

## Introduction

### Stainless steel pipework

The ACO Building Drainage name is synonymous with the highest standards in product design, range diversity and function for industrial, commercial and architectural drainage products manufactured in stainless steel.

As part of a growing range of engineered drainage solutions, ACO PIPE® presents a wide range of socketed waste pipework systems in thin-wall stainless steel for above and below ground drainage applications.

Manufactured from grade 304 austenitic stainless steel as standard, ACO PIPE® is ideal for most liquid transference including soil, waste, process drainage and rainwater. Optional 316 grade stainless steel pipe and fittings is available for particularly aggressive process drainage applications.

ACO PIPE® stainless steel socketed pipe systems provide the modern metal alternative to PVC-u and cast iron soil and waste pipework. The range is completely compatible with ACO Eurogullies, Selecta floor gullies, channel systems and rainwater drainage products providing a comprehensive range for engineered drainage solutions.

### Applications

ACO PIPE® stainless steel pipe is the fast track alternative to cast iron or PVC-u pipe systems and is available in standard pipe sizes with easy to assemble push-on fittings. ACO PIPE® is ideal for:

- Food processing plants
- Commercial buildings
- Chemical processing plant
- Industrial buildings
- Hotels
- Kitchens
- Leisure centres
- Hospitals
- Laboratories
- Schools
- Abattoirs

### Product benefits

ACO PIPE® socketed stainless steel systems significantly reduces installation time and associated costs along with long term maintenance and care costs.

- Highly corrosion resistant
- Lightweight and easy to handle
- Double sealed jointing system
- Simple push-fit assembly
- Low thermal expansion coefficient
- No painting required
- Aesthetically pleasing
- Electro-polished option
- Sustainable material - manufactured from at least 70% recycled material and 100%

### Design considerations

#### Overview

ACO Building Drainage thin-walled stainless steel pipe systems are suitable for a wide range of applications.

All ACO PIPE® products are manufactured from either 304 or 316 grades of austenitic stainless steel and are fully chemically pickle passivated for maximum durability and corrosion resistance. Further details on the materials, finishing processes and corrosion resistance can be found on page 34 and 35.

ACO PIPE® stainless steel pipe systems are available in 50mm, 75mm, 110mm, 125mm, 160mm and 200mm outside diameters and in standard lengths of 0.15, 0.25, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0 and 6.0 metres long for maximum installation convenience. Any pipe lengths up to 6.0 metres can be supplied to suit specific project applications.

304 grade stainless steel ACO PIPE® sockets are supplied with double EPDM seals as standard for regular above and below ground drainage applications. For particularly aggressive chemical applications, 316 grade material and Viton seals can be supplied for the ultimate in corrosion resistance. All interconnecting seals and fittings incorporate a unique double sealing system providing a reliable, trouble-free installation - every time.



## Key benefits

ACO PIPE® stainless steel pipework systems offer all the key features found in traditional metal rainwater, soil and waste systems with additional benefits unique to stainless steels, these features include:

- The low 'first cost' choice of material for the expected life of the building
- Cost competitive alternative to traditional cast iron and aluminium alloy systems
- Excellent corrosion resistance provides for long-term contract dependability
- Cost savings on fewer component parts
- Non-combustibility of stainless steel controls spread of fire risk through walls and compartments
- Non-hazardous material
- Totally weather-proof and available electropolished to special order



## Hydraulic performance

### Introduction

Compared to cast iron, clay and vitreous pipe systems, stainless steel pipes have a considerably smoother bore and in general, stainless steel pipes are less susceptible internal scaling when compared to most traditional pipe systems.

Some pipe manufacturers claim very low roughness coefficients ( $k_s$ ) which are not generally a true reflection of long term hydraulic performance of the installed system. For long term reliability and practical considerations, roughness coefficients of 0.6mm should be used for rainwater/storm drainage and 1.5mm for soil/foul drainage.

## Self-cleansing velocity

When draining storm or foul water applications, it is inevitable that sediment deposits will occur within the drainage system.

Some pipe manufacturers often make many claims in respect to self-cleansing velocity, but research has shown that there are no unique design criteria to achieve a self-cleansing installation.

This is because the sediment type, size, concentration, flow rates and viscosity all play an important part in the self-cleansing process.

Sediment and scale deposits will reduce the flow rate through any pipe system and is recommended that an allowance is made for this within the system design.

## Flow tables

Two sets of flow tables are provided in this design guide. The first table is for pipes installed with varying gradients and the velocity and volumetric flow rate figures are based on the Colebrook-White steady, uniform flow equation, using an appropriate roughness coefficient for stainless steel.

The second table is for pipes installed with level or nearly level gradients where the steady, uniform flow equations are not applicable. The performance figures therefore have been generated from the ACO hydraulic design program that is based on spatially varied flow theory and which has been verified following full-scale laboratory testing.

The second table will be of particular interest to the designer who is unable to provide a significant gradient due to installation restrictions.

**Table 1a. Full Bore Flow Rate Tables For Varying Gradients**

For rainwater/storm drainage applications.

Flow rates based on Colebrook-White formula.

Roughness Coefficient  $k_s = 0.6\text{mm}$  (calculation uses internal diameters for pipes).

Gradient %	Pipe Ø 50mm		Pipe Ø 75mm		Pipe Ø 110mm		Pipe Ø 125mm		Pipe Ø 160mm		Pipe Ø 200mm	
	Flow Rate Q (l/s)	Velocity v (m/s)	Flow Rate Q (l/s)	Velocity v (m/s)	Flow Rate Q (l/s)	Velocity v (m/s)	Flow Rate Q (l/s)	Velocity v (m/s)	Flow Rate Q (l/s)	Velocity v (m/s)	Flow Rate Q (l/s)	Velocity v (m/s)
10.0	2.74	1.52	8.40	2.01	23.81	2.60	33.61	2.83	64.15	3.31	116.89	3.83
7.5	2.38	1.31	7.28	1.74	20.62	2.25	29.11	2.45	55.56	2.87	101.22	3.32
5.0	1.94	1.07	5.94	1.42	16.83	1.84	23.77	2.00	45.36	2.34	82.65	2.71
4.5	1.84	1.02	5.64	1.35	15.97	1.74	22.55	1.90	43.03	2.22	78.40	2.57
4.0	1.73	0.96	5.31	1.27	15.06	1.64	21.26	1.79	40.57	2.10	73.92	2.43
3.5	1.62	0.90	4.97	1.19	14.08	1.54	19.88	1.67	37.95	1.96	69.14	2.27
3.0	1.50	0.83	4.60	1.10	13.04	1.42	18.41	1.55	35.13	1.81	64.01	2.10
2.5	1.37	0.76	4.20	1.00	11.90	1.30	16.80	1.41	32.07	1.66	58.43	1.92
2.0	1.23	0.68	3.76	0.90	10.64	1.16	15.03	1.26	28.68	1.48	52.26	1.71
1.5	1.06	0.59	3.25	0.78	9.22	1.01	13.01	1.10	24.84	1.28	45.26	1.48
1.0	0.87	0.48	2.66	0.63	7.53	0.82	10.63	0.89	20.28	1.05	36.95	1.21

Flow rates shown in Table 1a assume a free outlet from the pipe. For installations without a free outlet, the flow rate will be affected by the downstream throttle.

For shallow gradients, the Colebrook-White formula underestimates flow rates (because when the gradient tends to zero %, the velocity also tends to zero).

For level or nearly level installations (gradient < 1%), spatially varied flow should be used, refer to Table 2.

For any further assistance call

**Gutter Centre** 0330 2231731

**Table 1b. Full Bore Flow Rate Tables For Varying Gradients**

For soil/foul drainage applications.

Flow rates based on Colebrook-White formula.

Roughness Coefficient ks = 1.5mm (calculation uses internal diameters for pipes).

Gradient %	Pipe Ø 50mm		Pipe Ø 75mm		Pipe Ø 110mm		Pipe Ø 125mm		Pipe Ø 160mm		Pipe Ø 200mm	
	Flow Rate Q (l/s)	Velocity v (m/s)	Flow Rate Q (l/s)	Velocity v (m/s)	Flow Rate Q (l/s)	Velocity v (m/s)	Flow Rate Q (l/s)	Velocity v (m/s)	Flow Rate Q (l/s)	Velocity v (m/s)	Flow Rate Q (l/s)	Velocity v (m/s)
10.0	2.30	1.27	7.14	1.71	20.45	2.23	28.97	2.44	55.61	2.87	101.81	3.34
7.5	1.99	1.10	6.19	1.48	17.71	1.93	25.09	2.11	48.16	2.49	88.17	2.89
5.0	1.63	0.90	5.05	1.21	14.46	1.58	20.49	1.72	39.32	2.03	71.99	2.36
4.5	1.54	0.85	4.79	1.14	13.72	1.50	19.43	1.64	37.30	1.93	68.30	2.24
4.0	1.46	0.80	4.52	1.08	12.94	1.41	18.32	1.54	35.17	1.82	64.39	2.11
3.5	1.36	0.75	4.23	1.01	12.10	1.32	17.14	1.44	32.90	1.70	60.23	1.98
3.0	1.26	0.70	3.91	0.93	11.20	1.22	15.87	1.34	30.46	1.57	55.76	1.83
2.5	1.15	0.64	3.57	0.85	10.23	1.12	14.49	1.22	27.80	1.44	50.90	1.67
2.0	1.03	0.57	3.19	0.76	9.15	1.00	12.96	1.09	24.87	1.28	45.53	1.49
1.5	0.89	0.49	2.77	0.66	7.92	0.86	11.22	0.94	21.53	1.11	39.43	1.29
1.0	0.73	0.40	2.26	0.54	6.47	0.71	9.16	0.77	17.58	0.91	32.19	1.06

Flow rates shown in Table 1b assume a free outlet from the pipe. For installations without a free outlet, the flow rate will be affected by the downstream throttle.

For shallow gradients, the Colebrook-White formula underestimates flow rates (because when the gradient tends to zero %, the velocity also tends to zero).

