
Connection / Disconnection

Ø 76, 100



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

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

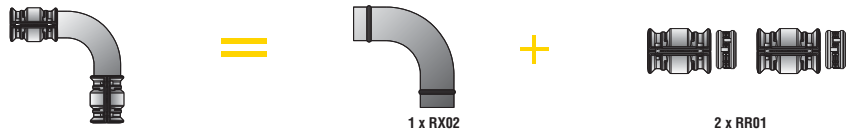


To disconnect, perform the same operations in reverse order.

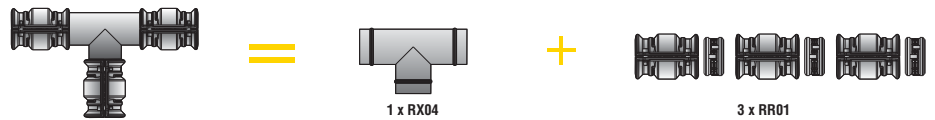
Practical Examples

Various Ø 76 and 100 configurations

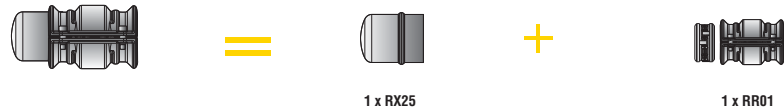
Changing direction with a 90° elbow



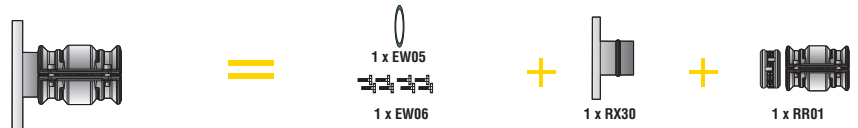
Changing direction with a tee piece



Connecting an end cap



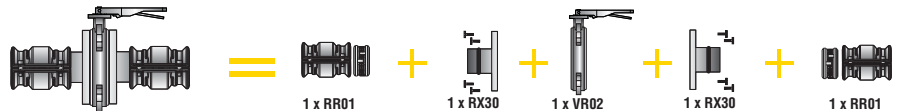
Connecting a circular flange and a connector



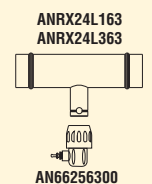
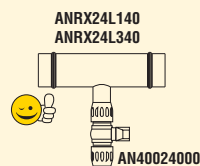
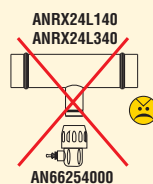
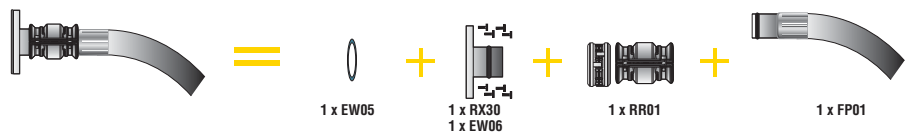
Reduction from Ø 100 to 76



Connecting a valve

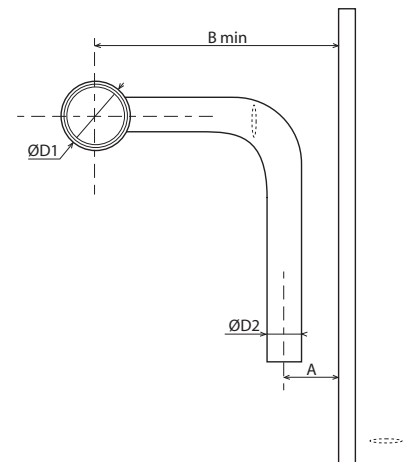
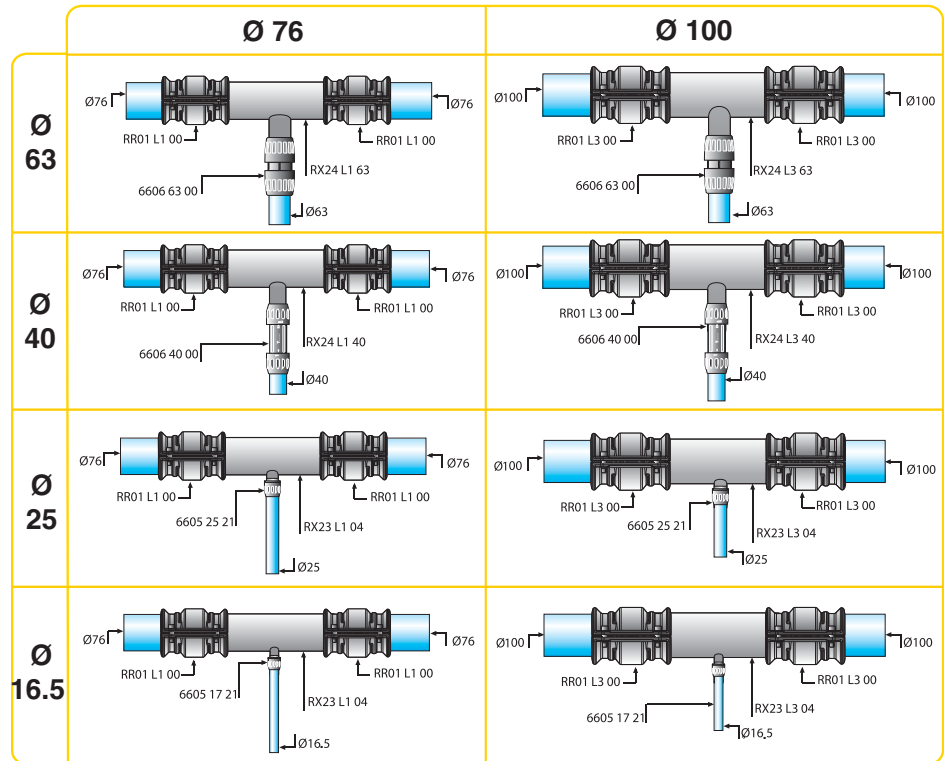


Connecting a flexible hose and a circular flange



Practical Examples

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



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

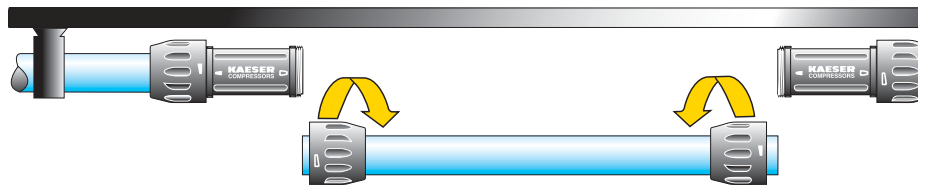
Minimum pipe center-to-center mounting distances for Ø 76 and 100 brackets