For level or nearly level installations (gradient < 1%), spatially varied flow should be used, refer to Table 2.



**Table 2. Full Bore Flow Rate Tables For Level Or Nearly Level Gradients**

Flow rates based on spatially-varied flow formula for steady non-uniform flow.

Strickler Coefficient = 90.

Pipe Dia (mm)	Length (m)	Gradient			
		0.0% Flow Rate Q (l/s)	0.25% Flow Rate Q (l/s)	0.5% Flow Rate Q (l/s)	0.75% Flow Rate Q (l/s)
50	5	0.40	0.57	0.75	0.92
50	10	0.30	0.54	0.75	0.92
50	15	0.26	0.53	0.75	0.92
50	20	0.23	0.53	0.75	0.92

Pipe Dia (mm)	Length (m)	Gradient			
		0.0% Flow Rate Q (l/s)	0.25% Flow Rate Q (l/s)	0.5% Flow Rate Q (l/s)	0.75% Flow Rate Q (l/s)
75	5	1.45	1.75	2.40	2.90
75	10	1.10	1.72	2.35	2.90
75	15	0.95	1.70	2.35	2.90
75	20	0.85	1.70	2.35	2.90

Pipe Dia (mm)	Length (m)	Gradient			
		0.0% Flow Rate Q (l/s)	0.25% Flow Rate Q (l/s)	0.5% Flow Rate Q (l/s)	0.75% Flow Rate Q (l/s)
110	5	4.50	5.55	6.75	8.15
110	10	3.60	5.05	6.60	8.15
110	15	3.20	4.90	6.50	8.15
110	20	2.80	4.80	6.50	8.15

Pipe Dia (mm)	Length (m)	Gradient			
		0.0% Flow Rate Q (l/s)	0.25% Flow Rate Q (l/s)	0.5% Flow Rate Q (l/s)	0.75% Flow Rate Q (l/s)
125	5	6.45	7.90	9.60	11.45
125	10	5.20	7.25	9.50	11.45
125	15	4.55	7.00	9.50	11.45
125	20	4.10	6.85	9.50	11.45

Pipe Dia (mm)	Length (m)	Gradient			
		0.0% Flow Rate Q (l/s)	0.25% Flow Rate Q (l/s)	0.5% Flow Rate Q (l/s)	0.75% Flow Rate Q (l/s)
160	5	13.00	15.40	18.60	21.20
160	10	10.90	14.30	18.50	21.20
160	15	9.50	13.80	18.40	21.20
160	20	8.50	13.50	18.30	21.20

Pipe Dia (mm)	Length (m)	Gradient			
		0.0% Flow Rate Q (l/s)	0.25% Flow Rate Q (l/s)	0.5% Flow Rate Q (l/s)	0.75% Flow Rate Q (l/s)
200	5	24.80	29.00	34.20	38.70
200	10	20.80	26.70	33.80	38.40
200	15	18.60	25.70	33.70	38.40
200	20	17.00	25.00	33.60	38.40

## Reference Standards

ACO PIPE® stainless steel pipework system is designed, manufactured and tested to BS EN 1124 Part 1 and BS EN 1124 Part 2 - *Pipes and fittings of longitudinally welded stainless steel pipes with spigot and socket for waste water systems.*

The following standards may assist the designer to select the correct size of pipe system for the particular application:

BS EN 12056 - *Gravity drainage systems inside buildings.*

BS EN 752 - *Drain and sewer systems outside buildings.*

### UK Building Regulations

The designer may seek additional guidance from the following UK Building Regulations:

**England and Wales** - Approved Document H - *Drainage and Waste Disposal.*

**Scotland** - Domestic and Non-Domestic Technical Handbooks, Section 3 - *Environment.*

**Northern Ireland** - Technical Booklets N - *Drainage.*

### Operating pressure

The system is designed to operate at a maximum positive internal pressure of 0.5 bar without pipe restraint.

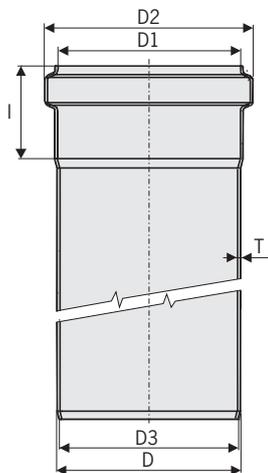
Pipe sizes up to 110mm can be operated at 2 bar or up to 1 bar for 125mm and 160mm pipes, if fitted with the appropriate socket clamp to prevent axial movement as shown on Page 25.

For reduced pressure or vacuum operation, the system is designed to operate down to 0.2 bar absolute (- 0.8 bar gauge) for 50mm and 75mm pipes and to 0.4 bar absolute (-0.6 bar gauge) for 110mm, 125mm and 160mm pipes.

### Design & maintenance tips

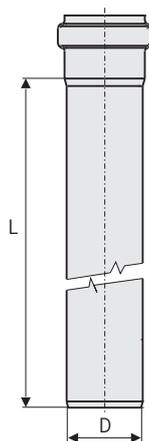
- Perform a Risk Assessment of the installation to assess the consequences of flooding due to blockages or silt and scale build-up within the pipe system and/or unexpected hydraulic demands due to accidental spillage, thunderstorms and so on.
- Perform a Risk Assessment of the installation if the system is liable to be subjected to thermal shock. Stainless steel pipes are particularly tolerant of sudden temperature changes without risk of damage - see Page 30 for details.
- Avoid selecting a pipe size that is at or close to hydraulic capacity as the long-term effects of silt and scale may prove detrimental to the overall system performance.
- For stormwater applications, check the geographical location to confirm the designed rainfall intensity.
- Confirm the actual gradient of the installed pipe system. A level or nearly level gradient will have a reduced hydraulic performance compared to installations with defined gradients.
- Fully assess ALL fluids to be drained in the system to avoid corrosion of the pipe and/or seals. Checklist as follows:
  - **Identify each chemical contained in fluid.**
  - **Establish the chemical concentration(s).**
  - **Confirm maximum temperature of the solution.**
- Given the above information, the system materials can be selected - 304 or 316 stainless steel with either EPDM or Viton seals.
- It should be noted that 304 stainless steel and EPDM seal is the most cost effective combination. However, it is important to select the correct materials for the particular installation.
- Try to design the system with the minimum number of joints and limit the number of bends. This will help to reduce both cost and hydraulic losses in the system.
- Provide good access points for cleaning and rodding so as to maintain the hydraulic performance of the system.
- Care should be taken to avoid damage both during and after installation, as dents and kinks will affect hydraulic performance as well as a negative visual impact, particularly on above ground installations.

**Dimensions Of Socket And Spigot For All Pipe Sizes**



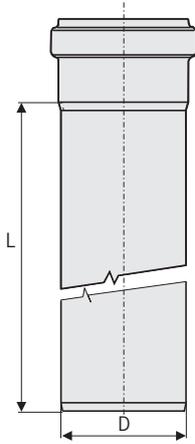
D (mm)	D1 (mm)	D2 (mm)	D3 (mm)	Socket Length l (mm)	Wall Thickness T (mm)
50	51	62.0	47	42	1
75	76	87.5	72	50	1
110	111	125.5	107	57	1
125	126	141.0	122	63	1
160	161	178.0	156	70	1.25
200	201	219.0	195	80	1.5

**50mm Socketed Pipe**



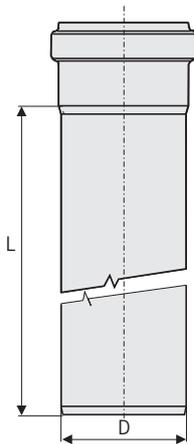
D (mm)	Active Length L (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	150	0.2	EPDM	98500	98550
50	150	0.2	Viton	98501	98551
50	250	0.4	EPDM	98502	98552
50	250	0.4	Viton	98503	98553
50	500	0.7	EPDM	98504	98554
50	500	0.7	Viton	98505	98555
50	750	1.0	EPDM	98506	98556
50	750	1.0	Viton	98507	98557
50	1000	1.3	EPDM	98508	98558
50	1000	1.3	Viton	98509	98559
50	1500	1.9	EPDM	98510	98560
50	1500	1.9	Viton	98511	98561
50	2000	2.6	EPDM	98512	98562
50	2000	2.6	Viton	98513	98563
50	2500	3.2	EPDM	419274	419282
50	2500	3.2	Viton	419275	419283
50	3000	3.8	EPDM	98514	98564
50	3000	3.8	Viton	98515	98565
50	4000	5.0	EPDM	419458	419482
50	4000	5.0	Viton	419459	419483
50	5000	6.3	EPDM	419466	419490
50	5000	6.3	Viton	419467	419491
50	6000	7.5	EPDM	419474	419498
50	6000	7.5	Viton	419475	419499

**75mm Socketed Pipe**



D (mm)	Active Length L (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
75	150	0.4	EPDM	98516	98566
75	150	0.4	Viton	98517	98567
75	250	0.6	EPDM	98518	98568
75	250	0.6	Viton	98519	98569
75	500	1.0	EPDM	98520	98570
75	500	1.0	Viton	98521	98571
75	750	1.5	EPDM	98522	98572
75	750	1.5	Viton	98523	98573
75	1000	2.0	EPDM	98524	98574
75	1000	2.0	Viton	98525	98575
75	1500	2.9	EPDM	98526	98576
75	1500	2.9	Viton	98527	98577
75	2000	3.6	EPDM	98528	98578
75	2000	3.6	Viton	98529	98579
75	2500	4.8	EPDM	419276	419284
75	2500	4.8	Viton	419277	419285
75	3000	5.7	EPDM	98530	98580
75	3000	5.7	Viton	98531	98581
75	4000	7.6	EPDM	419460	419484
75	4000	7.6	Viton	419461	419485
75	5000	9.4	EPDM	419468	419492
75	5000	9.4	Viton	419469	419493
75	6000	11.3	EPDM	419476	419500
75	6000	11.3	Viton	419477	419501

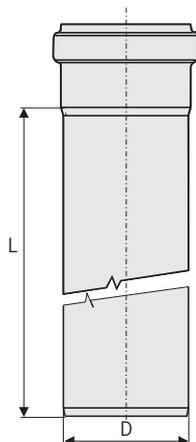
**110mm Socketed Pipe**



D (mm)	Active Length L (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
110	150	0.6	EPDM	98532	98582
110	150	0.6	Viton	98533	98583
110	250	0.9	EPDM	98534	98584
110	250	0.9	Viton	98535	98585
110	500	1.5	EPDM	98536	98586
110	500	1.5	Viton	98537	98587
110	750	2.2	EPDM	98538	98588
110	750	2.2	Viton	98539	98589
110	1000	2.9	EPDM	98540	98590
110	1000	2.9	Viton	98541	98591
110	1500	4.3	EPDM	98542	98592
110	1500	4.3	Viton	98543	98593
110	2000	5.7	EPDM	98544	98594
110	2000	5.7	Viton	98545	98595
110	2500	7.1	EPDM	419278	419286
110	2500	7.1	Viton	719279	419287
110	3000	8.4	EPDM	98546	98596
110	3000	8.4	Viton	98547	98597
110	4000	11.1	EPDM	419462	419486
110	4000	11.1	Viton	419463	419487
110	5000	13.9	EPDM	419470	419494
110	5000	13.9	Viton	419471	419495
110	6000	16.7	EPDM	419478	419502
110	6000	16.7	Viton	419479	419503

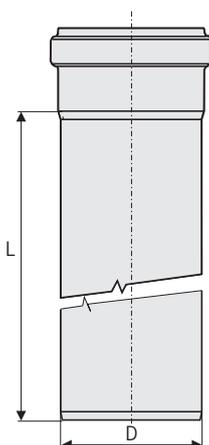


**125mm Socketed Pipe**



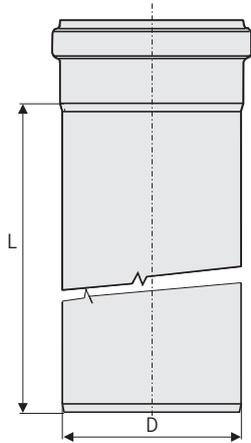
D (mm)	Active Length L (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
125	150	0.7	EPDM	419692	419712
125	150	0.7	Viton	419693	419713
125	250	1.0	EPDM	419694	419714
125	250	1.0	Viton	419695	419715
125	500	1.7	EPDM	419696	419716
125	500	1.7	Viton	419697	419717
125	750	2.5	EPDM	419698	419718
125	750	2.5	Viton	419699	419719
125	1000	3.3	EPDM	419700	451720
125	1000	3.3	Viton	419701	419721
125	1500	4.9	EPDM	419702	419722
125	1500	4.9	Viton	419703	419723
125	2000	6.5	EPDM	419704	419724
125	2000	6.5	Viton	419705	419725
125	2500	8.1	EPDM	419706	419726
125	2500	8.1	Viton	419707	419727
125	3000	9.6	EPDM	419708	419728
125	3000	9.6	Viton	419709	419729
125	6000	19.0	EPDM	419710	419730
125	6000	19.0	Viton	419711	419731

**160mm Socketed Pipe**



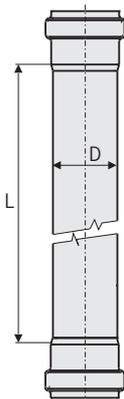
D (mm)	Active Length L (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
160	150	1.1	EPDM	98548	98598
160	150	1.1	Viton	98549	98599
160	250	1.6	EPDM	98600	98650
160	250	1.6	Viton	98601	98651
160	500	2.9	EPDM	98602	98652
160	500	2.9	Viton	98603	98653
160	750	4.1	EPDM	98604	98654
160	750	4.1	Viton	98605	98655
160	1000	5.4	EPDM	98606	98656
160	1000	5.4	Viton	98607	98657
160	1500	7.9	EPDM	98608	98658
160	1500	7.9	Viton	98609	98659
160	2000	10.4	EPDM	98610	98660
160	2000	10.4	Viton	98611	98661
160	2500	12.9	EPDM	419280	419288
160	2500	12.9	Viton	419281	419289
160	3000	15.4	EPDM	98612	98662
160	3000	15.4	Viton	98613	98663
160	4000	20.4	EPDM	419464	419488
160	4000	20.4	Viton	419465	419489
160	5000	25.4	EPDM	419472	419496
160	5000	25.4	Viton	419473	419497
160	6000	30.4	EPDM	419480	419504
160	6000	30.4	Viton	419481	419505

**200mm Socketed Pipe**



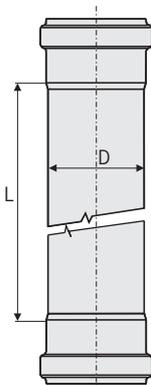
D (mm)	Active Length L (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
200	500	4.5	EPDM	419383	419384
200	500	4.5	Viton	419385	419386
200	1000	8.3	EPDM	419387	419388
200	1000	8.3	Viton	419389	419390
200	2000	15.8	EPDM	419391	419392
200	2000	15.8	Viton	419393	419394
200	3000	23.2	EPDM	419395	419396
200	3000	23.2	Viton	419397	419398

**50mm Double Socketed Pipe**



D (mm)	Active Length L (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	250	0.4	EPDM	419554	419594
50	250	0.4	Viton	419555	419595
50	500	0.7	EPDM	419556	419596
50	500	0.7	Viton	419557	419597
50	750	1.1	EPDM	419558	419598
50	750	1.1	Viton	419559	419599
50	1000	1.4	EPDM	419560	419600
50	1000	1.4	Viton	419561	419601
50	1500	2.0	EPDM	419562	419602
50	1500	2.0	Viton	419563	419603
50	2000	2.6	EPDM	419564	419604
50	2000	2.6	Viton	419565	419605
50	3000	3.9	EPDM	419566	419606
50	3000	3.9	Viton	419567	419607

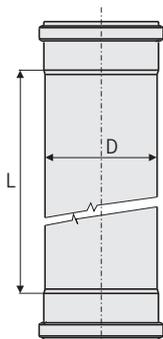
**75mm Double Socketed Pipe**



D (mm)	Active Length L (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
75	250	0.7	EPDM	419568	419608
75	250	0.7	Viton	419569	419609
75	500	1.2	EPDM	419570	419610
75	500	1.2	Viton	419571	419611
75	750	1.6	EPDM	419572	419612
75	750	1.6	Viton	419573	419613
75	1000	2.1	EPDM	419574	419614
75	1000	2.1	Viton	419575	419615
75	1500	3.0	EPDM	419576	419616
75	1500	3.0	Viton	419577	419617
75	2000	4.0	EPDM	419578	419618
75	2000	4.0	Viton	419579	419619
75	3000	5.8	EPDM	419580	419620
75	3000	5.8	Viton	419581	419621

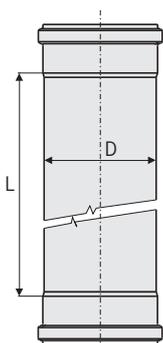


### 110mm Double Socketed Pipe



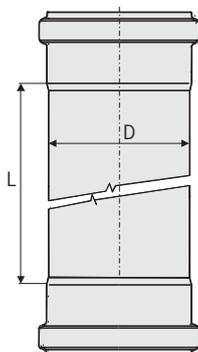
D (mm)	Active Length L (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
110	500	1.7	EPDM	419582	419622
110	500	1.7	Viton	419583	419623
110	750	2.4	EPDM	419584	419624
110	750	2.4	Viton	419585	419625
110	1000	3.0	EPDM	419586	419626
110	1000	3.0	Viton	419587	419627
110	1500	4.4	EPDM	419588	419628
110	1500	4.4	Viton	419589	419629
110	2000	5.7	EPDM	419590	419630
110	2000	5.7	Viton	419591	419631
110	3000	8.4	EPDM	419592	419632
110	3000	8.4	Viton	419593	419633

### 125mm Double Socketed Pipe



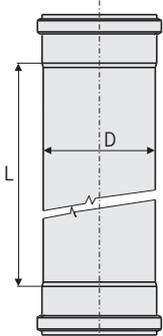
D (mm)	Active Length L (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
125	500	1.7	EPDM	419787	419799
125	500	1.7	Viton	419788	419800
125	750	2.5	EPDM	419789	419801
125	750	2.5	Viton	419790	419802
125	1000	3.3	EPDM	419791	419803
125	1000	3.3	Viton	419792	419804
125	1500	4.9	EPDM	419793	419805
125	1500	4.9	Viton	419794	419806
125	2000	6.5	EPDM	419795	419807
125	2000	6.5	Viton	419796	419808
125	3000	9.6	EPDM	419797	419809
125	3000	9.6	Viton	419798	419810

### 160mm Double Socketed Pipe



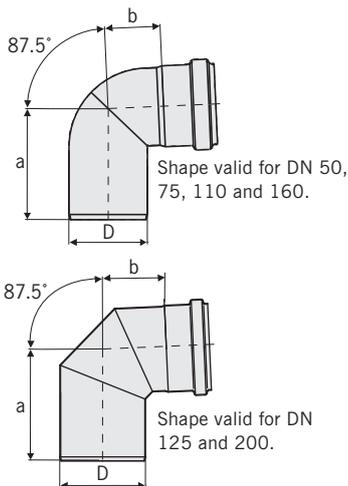
D (mm)	Active Length L (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
160	500	3.3	EPDM	419634	419646
160	500	3.3	Viton	419635	419647
160	750	4.5	EPDM	419636	419648
160	750	4.5	Viton	419637	419649
160	1000	5.8	EPDM	419638	419650
160	1000	5.8	Viton	419639	419651
160	1500	8.2	EPDM	419640	419652
160	1500	8.2	Viton	419641	419653
160	2000	10.7	EPDM	419642	419654
160	2000	10.7	Viton	419643	419655
160	3000	15.7	EPDM	419644	419656
160	3000	15.7	Viton	419645	419657