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



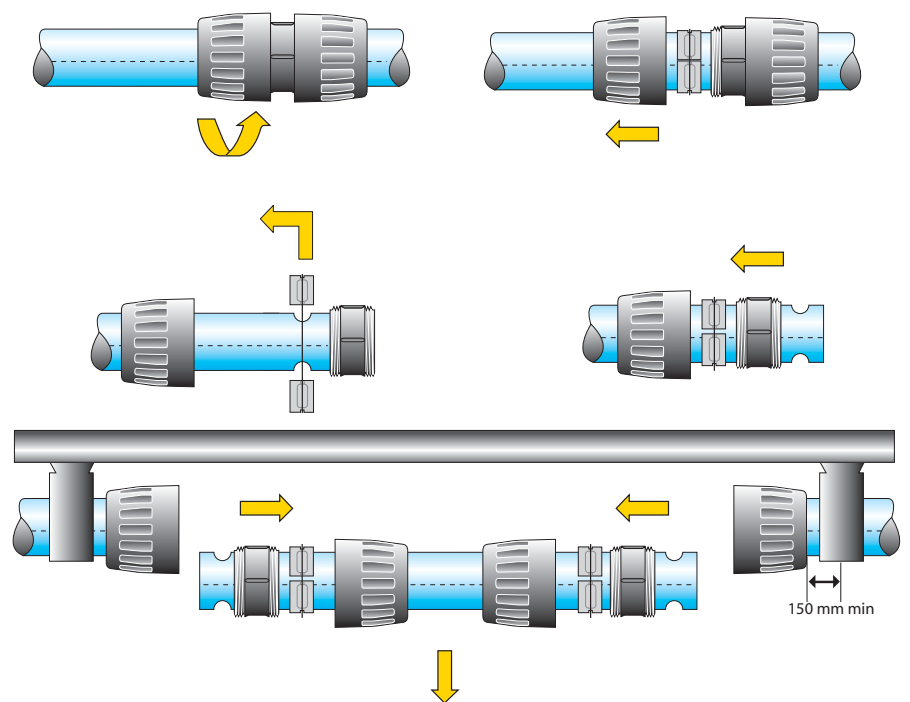
Lateral Dismantling

Ø 16.5, 25, 40



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

Ø 63

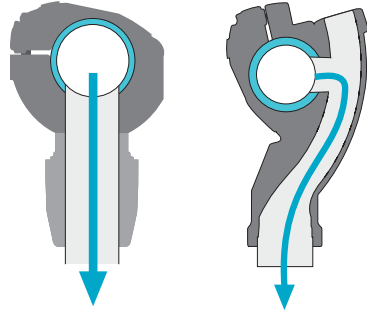


- 1** Loosen the connector nuts on the ends of the pipe to be removed
- 2** Slide them along the pipe
- 3** Remove the clamp rings from their housings
- 4** Slide the clamps and the connector body along the pipe which is to be removed
- 5** Repeat the operation at the other end of the pipe and laterally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

Quick Assembly Brackets

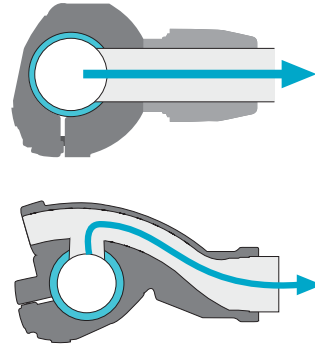
General

Vertical Drop



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

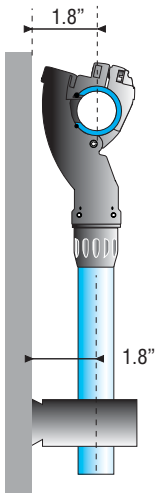
Horizontal Branch Line



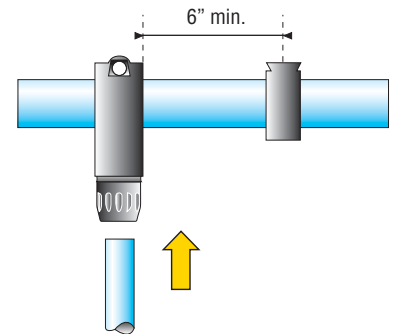
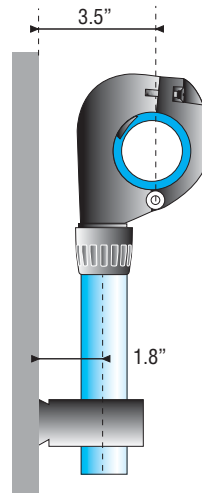
retains condensate water in the main line. Thanks to its small size, the SmartPipe quick assembly bracket facilitates new additions in the tightest places and can be used for connecting horizontal branch lines and vertical drops.

Specific instructions for fitting a bracket

Ø 25 - Ø 40



Ø 63



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 63 SmartPipe quick assembly brackets, the pipe center to wall distance is

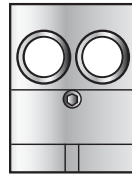
3.5". Furthermore, SmartPipe clips should be fitted at a distance of at least 6" from a quick assembly bracket in order to allow for the expansion / contraction of aluminum pipe.

Fitting a Quick Assembly 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

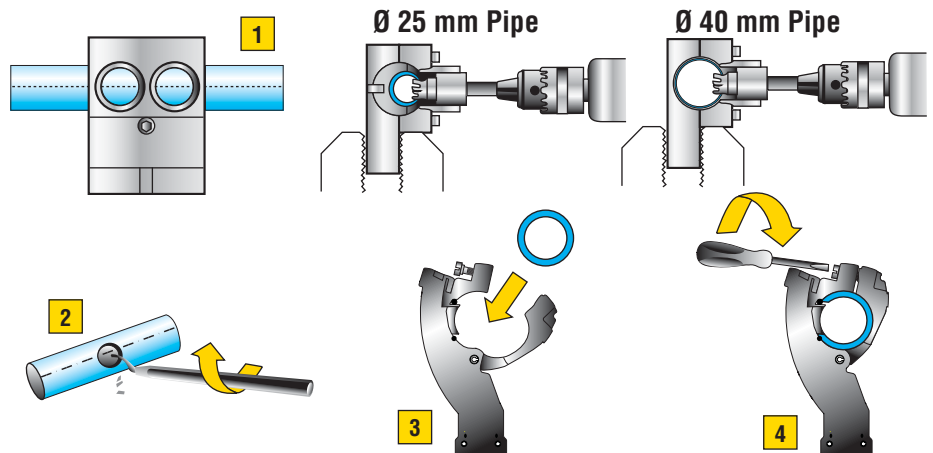


Permanent marker pen



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

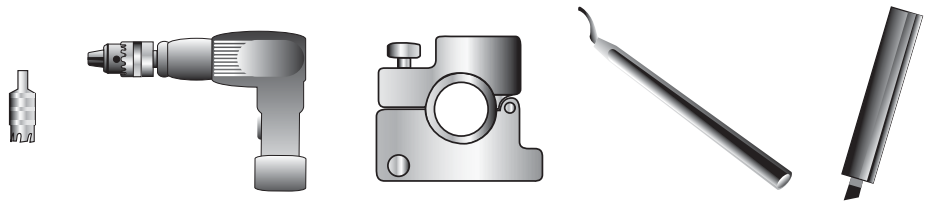
Note: Drill without lubrication.

- 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.