**200mm Double Socketed Pipe**



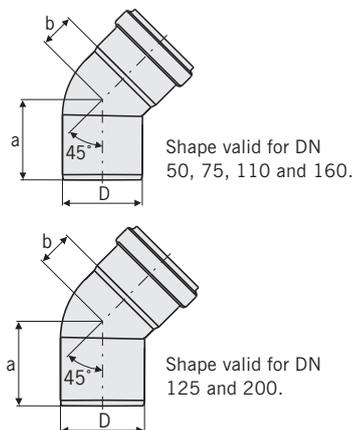
D (mm)	Active Length L (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
200	500	5.0	EPDM	419658	419659
200	500	5.0	Viton	419660	419661
200	1000	8.6	EPDM	419662	419663
200	1000	8.6	Viton	419664	419665
200	2000	15.9	EPDM	419666	419667
200	2000	15.9	Viton	419668	419669
200	3000	23.1	EPDM	419670	419671
200	3000	23.1	Viton	419672	419673

**87.5° Bend**



D (mm)	a (mm)	b (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	86	40	0.2	EPDM	98700	98750
50	86	40	0.2	Viton	98701	98751
75	107	53	0.4	EPDM	98702	98752
75	107	53	0.4	Viton	98703	98753
110	134	67	0.7	EPDM	98704	98754
110	134	67	0.7	Viton	98705	98755
125	161	93	0.8	EPDM	419732	419734
125	161	93	0.8	Viton	419733	419735
160	181	105	1.7	EPDM	98706	98756
160	181	105	1.7	Viton	98707	98757
200	215	129	3.9	EPDM	419411	419413
200	215	129	3.9	Viton	419412	419414

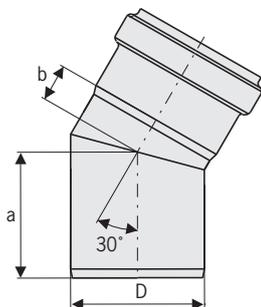
**45° Bend**



D (mm)	a (mm)	b (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	62	24	0.2	EPDM	98708	98758
50	62	24	0.2	Viton	98709	98759
75	76	32	0.3	EPDM	98710	98760
75	76	32	0.3	Viton	98711	98761
110	93	42	0.5	EPDM	98712	98762
110	93	42	0.5	Viton	98713	98763
125	110	50	0.6	EPDM	419736	419738
125	110	50	0.6	Viton	419737	419739
160	131	55	1.3	EPDM	98714	98764
160	131	55	1.3	Viton	98715	98765
200	152	60	2.7	EPDM	419407	419409
200	152	60	2.7	Viton	419408	419410

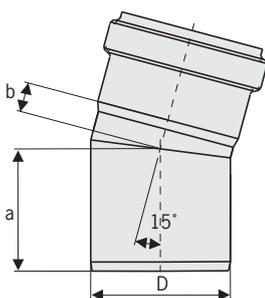


**30° Bend**



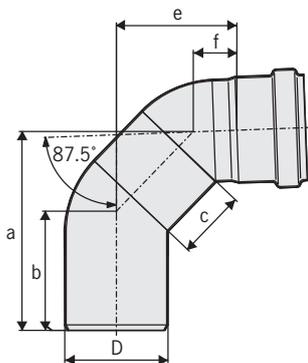
D (mm)	a (mm)	b (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	57	16	0.2	EPDM	98716	98766
50	57	16	0.2	Viton	98717	98767
75	71	21	0.3	EPDM	98718	98768
75	71	21	0.3	Viton	98719	98769
110	85	27	0.5	EPDM	98720	98770
110	85	27	0.5	Viton	98721	98771
125	98	28	0.6	EPDM	419740	419742
125	98	28	0.6	Viton	419741	419743
160	110	40	1.2	EPDM	98722	98772
160	110	40	1.2	Viton	98723	98773
200	137	45	2.3	EPDM	419403	419405
200	137	45	2.3	Viton	419404	419406

**15° Bend**



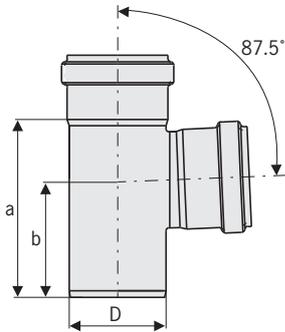
D (mm)	a (mm)	b (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	54	12	0.1	EPDM	98724	98774
50	54	12	0.1	Viton	98725	98775
75	66	16	0.3	EPDM	98726	98776
75	66	16	0.3	Viton	98727	98777
110	78	15	0.4	EPDM	98728	98778
110	78	15	0.4	Viton	98729	98779
125	84	19	0.5	EPDM	419744	419746
125	84	19	0.5	Viton	419745	419747
160	99	29	1.0	EPDM	98730	98780
160	99	29	1.0	Viton	98731	98781
200	123	31	1.9	EPDM	419399	419401
200	123	31	1.9	Viton	419400	419402

**87.5° Long Bend**



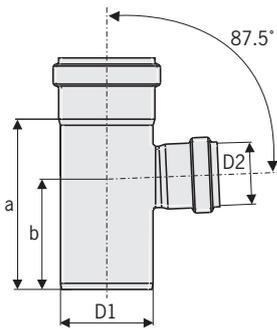
D (mm)	a (mm)	b (mm)	c (mm)	e (mm)	f (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	123	71	50	75	25	0.3	EPDM	419146	419000
50	123	71	50	75	25	0.3	Viton	419147	419001
75	146	87	50	88	32	0.5	EPDM	419148	419002
75	146	87	50	88	32	0.5	Viton	419149	419003
110	175	103	250	103	39	1.4	EPDM	419150	419004
110	175	103	250	103	39	1.4	Viton	419151	419005
160	222	126	250	183	92	2.2	EPDM	419152	419144
160	222	126	250	183	92	2.2	Viton	419153	419145

**87.5° Single Branch**



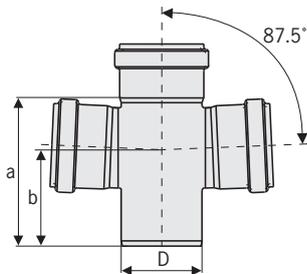
D (mm)	a (mm)	b (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	106	71	0.3	EPDM	98732	98782
50	106	71	0.3	Viton	98733	98793
75	139	90	0.5	EPDM	98734	98784
75	139	90	0.5	Viton	98735	98785
110	183	117	0.8	EPDM	98736	98786
110	183	117	0.8	Viton	98737	98787
125	220	135	0.9	EPDM	419748	419750
125	220	135	0.9	Viton	419749	419751
160	288	184	2.3	EPDM	98738	98788
160	288	184	2.3	Viton	98739	98789
200	333	206	4.5	EPDM	419419	419421
200	333	206	4.5	Viton	419420	419422

**87.5° Single Branch Reduction**



D1 (mm)	D2 (mm)	a (mm)	b (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
75	50	139	90	0.3	EPDM	98928	98930
75	50	139	90	0.3	Viton	98929	98931
110	50	183	117	0.5	EPDM	98932	98934
110	50	183	117	0.5	Viton	98933	98935
110	75	183	117	0.8	EPDM	98936	98938
110	75	183	117	0.8	Viton	98937	98939
125	75	187	110	0.9	EPDM	419752	419754
125	75	187	110	0.9	Viton	419753	419755
125	110	205	127	0.9	EPDM	419756	419758
125	110	205	127	0.9	Viton	419757	419759
160	110	288	184	2.3	EPDM	400691	400693
160	110	288	184	2.3	Viton	400692	400694
200	160	293	186	3.7	EPDM	419415	419417
200	160	293	186	3.7	Viton	419416	419418

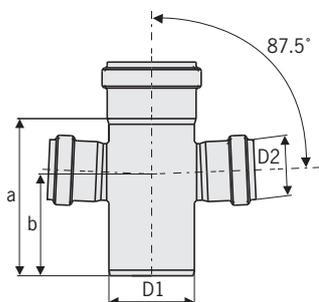
**87.5° Double Branch**



D (mm)	a (mm)	b (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	106	71	0.3	EPDM	98740	98790
50	106	71	0.3	Viton	98741	98791
75	139	90	0.6	EPDM	98742	98792
75	139	90	0.6	Viton	98743	98793
110	183	117	0.9	EPDM	98744	98794
110	183	117	0.9	Viton	98745	98795
160	288	184	2.7	EPDM	98746	98796
160	288	184	2.7	Viton	98747	98797

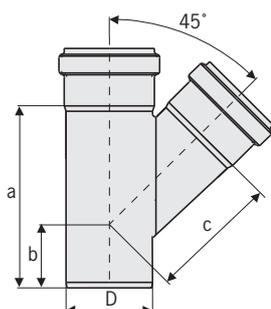


### 87.5° Double Branch Reduction



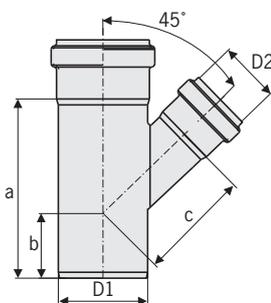
D1 (mm)	D2 (mm)	a (mm)	b (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
75	50	139	90	0.3	EPDM	98940	98942
75	50	139	90	0.3	Viton	98941	98943
110	50	183	117	0.6	EPDM	98944	98946
110	50	183	117	0.6	Viton	98945	98947
110	75	183	117	0.9	EPDM	98900	98902
110	75	183	117	0.9	Viton	98901	98903
160	110	288	184	2.7	EPDM	400695	400697
160	110	288	184	2.7	Viton	400696	400698

### 45° Single Branch



D (mm)	a (mm)	b (mm)	c (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	128	57	76	0.3	EPDM	98748	98798
50	128	57	76	0.3	Viton	98749	98799
75	179	74	110	0.5	EPDM	98800	98850
75	179	74	110	0.5	Viton	98801	98851
110	233	88	149	1.0	EPDM	98802	98852
110	233	88	149	1.0	Viton	98803	98853
125	273	103	170	1.1	EPDM	419760	419762
125	273	103	170	1.1	Viton	419761	419763
160	332	119	222	2.6	EPDM	98804	98854
160	332	119	222	2.6	Viton	98805	98855
200	415	151	274	5.7	EPDM	419427	419429
200	415	151	274	5.7	Viton	419428	419430

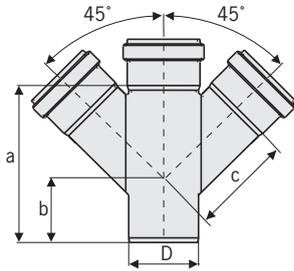
### 45° Single Branch Reduction



D1 (mm)	D2 (mm)	a (mm)	b (mm)	c (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
75	50	144	56	94	0.3	EPDM	400661	400663
75	50	144	56	94	0.3	Viton	400662	400664
110	50	147	42	119	0.5	EPDM	400665	400667
110	50	147	42	119	0.5	Viton	400666	400668
110	75	182	60	135	1.0	EPDM	400669	400671
110	75	182	60	135	1.0	Viton	400670	400672
125	75	200	65	141	1.1	EPDM	419764	419766
125	75	200	65	141	1.1	Viton	419765	419767
125	110	250	90	160	1.1	EPDM	419768	419770
125	110	250	90	160	1.1	Viton	419769	419771
160	110	332	119	191	2.6	EPDM	400699	400701
160	110	332	119	191	2.6	Viton	400700	400702
200	160	359	123	250	4.7	EPDM	419423	419425
200	160	359	123	250	4.7	Viton	419424	419426

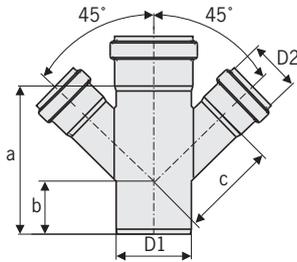


**45° Double Branch**



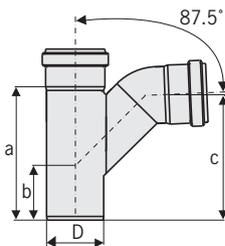
D (mm)	a (mm)	b (mm)	c (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	128	57	76	0.4	EPDM	98806	98856
50	128	57	76	0.4	Viton	98807	98857
75	179	74	110	0.7	EPDM	98808	98858
75	179	74	110	0.7	Viton	98809	98859
110	233	88	149	1.2	EPDM	98810	98860
110	233	88	149	1.2	Viton	98811	98861
160	332	184	222	3.5	EPDM	98812	98862
160	332	184	222	3.5	Viton	98813	98863

**45° Double Branch Reduction**



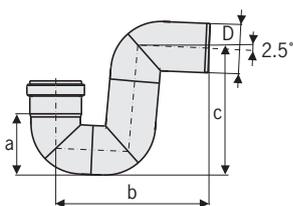
D1 (mm)	D2 (mm)	a (mm)	b (mm)	c (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
75	50	144	56	94	0.4	EPDM	400673	400675
75	50	144	56	94	0.4	Viton	400674	400676
110	50	147	42	119	0.7	EPDM	400677	400679
110	50	147	42	119	0.7	Viton	400678	400680
110	75	182	60	135	1.2	EPDM	400681	400683
110	75	182	60	135	1.2	Viton	400682	400684
160	110	332	119	190	3.5	EPDM	400703	400705
160	110	332	119	190	3.5	Viton	400704	400706

**87.5° Swept Single Branch**



D (mm)	a (mm)	b (mm)	c (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	128	57	117	0.3	EPDM	98814	98864
50	128	57	117	0.3	Viton	98815	98865
75	179	74	157	0.6	EPDM	98816	98866
75	179	74	157	0.6	Viton	98817	98867
110	233	88	209	1.1	EPDM	98818	98868
110	233	88	209	1.1	Viton	98819	98869
160	332	184	302	2.8	EPDM	98820	98870
160	332	184	302	2.8	Viton	98821	98871

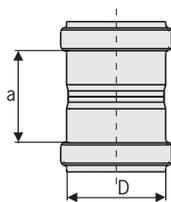
**'P' Trap**



D (mm)	a (mm)	b (mm)	c (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	68	187	149	0.5	EPDM	98822	98872
50	68	187	149	0.5	Viton	98823	98873
75	94	232	193	0.7	EPDM	98824	98874
75	94	232	193	0.7	Viton	98825	98875
110	132	300	254	1.3	EPDM	98826	98876
110	132	300	254	1.3	Viton	98827	98877
160	190	404	347	3.3	EPDM	98828	98878
160	190	404	347	3.3	Viton	98829	98879

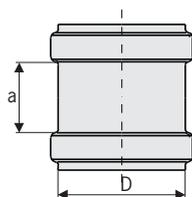


### Straight Coupling



D (mm)	a (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	54	0.1	EPDM	98920	98970
50	54	0.1	Viton	98921	98971
75	75	0.2	EPDM	98922	98972
75	75	0.2	Viton	98923	98973
110	84	0.4	EPDM	98924	98974
110	84	0.4	Viton	98925	98975
125	140	0.4	EPDM	419813	419815
125	140	0.4	Viton	419814	419816
160	110	0.8	EPDM	98926	98976
160	110	0.8	Viton	98927	98977
200	136	1.8	EPDM	419431	419433
200	136	1.8	Viton	419432	419434

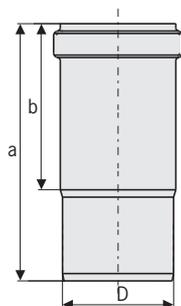
### Repair Coupling



D (mm)	a (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	44	0.1	EPDM	98830	98880
50	44	0.1	Viton	98831	98881
75	46	0.2	EPDM	98832	98882
75	46	0.2	Viton	98833	98883
110	52	0.3	EPDM	98834	98884
110	52	0.3	Viton	98835	98885
125	70	0.4	EPDM	419772	419774
125	70	0.4	Viton	419773	419775
160	76	0.7	EPDM	98836	98886
160	76	0.7	Viton	98837	98887
200	100	1.5	EPDM	419435	419437
200	100	1.5	Viton	419436	419438

**Note:** Repair couplings are used to aid a convenient repair to a damaged in-situ pipe. Unlike the standard Straight Coupling, there is no central registration to limit the insertion depth of the pipe. The Repair Coupling slides completely over a pipe joint and simply re-positioned to bridge the required pipe joint. **Installation tip:** mark the final position of the repair coupling on the installed pipe system to ensure the coupling seals are positioned symmetrically about the pipe joint.

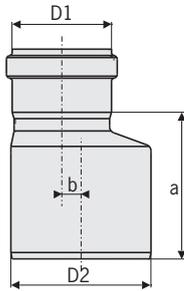
### Expansion Socket



D (mm)	a (mm)	b (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
50	159	102	0.2	EPDM	98664	98666
50	159	102	0.2	Viton	98665	98667
75	175	113	0.3	EPDM	98668	98670
75	175	113	0.3	Viton	98669	98671
110	200	121	0.5	EPDM	98672	98674
110	200	121	0.5	Viton	98673	98675
125	250	165	0.6	EPDM	419776	419778
125	250	165	0.6	Viton	419777	419779
160	292	170	1.4	EPDM	98676	98678
160	292	170	1.4	Viton	98677	98679

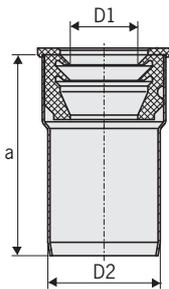
**Note:** Expansion socket is generally used in conjunction with a branch unit when adding a branch into an existing pipe run.

**Eccentric Increaser Coupling**



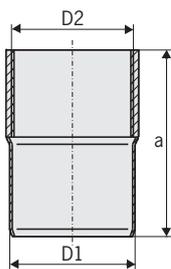
D1 (mm)	D2 (mm)	a (mm)	b (mm)	Weight (kg)	Seal Material	Part No 316
50	75	88	7	0.3	EPDM	98892
50	75	88	7	0.3	Viton	98893
50	110	103	25	0.4	EPDM	98978
50	110	103	25	0.4	Viton	98979
75	110	116	15	0.5	EPDM	98894
75	110	116	15	0.5	Viton	98895
110	125	107	0	0.6	EPDM	419780
110	125	107	0	0.6	Viton	419781
110	160	123	22	1.1	EPDM	98896
110	160	123	22	1.1	Viton	98897
125	160	150	0	1.2	EPDM	419811
125	160	150	0	1.2	Viton	419812
160	200	170	0	1.8	EPDM	419441
160	200	170	0	1.8	Viton	419442

**Increaser Connector**



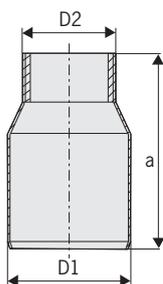
D1 (mm)	D2 (mm)	a (mm)	Weight (kg)	Seal Material	Part No 316
32	50	90	0.2	NBR	419373
40	50	90	0.2	NBR	419374

**Connector With Internal Screw Thread And Spigot**



D1 (mm)	D2 (mm)	a (mm)	Weight (kg)	Part No 316
50	Rp 1 1/4"	72	0.2	98956
50	Rp 1 1/2"	75	0.3	98957
50	Rp 2"	80	0.3	98958

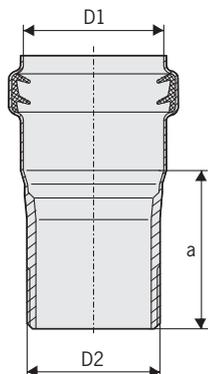
**Connector With External Screw Thread And Spigot**



D1 (mm)	D2 (mm)	a (mm)	Weight (kg)	Part No 316
50	R 1 1/4"	100	0.2	419330
50	R 1 1/2"	100	0.3	419331
50	R 2"	100	0.3	419332