Quick Assembly Brackets

Fitting a bracket on Ø 63 pipe

Tools required



Drilling tool
for aluminum
pipe ref.
AN66980201

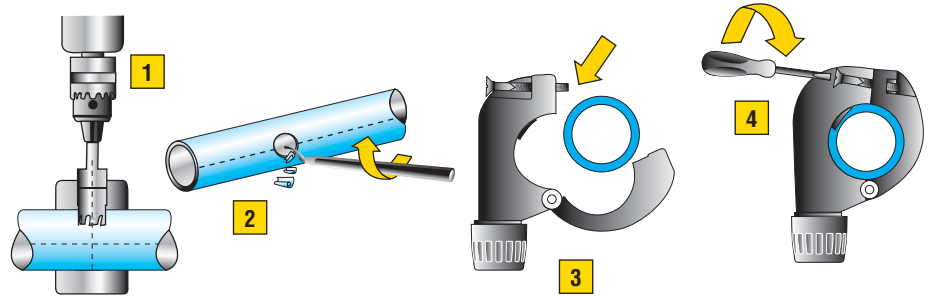
Drill

Drilling jig for
aluminum pipe
ref. AN66980102

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 centred 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.

- 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

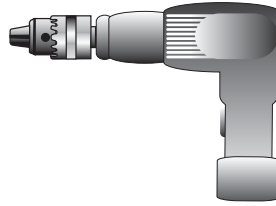
Note: Drill without lubrication.

Fitting a bracket on Ø 76 and 100 pipe

Tools required



Drilling tool
for aluminum
pipe ref.
ANEW090030



Drill

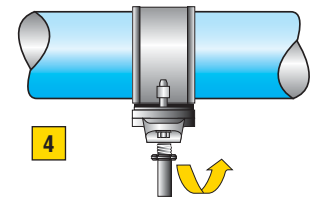
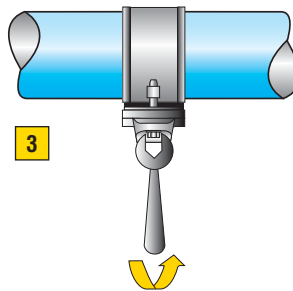
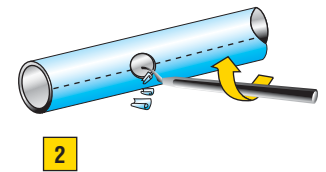
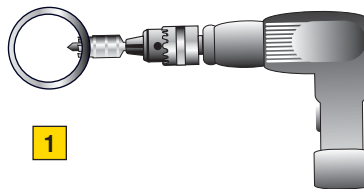


Deburring tool for
aluminum pipe
ref. AN66980402



Permanent
marker pen

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.

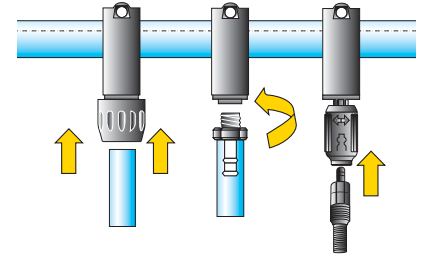
Quick Assembly Brackets

Practical Examples

Creating vertical and horizontal take-off points

Adding a vertical bracket

Using the same locator mark



Using 2 locator marks

Adding an off-set bracket



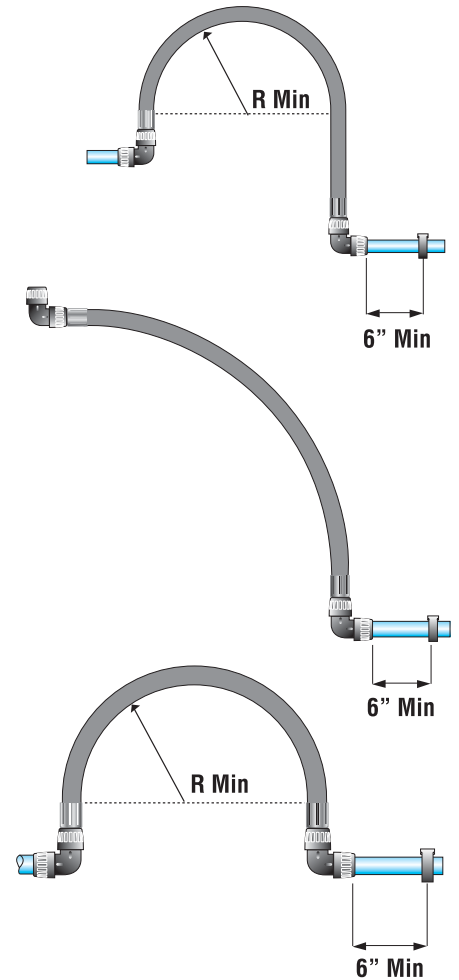
Flexible Hose

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.

Applications

Ø (mm)	Length (mm)	SmartPipe	R Min (mm)
25	570	AN1001E250001	100
	1500	AN1001E250003	
	2000	AN1001E250004	
25	570	AN1001E25V01	75
	1500	AN1001E25V03	
	2000	AN1001E25V04	
40	1150	AN1001E40002	400
	2000	AN1001E40004	
	3000	AN1001E40005	
	950	AN1001E40V07	160
	2000	AN1001E40V04	
3000	AN1001E40V05		
63	1400	AN1001E63008	300
	3000	AN1001E63005	650
	4000	AN1001E63006	250
	3000	AN1001E63V05	
	4000	AN1001E63V06	
76	1500	ANFP01L101	350
	2000	ANFP01L102	
100	2000	ANFP01L302	450
	3000	ANFP01L303	



Safety

Anti-whiplash Straps



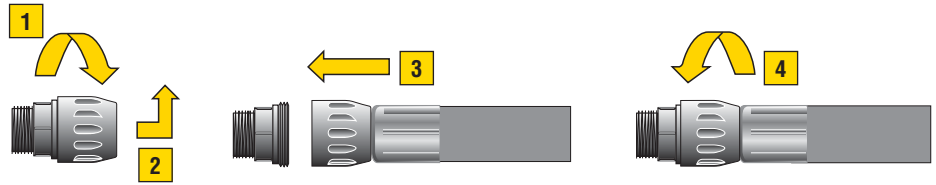
Part No.	Weight (lb.)
AN66989903	0.47

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).

Flexible Hose

Network Connection Ø 16.5, 25, 40

Using a male stud fitting



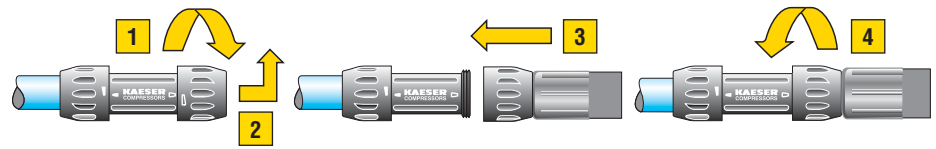
1 Loosen the nut on the stud fitting

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



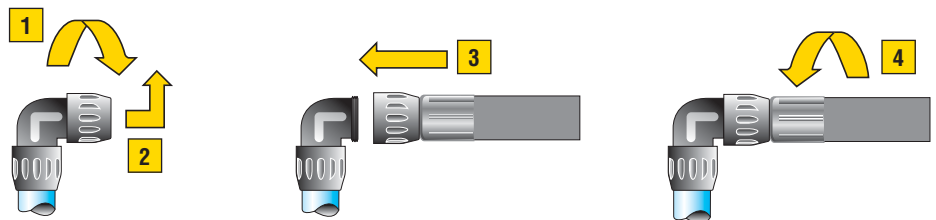
1 Loosen the nut on the connector fitting

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

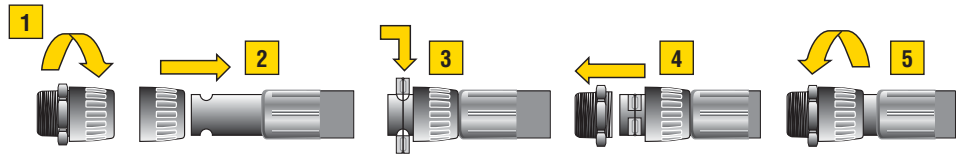
2 Remove it

3 Move the swaged end of the hose onto towards the elbow thread

4 Tighten the nut

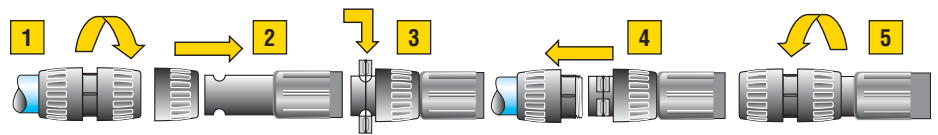
Network Connection Ø 63

Using a male threaded fitting



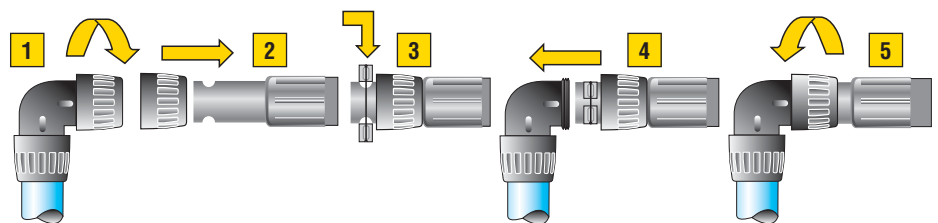
- 1** Loosen the nut on the stud fitting and remove it
- 2** Place the nut over the swaged end of the flexible hose
- 3** Place the pipe connector clamps in the housings on the hose
- 4** Slide the nut forward to the end of the flexible hose and assemble onto the male thread
- 5** Tighten the nut using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

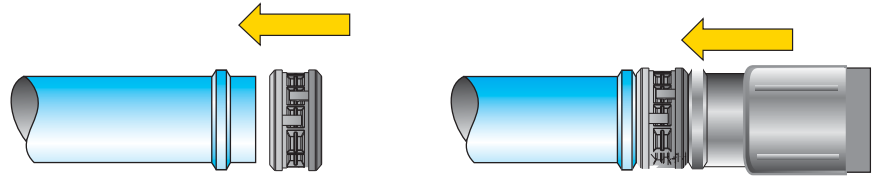
Using a 90° elbow



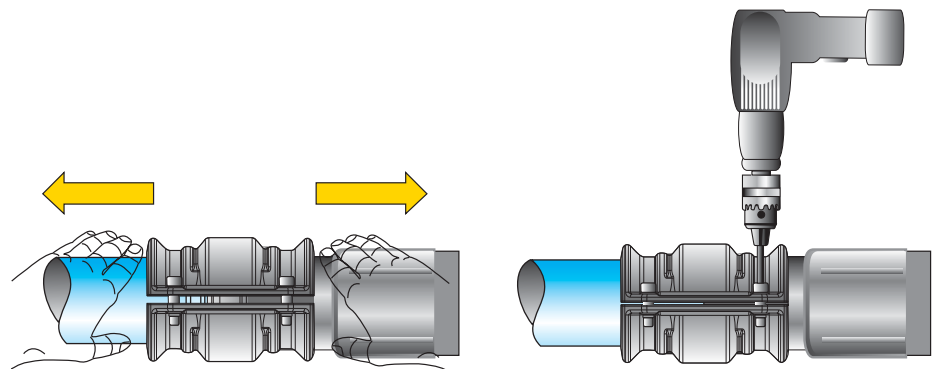
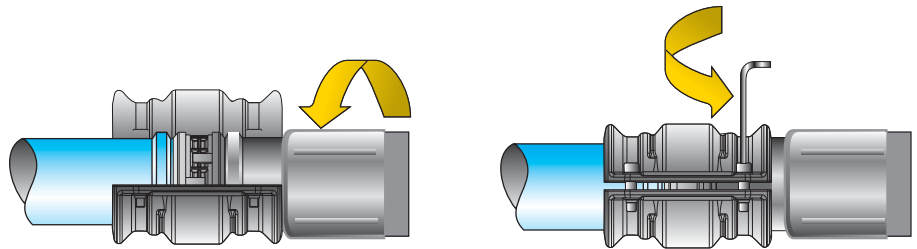
- 1** Loosen the nut on the elbow and remove it
- 2** Fit it over the swaged end of the flexible hose
- 3** Place the elbow clamps in the housings on the hose
- 4** Slide the nut forward to the end of the flexible hose, until it touches the clamps
- 5** Tighten the nut using the Ø 63 spanner set

Flexible Hose

System Connection
Ø 76-100

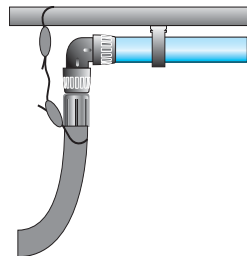
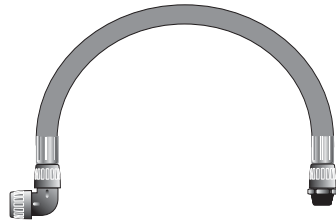
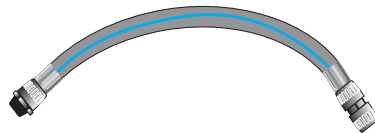
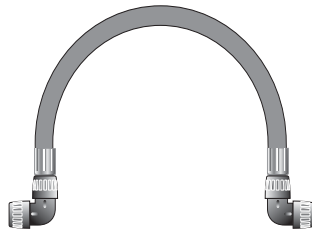


Using a steel clamp

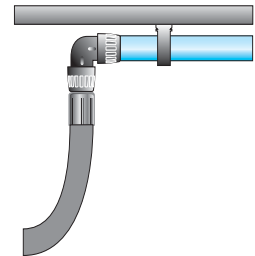
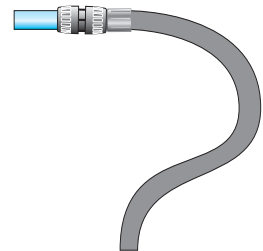
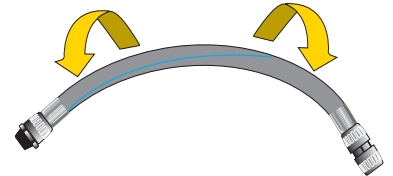
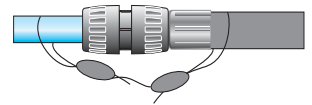


Flexible Hose Do's and Dont's

Do's



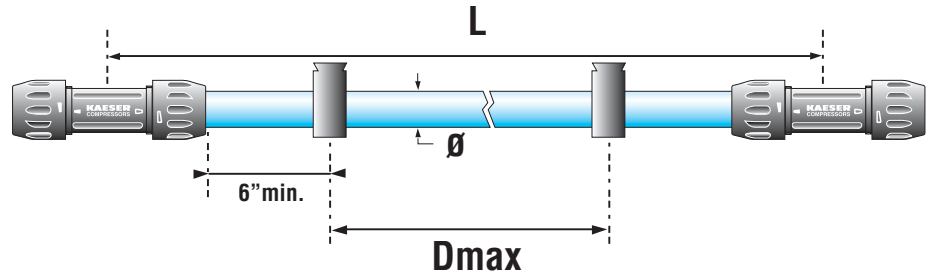
Don'ts



Mounting Hardware

SmartPipe Attachments

SmartPipe clip for Ø 16.5, 25, 40, and 63 rigid pipe



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.