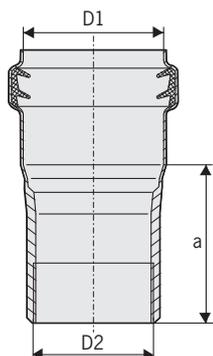


**Connector And Socket With External Screw Thread**



D1 (mm)	D2 (mm)	a (mm)	Weight (kg)	Seal Material	Part No 316
50	R 1 1/4"	58	0.2	EPDM	419250
50	R 1 1/4"	58	0.2	Viton	419251
50	R 1 1/2"	58	0.3	EPDM	419252
50	R 1 1/2"	58	0.3	Viton	419253
50	R 2"	58	0.3	EPDM	419254
50	R 2"	58	0.3	Viton	419255

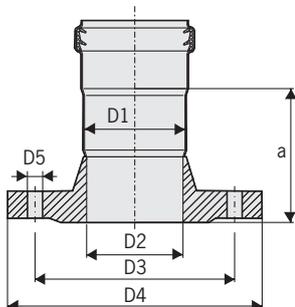
**Connector And Socket With Internal Screw Thread**



D1 (mm)	D2 (mm)	a (mm)	Weight (kg)	Seal Material	Part No 316
50	Rp 1 1/4"	58	0.2	EPDM	419333
50	Rp 1 1/4"	58	0.2	Viton	419334
50	Rp 1 1/2"	58	0.3	EPDM	419335
50	Rp 1 1/2"	58	0.3	Viton	419336
50	Rp 2"	58	0.3	EPDM	419337
50	Rp 2"	58	0.3	Viton	419338



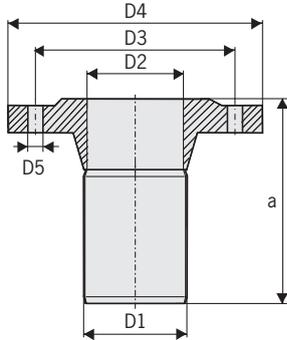
**Connector With Socket And Flange**



D1 (mm)	D2 (mm)	D3 (mm)	D4 (mm)	N x D5 (mm)	a (mm)	Weight (kg)	Seal Material	Part No 316
50	DN 40	110	150	4 x 18	100	2.3	EPDM	419256
50	DN 40	110	150	4 x 18	100	2.3	Viton	419257
50	DN 50	125	165	4 x 18	100	2.7	EPDM	419258
50	DN 50	125	165	4 x 18	100	2.7	Viton	419259
75	DN 65	145	185	4 x 18	100	3.4	EPDM	419260
75	DN 65	145	185	4 x 18	100	3.4	Viton	419261
110	DN 100	180	220	8 x 18	100	4.9	EPDM	419262
110	DN 100	180	220	8 x 18	100	4.9	Viton	419263
200	DN 200	295	340	12 x 22	102	12.0	EPDM	419514
200	DN 200	295	340	12 x 22	102	12.0	Viton	419515

**Note:** Flange PN16 to DIN 2633.  
Flanges to PN6 and PN10 available on request.

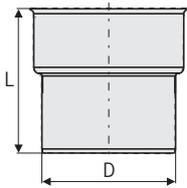
**Connector With Socket And Flange**



D1 (mm)	D2 (mm)	D3 (mm)	D4 (mm)	N x D5 (mm)	a (mm)	Weight (kg)	Part No 316
50	DN 40	110	150	4 x 18	192	2.3	419264
50	DN 50	125	165	4 x 18	192	2.7	419265
75	DN 65	145	185	4 x 18	245	3.4	419266
110	DN 100	180	220	8 x 18	259	4.9	419267
160	DN 150	240	285	8 x 22	200	8.5	419540
200	DN 200	295	240	12 x 22	240	12.3	419541

**Note:** Flange PN16 to DIN 2633.  
Flanges to PN6 and PN10 available on request.

**Connector: Cast Iron Spigot → ACO PIPE® Socket**



ACO Pipe® Spigot Dia D (mm)	L (mm)	Weight (kg)	Part No 316
75	121	0.4	98904
110	137	0.6	98906
160	174	1.0	98905

**Note:** Connector is NOT supplied with seals.  
Select the required reduction seal for the application below.

**Reduction Seal: Cast Iron Spigot → ACO PIPE® Socket**



Cast Iron Spigot (mm)	ACO Pipe® Spigot Dia D (mm)	Weight (kg)	Part No EPDM
DN 70 / 75	75	0.06	400580
DN 100 / 110	110	0.10	400581
DN 150 / 160	160	0.14	400582

**Note:** For cast iron spigot to ACO Pipe® socket conversion, select the appropriate seal for use with the required socket above.

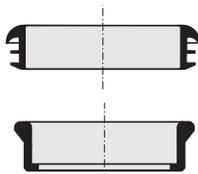
**Reduction Seal: ACO PIPE® Spigot → Cast Iron Socket**



Cast Iron Spigot (mm)	ACO Pipe® Spigot Dia D (mm)	Weight (kg)	Part No EPDM
75 / DN 70	75	0.05	400586
110 / DN 100	110	0.08	400587
160 / DN 150	160	0.12	400588

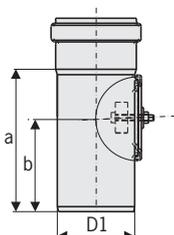
**Note:** To convert ACO Pipe® spigot to cast iron socket, select appropriate seal.  
No other connector component is required.

**Reduction Seal Set For Cast Iron**



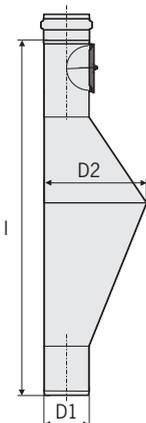
Cast Iron Spigot (mm)	ACO Pipe® Spigot Dia D (mm)	Weight (kg)	Part No EPDM
75 / DN 70	75	0.11	419370
110 / DN 100	110	0.18	419371
160 / DN 150	160	0.26	419372

**Access Unit**



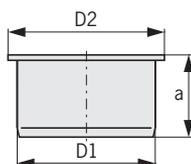
D (mm)	a (mm)	b (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
75	139	90	0.5	EPDM	98913	98963
75	139	90	0.5	Viton	98914	98964
110	183	117	0.8	EPDM	98915	98965
110	183	117	0.8	Viton	98916	98966
125	210	135	0.9	EPDM	419783	419785
125	210	135	0.9	Viton	419784	419786
160	288	184	2.3	EPDM	98917	98967
160	288	184	2.3	Viton	98918	98968
200	293	186	3.7	EPDM	419676	419678
200	293	186	3.7	Viton	419677	419679

**Rat Stop Pipe**



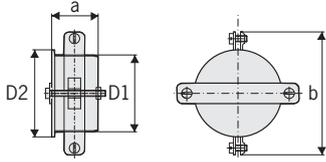
D1 (mm)	D2 (mm)	l (mm)	Weight (kg)	Seal Material	Part No 304	Part No 316
110	250	864	3.8	EPDM	419268	419270
110	250	864	3.8	Viton	419269	419271

**Socket Plug (No Clamp)**



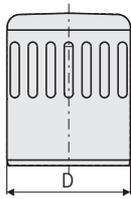
D1 (mm)	D2 (mm)	a (mm)	Weight (kg)	Part No 316
50	58	45	0.1	98888
75	85	45	0.3	98889
110	120	45	0.5	98890
125	135	50	0.6	419782
160	170	50	0.7	98891
200	210	50	1.0	98994

### Socket Plug With Clamp



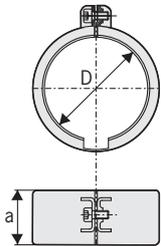
D1 (mm)	D2 (mm)	a (mm)	Weight (kg)	Seal Material	Part No 316
50	58	45	88	0.4	419138
75	85	45	120	0.6	419139
110	120	45	167	0.8	419140
160	170	50	214	1.1	419141

### Vent Cowl



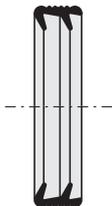
D (mm)	Weight (kg)	Part No EPDM
110	0.4	98962

### Socket Clamp



D (mm)	a (mm)	Weight (kg)	Part No 316
50	40	0.1	419134
75	40	0.2	419135
110	43	0.3	419136
160	43	0.4	419137

### Pipe Seal



D (mm)	Weight (kg)	Part No EPDM	Part No Viton
50	0.01	98400	98404
75	0.02	98401	98405
110	0.05	98402	98406
125	0.06	419453	419454
160	0.08	98403	98407
200	0.10	98433	98437

**Note:** ACO PIPE® seals are available in all sizes manufactured from EPDM and Viton materials. All seals incorporate the unique ACO PIPE® double lip seal arrangement for increased reliability and security. Both seal materials are mechanically interchangeable thereby facilitating easy on-site upgrade from EPDM to Viton, for example. For seal installation instructions, refer to the Appendices. To aid identification, the seals are colour coded as follows: EPDM seals are BLACK and Viton seals are GREEN.