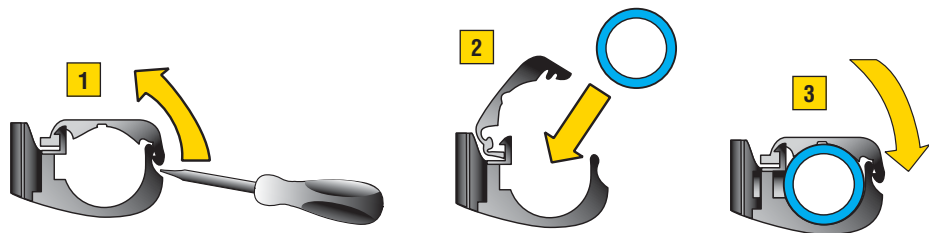
Ø	L (ft.)	Dmax (ft.)
16.5	10	8
25	20	10
40	20	10
63	20	10

Properties

SmartPipe fixing clips for Ø 16.5, 25, and 40: 1/4" UNC nuts

SmartPipe fixing clips for Ø 63 systems: 3/8" UNC nuts

Procedures



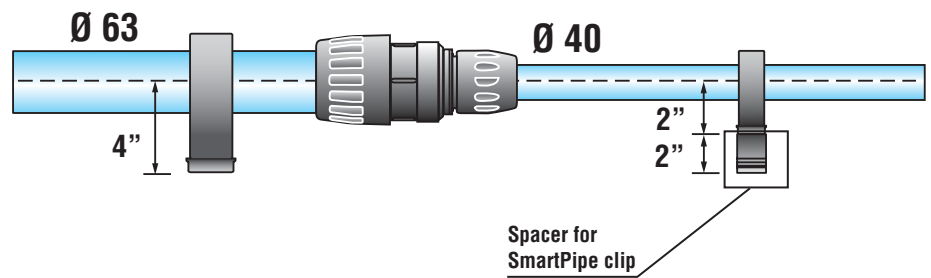
- 1 Place the clip as required and open it using a screwdriver
- 2 Insert the pipe into the clip
- 3 Close the clip

Spacer

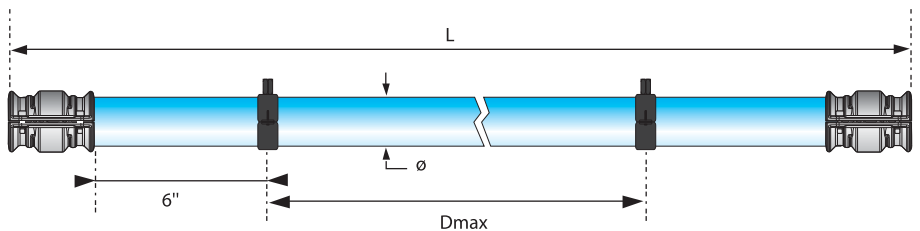
The SmartPipe AN66970003 spacer is used for aligning SmartPipe pipe of different diameters.



Example



SmartPipe fixing clips for Ø 76 and 100 systems



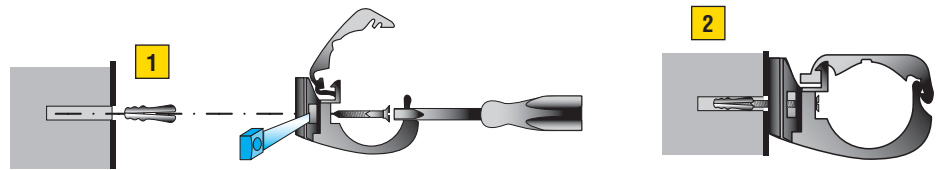
To ensure good network stability, we recommend the use of at least two fixing clips per length of pipe. SmartPipe fixing clips for Ø 76 and Ø 100 networks: 3/8" UNC thread.

Ø	L (ft.)	Dmax (ft.)
76	20	16
100		

Mounting Hardware and Acceptable Mounting Methods

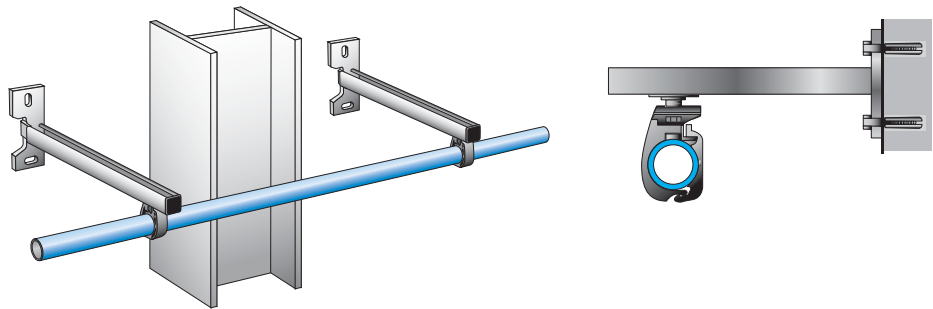
Supporting a SmartPipe System

Offset from a wall



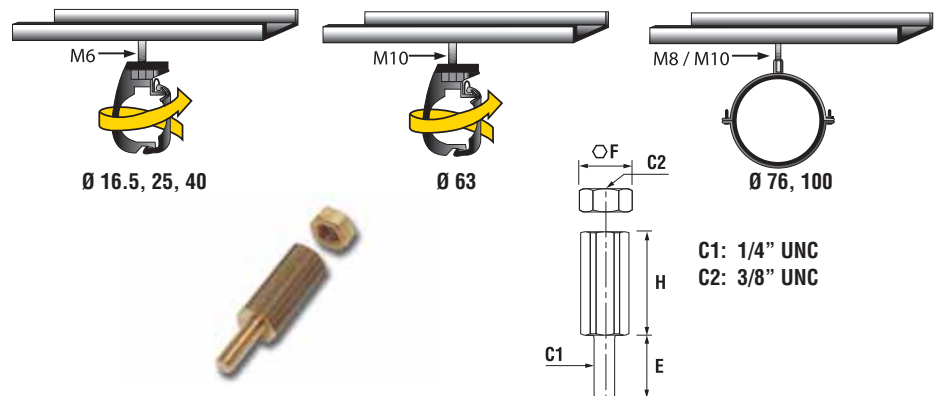
- 1** Remove the nut at the base of the pipe clip using a screwdriver and insert the screw by passing it through the clip
- 2** Tighten the screw

U-channel type mounting bracket



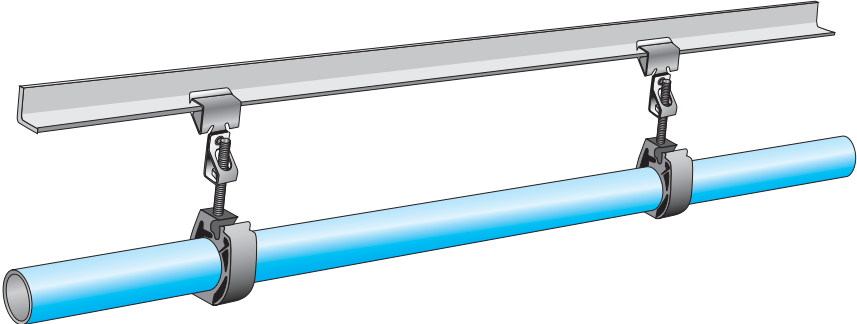
U-channel assemblies are used to offset networks and to bypass obstacles.

Threaded rod adapter



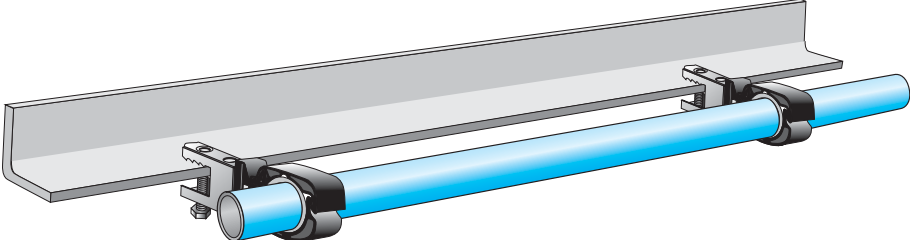
The SmartPipe threaded rod adaptor allows $\varnothing 16.5$, $\varnothing 25$ and $\varnothing 40$ SmartPipe pipe clips to be easily suspended under 3/8" UNC threaded rod.

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 ($^{\circ}\text{C}$)

ΔL : line length variation (mm)

For SmartPipe aluminum pipe networks:

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

1 - Expansion related to pipe retraction in the connector

2 - Expansion related to temperature variations

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

Using an elbow

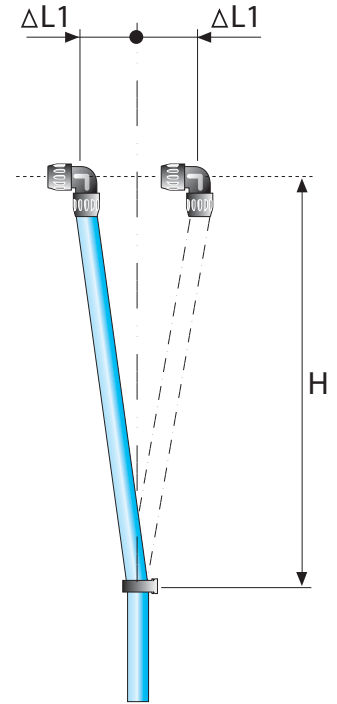
In addition to expansion loops, changes of direction are another method of compensating for expansion and contraction.

For SmartPipe Ø 16.5, 25, 40, 63 aluminum pipe networks

H = 2.46'	$\Delta L1 = 0.6''$
H = 4.92'	$\Delta L1 = 1.2''$

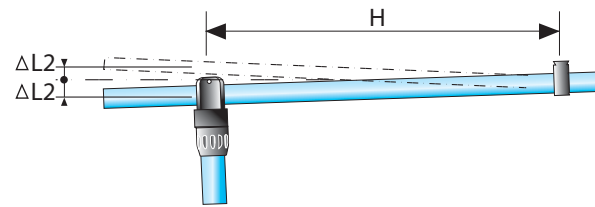
For SmartPipe Ø 76 and 100 aluminum pipe networks

H = 2.46'	$\Delta L1 = 3/8''$
H = 4.92'	$\Delta L1 = 6/8''$

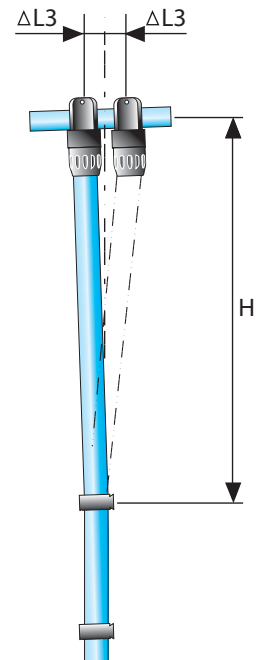


Using a quick assembly bracket

For SmartPipe Ø 16.5, 25, 40, 63 aluminum pipe networks



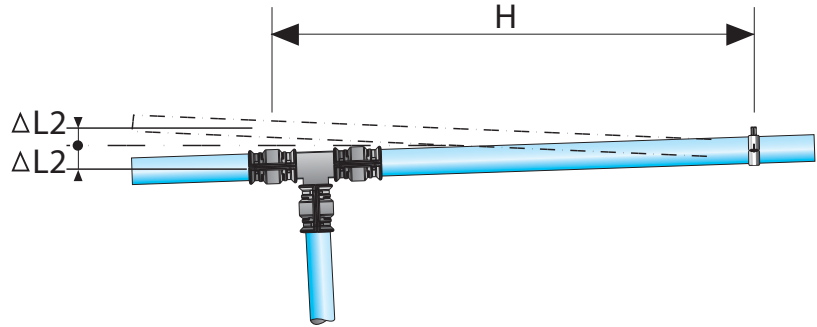
Ø1	Ø2	H (ft.)	$\Delta L2$ (in.)	$\Delta L3$ (in.)
25	16.5	5	1/2	1
	25			
40	16.5			
	25			
63	25			



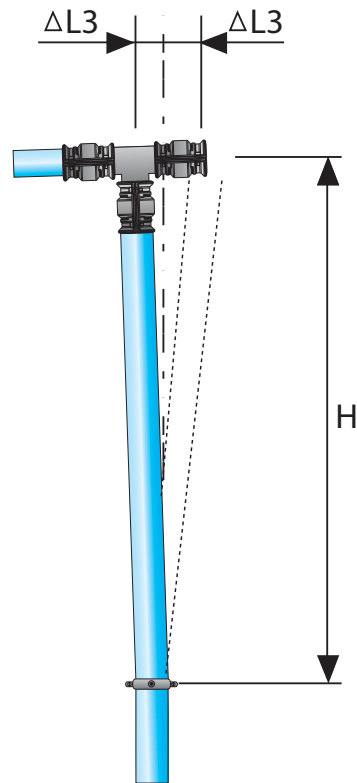
The length variation ΔL , calculated for the SmartPipe line, must always be equal to or less than $\Delta L2$ and $\Delta L3$. If this is not the case, then an expansion loop, using SmartPipe flexible hose, must be added.