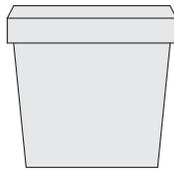


**Universal Lubricant - 150ml Approximately**



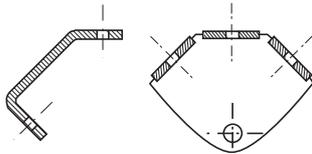
Weight (kg)	Part No
0.15	E80350000

**Universal lubricant - 1 litre approximately**



Weight (kg)	Part No
1.0	E80350001

**Axial Restraint Fixing Set**

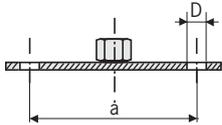


Weight (kg)	Part No Galvanised Steel	Part No 316
0.11	400565	400561

**Note:** Six M8 nuts included.

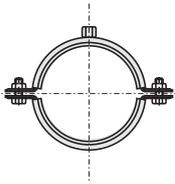


**Fixing Plate**



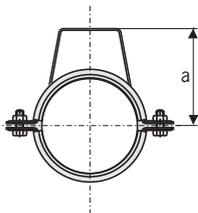
D (mm)	a (mm)	Weight (kg)	Part No Galvanised Steel	Part No 316
8.4	70	0.05	400525	400521

**Support Bracket With Rubber Infill**



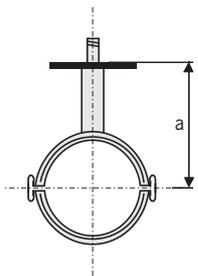
D (mm)	Weight (kg)	Part No Galvanised Steel	Part No 316
50	0.14	400533	400529
75	0.23	400534	400530
110	0.33	400535	400531
125	0.36	419854	419855
160	0.39	400536	400532
200	0.44	419451	419675

**Support Bracket With Rubber Infill And Stirrup**



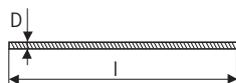
D (mm)	a (mm)	Weight (kg)	Part No Galvanised Steel	Part No 316
50	56	0.18	400541	400537
75	80	0.28	400542	400538
110	116	0.41	400543	400539
160	166	0.48	400544	400540

**Support Bracket With Rubber Infill And Key**



D (mm)	a (mm)	Weight (kg)	Part No Galvanised Steel	Part No 316
50	120	0.16	400549	400545
75	133	0.26	400550	400546
110	150	0.38	400551	400547
160	175	0.44	400552	400548

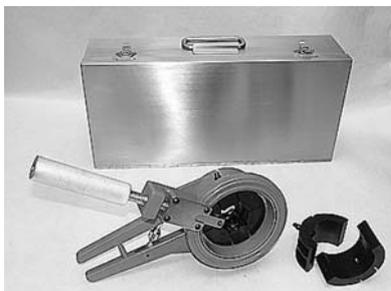
**Threaded Support Pole M8**



D (mm)	Length l (mm)	Weight (kg)	Part No Galvanised Steel	Part No 316
M8	1000	0.39	400557	400553
M8	90	0.03	400558	400554
M8	40	0.02	400559	400555



**Aco Pipe® Cutter - Manually Operated 50 - 110mm**



Product Description	Weight (kg)	Part No
Manual pipe cutter 50 - 110mm supplied in plastic case including integrated pipe holder	3.5	419363
Manual pipe cutter 50 - 110mm supplied in stainless steel case including integrated pipe holder	8.0	419364
Replacement cutting discs	0.005	419365

**Note:** For replacement cutting discs, minimum order quantity: 10 off.

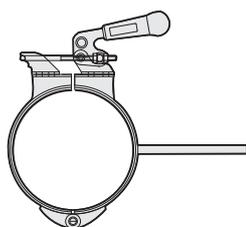
**Aco Pipe® Cutter - Manually Operated 110 - 160mm**



Product Description	Weight (kg)	Part No
Manual pipe cutter 110 - 160mm	2.0	400738
Replacement cutting discs	0.005	400578

**Note:** While purchasing 110 - 160mm ACO PIPE® Manual Cutter it is recommended to order the appropriate ACO PIPE® Holder listed below for manual cutting. For replacement cutting discs, minimum order quantity: 10 off.

**Aco Pipe® Holder For Manual Cutting**



Pipe Dia D (mm)	Weight (kg)	Part No
110 - 160	4.0	400742

**Note:** While purchasing 110 - 160mm ACO PIPE® Manual Cutter it is recommended to order the ACO PIPE® Holder for manual cutting to prevent pipe distortion.

**Seal Material Data**

EPDM (Ethylene Propylene Diene Monomer)  
 EPDM was originally developed in the 1950's for vehicle tyre applications. It reached wider applications because of its suitability for outdoor use.

**Properties include:**

- ✓ The most water-resistant type of rubber - also very resistant to most water based chemicals.
- ✓ Inert structure and remains stable over long periods of time.
- ✓ Withstands elevated temperatures up to 130°C for extended periods (months).
- ✓ Easily compounded and processed.

**Limitations**

- ✗ Not resistant to oil or oil based products.

**Viton\***

Viton\* is a fluorocarbon and the best material for resistance to hostile chemical and oil environments at normal and elevated temperatures. This material is widely used in the chemical and pharmaceutical industries, however is significantly more expensive than EPDM.

**Properties include:**

- ✓ Good resistance to water.
- ✓ Good resistance to oils, fuels and most chemicals.

**Limitations**

- ✗ Not resistant to ketone solvents.

\* Du Pont Registered Trade Mark.

Property			EPDM	Viton*
Water resistance			Excellent	Good
Chemical resistance	Acids		Good	Excellent
	Bases		Good	Good
Solvent resistance (20°C)	Alcohol		Good	Good
	Acetone		Good	Unsuitable
	Benzene		Unsatisfactory	Good
Oil resistance	ASTM Oil No 1	@ 20° C	Fair	Excellent
		@ 100° C	Unsatisfactory	150°C Excellent
	ASTM Oil No 3	@ 20° C	Unsatisfactory	Excellent
		@ 100° C	Unsatisfactory	150°C Excellent
Fuel resistance	ASTM B	@ 20° C	Unsatisfactory	Excellent
Resistances	Oxidation		Excellent	Outstanding
	Ozone and weathering		Outstanding	Outstanding
Heat resistance	Maximum continuous		130°C	205°C
	Maximum intermittent		150°C	300°C
Low temperature resistance			-50°C	-20°C
Gas permeability			Fairly low	Very low
Physical strength			Good	Good
Compression set resistance			Good	Good
Tear and abrasion resistance			Good	Good
Cost factor			1	20



## Installation

### General

Installation should be in accordance with the manufacturer's recommendations. Reference also to BS EN 12056 Gravity Drainage Systems Inside Buildings and BS EN 752 Drain and Sewer Systems Outside Buildings is recommended.

### Thermal movement

ACO PIPE® stainless steel pipework systems have a low coefficient of thermal expansion, of approximately 1 in 1000mm per 60°C of temperature change.

The requirement for thermal tolerance on pipe systems is otherwise confined to hot water conditions. A comparison of approximate thermal movement between different pipe materials in mm per metre with a temperature change of 60°C is given below:

Aluminium Alloy	1.44mm
Copper	0.98mm
Grey Cast Iron	0.75mm
HDPE	9.0mm
PVC-U	3.0mm
Stainless Steel	0.99mm

Coefficient of linear expansion for various materials are as follows (°K<sup>-1</sup>):

Aluminium	24 x 10 <sup>-6</sup>
Copper	16.4 x 10 <sup>-6</sup>
Grey Cast Iron	12.5 x 10 <sup>-6</sup>
HDPE	150 x 10 <sup>-6</sup>
PVC-U	50 x 10 <sup>-6</sup>
Stainless Steel	16.5 x 10 <sup>-6</sup>

### Pipe weights

ACO PIPE® thin-wall stainless steel pipe systems are light in weight and high on performance with clear advantages in ease of handling and savings in labour costs over traditional metal pipe systems.

Engineers will need to know weights and loadings when designing vertical stack and horizontal pipe run systems. The table below gives weights for all pipe sizes empty and full of water.

Pipe Dia (mm)	Pipe Weight Empty (kg/m)	Pipe Weight Full (water) (kg/m)
50	1.2	3.0
75	1.8	6.9
110	2.7	11.9
125	3.3	15.8
160	5.0	24.6
200	7.5	38.0

### Pipe jointing

The assembly of pipe joints is quick and straightforward requiring only a light application of lubricant available from ACO to the chamfered pipe end. Ensure the mating ends of the pipes and fittings are clean and free from contamination. Push-fit the pipe end into the socket recess so as to allow for thermal expansion within the system.

### Pipe cutting

If it is necessary to adapt or shorten pipe lengths, then whatever tools are used, the cut end must be square, clean and ready chamfered. Suitable cutters and whole cutter sets are available from ACO and shown on Page 28.

### Wall thickness

Pipe wall thickness - up to Ø125mm: 1mm; Ø160mm: 1.25mm; Ø200mm: 1.5mm.

### Below ground installation

**Back Filling:** Backfilling around the pipe can only start when the position of the pipe has been checked and approved.

**Compression:** Care should be taken to avoid distortion of both the pipe run and pipe itself during backfilling and compaction. Avoid tipping backfill material directly on to the Pipe system.

If mechanical compaction is used, the weight of the resultant compressive force must be taken into account to avoid distortion. Backfill materials should be compacted to minimum of 93%.

**Filling the Excavation:** Soil from the excavation can be used for filling, but larger stones and blocks may not be used. Compression of the filling material outside reinforced areas is not necessary if the settling will not cause problems or damage.

## Installation

### Vertical pipe stacks

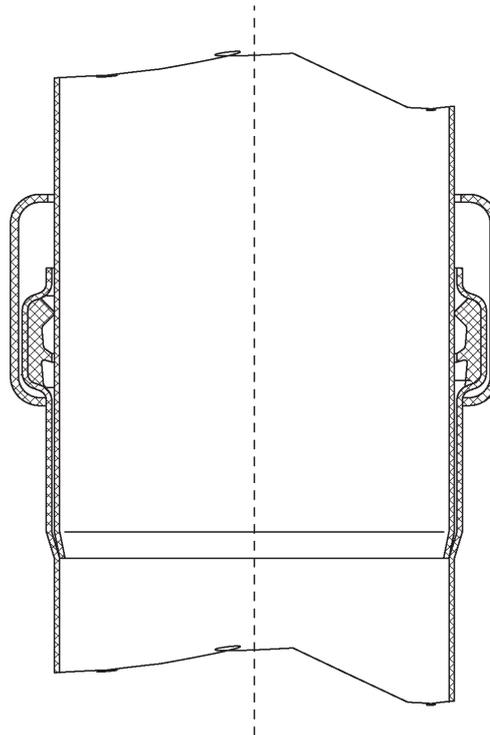
When designing rainwater or soil and waste systems, pipework must be supported at not more than 2 metre centres and vertical pipes should be fixed to the wall not closer than 30mm to facilitate maintenance and painting. Allow at least one bracket per fitting, preferably at the downstream end of the fitting, with additional brackets at changes of direction or junction points.