Expansion / Contraction

For SmartPipe Ø 76 and 100 aluminum pipe networks

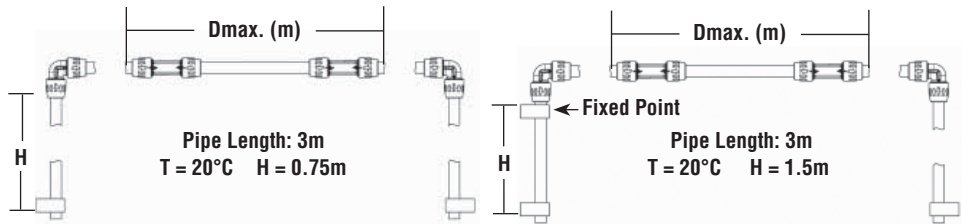


Changing direction with a tee



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

Examples



Example 1:

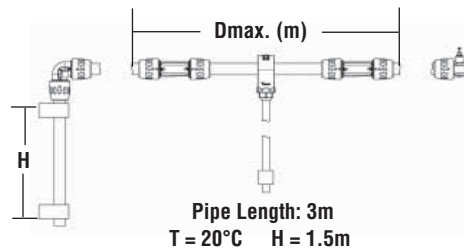
Maximum distance, without expansion loop, from a fixed point dependant on SmartPipe diameter (2 elbows).

Ø SmartPipe	16.5	25	40	63	76	100
Dmax. (m)	50	40	30	24	15	15

Example 2:

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

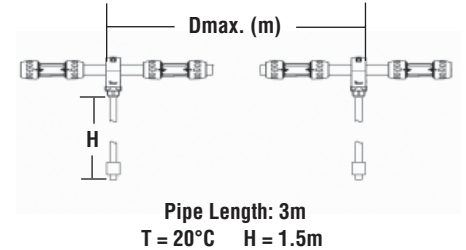
Ø SmartPipe	16.5	25	40	63	76	100
Dmax. (m)	50	40	30	25	15	15



Example 3:

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

Ø SmartPipe	16.5	25	40	63	76	100
Dmax. (m)	48	38	30	25	7.5	7.5



Example 4:

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

Ø SmartPipe	16.5	25	40	63	76	100
Dmax. (m)	80	70	55	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	0.65
700	0.70	27.56	2.30	0.76
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

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	6250
8	800	7.90	116.50	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

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

Part Number	Pg.	Part Number	Pg.	Part Number	Pg.	Part Number	Pg.	Part Number	Pg.
AN0169000500	15	AN66092535	10	AN66684022	12	ANCP05U1N04	25	ANRX31L300	23
AN1001E25001	9	AN66094035	10	AN66686322	19	ANCP05U2N02	26	ANRX64L163	22
AN1001E25003	9	AN66094043	10	AN66686328	19	ANCP05U2N03	26	ANRX64L363	22
AN1001E25004	9	AN66094050	10	AN66751722	14	ANCP05U2N04	26	ANRX66L3L1	22
AN1001E40002	9	AN66094044	10	AN66752522	14	ANER01L100	24	ANTA16L104	20
AN1001E40004	9	AN66096341	17	AN66791722	13	ANER01L300	24	ANTA16L304	20
AN1001E40005	9	AN66096346	17	AN66792522	13	ANEW010002	29	ANVR01L100	24
AN1001E63005	16	AN66122500	10	AN66841722	12	ANEW02L100	29	ANVR01L300	24
AN1001E63006	16	AN66124000	10	AN66842522	12	ANEW02L300	29		
AN1001E63008	16	AN66126300	17	AN66882222	13	ANEW030001	29		
AN1013A17040	9	AN66192522	10	AN66891722	13	ANEW05L100	23		
AN1016A6304	16	AN66192528	10	AN66892522	13	ANEW05L300	23		
AN1016A25040	9	AN66192535	10	AN66912222	13	ANEW060001	23		
AN1016A40040	9	AN66194035	10	AN66941722	14	ANEW080001	27		
AN40024000	14	AN66194043	10	AN66942522	14	ANEW090030	28		
AN40126300	19	AN66194050	10	AN66962522	13	ANEX01L100	24		
AN40991700	14	AN66194044	10	AN66970003	15, 19	ANEX01L300	24		
AN40992500	14	AN66211722	11	AN66971701	14	ANFP01L101	20		
AN66021700	10	AN66212522	11	AN66972501	14	ANFP01L102	20		
AN66022500	10	AN66212528	11	AN66974001	14	ANFP01L302	20		
AN66024000	10	AN66212535	11	AN66976301	19	ANFP01L303	20		
AN66026300	17	AN66214043	11	AN66980003	27	ANRP01L100	21		
AN66041700	11	AN66214050	11	AN66980101	27	ANRP01L300	21		
AN66042500	11	AN66251700	11	AN66980102	27	ANRR01L100	21		
AN66044000	11	AN66252500	11	AN66980201	28	ANRR01L300	21		
AN66046300	17	AN66254000	11	AN66980202	28	ANRR21L1N20	23		
AN66046340	17	AN66256300	18	AN66980301	27	ANRR21L1N24	23		
AN66051722	11	AN66362822	13	AN66980401	28	ANRR63L1N08	23		
AN66052522	11	AN66382522	14	AN66980402	28	ANRR63L3N08	23		
AN66052528	11	AN66401722	12	AN66980403	27	ANRX02L100	21		
AN66052535	11	AN66402522	12	AN66980503	28	ANRX02L300	21		
AN66054035	11	AN66422222	12	AN66989903	9, 16, 20	ANRX04L100	21		
AN66054043	11	AN6653252206	15	ANCA83A1N02	26	ANRX04L300	21		
AN66054044	11	AN6653402206	15	ANCA83A1N03	26	ANRX12L100	21		
AN66054050	11	AN66622500	12	ANCA83U1N02	25	ANRX12L300	21		
AN66056341	18	AN66622517	12	ANCA83U1N03	25	ANRX20L1N04	22		
AN66056344	18	AN66624017	12	ANCA83U2N02	26	ANRX20L3N04	22		
AN66056346	18	AN66624025	12	ANCA83U2N03	26	ANRX24L140	22		
AN66061700	10	AN66626325	18	ANCA84A1N02	26	ANRX24L163	22		
AN66062500	10	AN66632522	12	ANCA84A1N03	26	ANRX24L340	22		
AN66064000	10	AN66634022	12	ANCA84U1N02	25	ANRX24L363	22		
AN66066300	17	AN66636328	18	ANCA84U1N03	25	ANRX25L100	22		
AN66091714	10	AN66661725	11	ANCA84U2N02	26	ANRX25L300	22		
AN66091722	10	AN66662540	11	ANCA84U2N03	26	ANRX30L100	23		
AN66092522	10	AN66664063	18	ANCP05A1N03	26	ANRX30L300	23		
AN66092528	10	AN66682522	12	ANCP05A1N04	26	ANRX31L100	23		
				ANCP05U1N02	25				
				ANCP05U1N03	25				

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.

SmartPipe™ Warranty-Registration Card

In order for Kaeser Compressors, Inc. to properly handle warranty or other service requests, please fill out and mail this form within 30 days after start-up or **register online at www.kaeser.com/warranty**.

CONTACT NAME: _____ START-UP DATE: _____

COMPANY NAME: _____ INSTALLED BY: _____

STREET ADDRESS: _____ SYSTEM SIZE: _____

CITY: _____ STATE: _____ ZIP CODE: _____ COMPRESSOR ROOM/PAD: _____

I have read the attached warranty and limitation of liability statement. DISTRIBUTION HEADER: _____

Signed by: _____ Date: _____ BRANCH LINES: _____

The equipment has been installed in accordance with the SmartPipe Installation Manual. Yes No

Picture of installation submitted with Warranty Registration. Yes No

The equipment was started and adjusted by an authorized distributor/branch technician. Yes No

DISTRIBUTOR/BRANCH:

LIMITATION OF LIABILITY

THE REMEDIES OF THE PURCHASER SET FORTH HEREIN ARE EXCLUSIVE, AND KAESER COMPRESSORS' LIABILITY WITH RESPECT TO EQUIPMENT SOLD HEREUNDER SHALL BE LIMITED TO THE WARRANTY PROVIDED HEREIN AND, WITH RESPECT TO ANY BREACH OF ITS CONTRACT WITH PURCHASER, SHALL BE LIMITED TO THE CONTRACT PRICE OF EQUIPMENT THAT IS THE SUBJECT OF THE BREACH.

IN NO EVENT SHALL KAESER COMPRESSORS BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, OR EXPENSES INCURRED BY PURCHASER, PURCHASER'S CUSTOMERS OR ANY THIRD PARTY, WHETHER ARISING FROM BREACH OF CONTRACT, WARRANTY, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHER THEORIES OF LAW OR EQUITY, INCLUDING BUT NOT LIMITED TO LOSS OF PROFITS OR REVENUE, LOSS OF USE OF EQUIPMENT OR ANY ASSOCIATED EQUIPMENT, COST OF CAPITAL, COST OF SUBSTITUTE FACILITIES OR SERVICES, DOWNTIME COSTS OR CLAIMS OF CUSTOMERS OR PURCHASER FOR SERVICE INTERRUPTION, OR ANY OTHER TYPES OF ECONOMIC LOSS WHETHER OR NOT SUCH LOSS OR DAMAGE IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE. THE RIGHT TO RECOVER DAMAGES WITHIN THE LIMITATIONS SET FORTH IS PURCHASER'S EXCLUSIVE ALTERNATIVE REMEDY IF THE LIMITED REMEDY OF REPAIR, REPLACEMENT OR REFUND FAILS OF ITS ESSENTIAL PURPOSE. THE PARTIES AGREE THAT THIS ALTERNATIVE REMEDY WILL BE ENFORCEABLE EVEN IF THE LIMITED REMEDY OF REPAIR, REPLACEMENT OR REFUND FAILS OF ITS ESSENTIAL PURPOSE.



Built for a lifetime.™

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Certified Management Systems



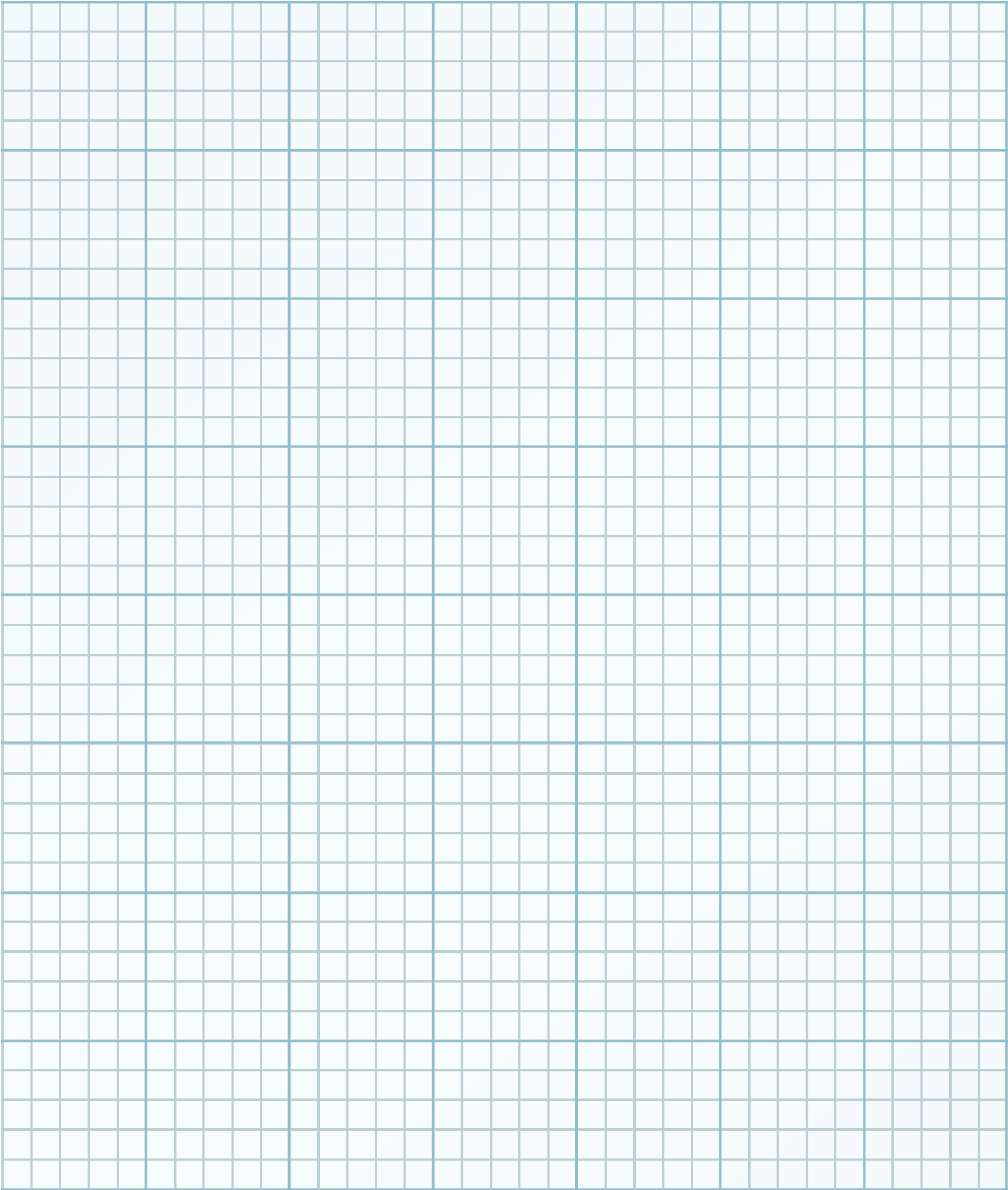
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**ATTENTION
AFTER-SALES SERVICE**

PLACE
STAMP
HERE

KAESER COMPRESSORS INC
PO BOX 946
FREDERICKSBURG VA 22404-0946

System Sketch and Notes



The Air Systems Specialist

We strive to earn our customers' trust by supplying high quality Kaeser air compressors and related compressed air equipment. Our products are designed for reliable performance, easy maintenance, and energy efficiency. Prompt and dependable customer service, quality assurance, training, and engineering support contribute to the value our customers have come to expect from Kaeser. Our employees are committed to implementing and maintaining the highest standards of quality to merit customer satisfaction. We aim for excellence in everything we do.

Our engineers continue to refine manufacturing techniques and take full advantage of the newest machining innovations. Extensive commitment to research and development keeps our products on the leading edge of technology to benefit our customers. With over 90 years of experience, Kaeser is the air systems specialist.



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Email: info.usa@kaeser.com

Certified Management Systems



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