### Horizontal Pipe Runs

Horizontal pipework should be supported with at least two brackets per 3 metre pipe length. One bracket should be within 300mm of the pipe joint and the other approximately at the mid-point of the pipe length, but not more than 2 metres from the next bracket. Additional brackets should be used at changes of direction and at junction points immediately downstream of the fitting.

Horizontal pipe runs may be installed at a fall of 1 in 50 (2%) and feeder connections should be achieved using 45° branches.

Where long pipe runs occur i.e. greater than 15 metres, a fixing arm should be attached to the bracket to prevent pendulum movement within the system.



ACO Pipe® socketed joints fitted with socket clamps can withstand the following internal pressures:

Pipe Dimension	Maximum Pressure
50mm	+ 2 bar
75mm	+ 2 bar
110mm	+ 2 bar
160mm	+ 1 bar

### Socket clamps

Drainage systems for soil, wastewater and rainwater in above ground installations are free-draining gravity systems and should not be overloaded or blocked.

ACO Pipe® is a socketed push-fit jointing system and consequently precautions will need to be taken to resist reaction forces generated from internal pressure rises within the pipe system to ensure the pipe joints do not slide apart.

Appropriate fixing to the building structure can prevent the joints from sliding apart in most cases, but if it is difficult or impossible to fix the pipes to the building, socket clamps (Part No 419134 - 7 as shown on Page 25) should be used.

### Structural penetrations

Where it is necessary for pipework to pass through walls, structural decking or floors with DPM waterproofing, the ACO Apex Wall Seal system provides water and gas tight quality sealing for pipe feed-throughs. ACO Apex systems can accommodate any structural thickness up to 400mm and provides the following benefits:

- Above and below ground damp and water proof penetration quality.
- Available in all ACO Pipe® stainless steel pipe sizes.
- Accommodates the effects of structural movement on pipework.
- Allows up to 8° of axial pipe deflection through fixed structures.

Refer to Page 36 for ACO APLEX pipe seal data.

## Installation

### Seal assembly

The double lip seal is easily removed and replaced from the female end of all pipes and fittings. This allows the on-site upgrade of seal material from EPDM or Viton without the need for special tools.

### Seal installation notes

1. If changing the seal, ensure the correct size and grade of seal is selected for the application. For reference, EPDM seals are BLACK and Viton seals are GREEN. If in doubt, contact the ACO Building Drainage Helpline on 01462 816666 for assistance.
2. Ensure the seal itself and the zone around the pipe and/or fitting receiving the seal is clean, dry and free from dirt, dust or particulates.
3. Insert the dry seal into the pipe/fitting recess as shown in the diagram below. NOTE: the seal MUST be inserted so the double sealing lips face away from the opening of the pipe/fitting.
4. Do not use tools to aid the assembly process otherwise damage to the pipes, fittings and seals may occur.

## Care And Maintenance

### General information

All grades of stainless steel will stain and discolour due to surface deposits and can never be accepted as completely maintenance free. In order to achieve maximum corrosion resistance, the surface of the stainless steel must be kept clean. Provided the grade of stainless steel and the surface finish are correctly selected and cleaning schedules carried out on a regular basis, good performance and long service life are assured.

### Factors affecting maintenance

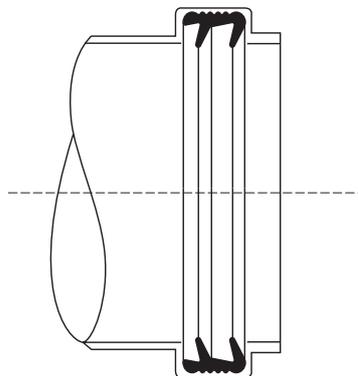
Surface contamination and the formation of deposits must be prevented in order to maintain a durable and hygienic surface.

These deposits may be minute particles of iron or rust from other sources used in the construction of new or refurbished premises and not removed until after the stainless steel drainage products have been installed. Care must be taken to avoid the cutting of carbon steels, including rebar for example and the storage and erection of scaffolding, near to stainless steels without careful protection. Industrial and even naturally occurring atmospheric conditions can produce deposits that can be equally corrosive e.g. salt deposits from marine applications.

The working environment also offers more aggressive conditions e.g. high humidity, such as experienced in swimming pools and therefore requires maintenance on a more frequent basis. Modern processes use many cleaners, sterilizers and bleaches for hygienic purposes. All these proprietary solutions, when used in accordance with manufacturers instructions are safe, but if used incorrectly, (e.g. warm or concentrated) they may cause discolouration and corrosion on the surface of any grade of stainless steel.

Strong acid solutions are sometimes used to clean masonry and ceramic tiles but they should never be permitted to come into contact with metals, including stainless steel. If this should inadvertently happen, the acid solution must be removed immediately by copious applications of clean water.

Wire brushes and wire wool must NOT be used to remove marks or cement spillage as this will only serve to introduce iron impurities into the surface of the stainless steel.



## Care And Maintenance

### Maintenance programme

With care taken during the fabrication and installation, cleaning before handing over to the client should present no special problems, although more attention than normal may be required if the installation period has been prolonged.

Where surface contamination is suspected, immediate attention to cleaning after site fixing will encourage a trouble-free product.

Food and beverage handling, pharmaceutical and chemical industry applications require extremely high levels of cleanliness applicable to each industry.

Advice is often sought concerning the frequency of cleaning stainless steel and the answer is quite simple - clean the metal whenever it becomes dirty in order to restore its original appearance. This may vary from one to four times per year for external applications or it may be once per day for products installed in hygienic or chemically aggressive applications.

Frequency and cost of cleaning is lower with stainless steel than with many other materials and will often outweigh the initial higher cost of this superior product.

Stainless steel is easy to clean. Washing with soap or mild detergent in warm water followed by a clear water rinse is usually quite adequate for many industrial applications. An enhanced aesthetic appearance will be achieved if the cleaned surface is finally wiped dry.

### Precautions

Acids should ONLY be used for on-site cleaning when all other methods have been proved unsatisfactory and in accordance with manufacturers' instructions. Appropriate personal protection equipment should be used at all times.

Care should be taken to ensure that acid cleaners do not spill over adjacent areas. Solvents should not be used in confined areas without adequate ventilation and only in accordance with manufacturers' instructions.

### Conclusion

If all the cleaning suggestions and actions in the table below have been attempted and the surface is still not satisfactory, stainless steel can be mechanically cleaned or electropolished by specialists on site. For further information, contact the ACO Building Drainage Helpline on 01462 816666 for help and assistance.

Problem	Cleaning Agent	Comments
Routine cleaning.	Soap or mild detergent (e.g. washing up liquid) and water.	Sponge, rinse with clean water. Wipe dry if necessary.
Fingerprints.	Soap and warm water or organic solvent (e.g. alcohol, acetone).	Rinse with clean water, wipe dry if necessary.
Stubborn stains and discolouration.	Mild cleaning solutions (e.g. Cif, GODDARD'S STAINLESS STEEL CARE).	Rinse well with clean water and wipe dry.
Oil and grease marks.	Organic solvent (e.g. alcohol, acetone).	Clean after with soap and water, rinse with clean water and dry.
Rust and other corrosion products.	Oxalic acid. The cleaning solution should be applied with a swab and allowed to stand for 15-20 minutes before being washed away with clean water. May continue using Cif to give final clean.	Rinse well with clean water. Precautions for acid cleaners must be observed.

**Note:** Always read instructions on proprietary cleaning agents



## Material Resistance Chart

The resistance information contained within this table is indicative only.

All data is based on reactions noted at an ambient temperature of 20°C. Higher temperatures will generally reduce the corrosion resistance of the materials.

Please contact ACO if guarantees are required of specific material suitability.

We shall arrange for tests to be undertaken with the reagent to establish the chemical resistance of the materials.

### Legend

- ✓ Recommended.
- ? Suitable.  
However, contact ACO for further advice.
- ✗ Not recommended.
- ~ No data available

Reagent	Stainless Steel 304	Stainless Steel 316	EPDM	Viton
Acetic Acid 20%	✓	✓	✓	✓
Acetic Acid 80%	✓	✓	✓	✓
Acetone	✓	✓	✓	✗
Alcohol (Methy or Ethyl)	✓	✓	✓	?
Aluminium Chloride	?	?	✓	✓
Aluminium Sulphate	✓	✓	✓	✓
Ammonia Gas (Dry)	✓	✓	~	~
Ammonium Chloride	?	?	✓	✓
Ammonium Hydroxide	✓	✓	✓	✓
Ammonium Nitrate	✓	✓	✓	✓
Ammonium Phosphate	✓	✓	✓	✓
Ammonium Sulphate	?	✓	✓	✓
Ammonium Sulphide	✓	✓	~	~
Amyl Chloride	✓	✓	✗	?
Aniline	✓	✓	?	✓
Barium Chloride	✓	✓	✓	✓
Barium Hydroxide 10%	~	~	✓	✓
Barium Sulphate	✓	✓	✓	✓
Barium Sulphide	~	~	✓	✓
Beer	✓	✓	✓	✓
Beet Sugar Liquors	✓	✓	✓	✓
Benzene	✓	✓	✗	✓
Benzoic Acid	✓	✓	✗	✓
Bleach - 12.5% Active Cl	~	~	✓	✗
Boric Acid	✓	✓	✓	✓
Bromic Acid	?	?	~	~
Bromine Water	✗	✗	~	~
Butane	✓	✓	✗	✓
Calcium Carbonate	✓	✓	✓	✓
Calcium Chloride	✗	?	✓	✓
Calcium Hydroxide	?	✓	✓	✓
Calcium Hypochlorite	✗	?	?	✓
Calcium Sulphate	✓	✓	✓	✓
Cane Sugar Liquors	~	~	✓	✓
Carbonic Acid	~	~	✓	✓
Carbon Bisulphide	✓	✓	✗	✓
Carbon Dioxide	✓	✓	✓	✓
Carbon Monoxide	✓	✓	✓	✓
Carbon Tetrachloride	?	?	✗	✓

Reagent	Stainless Steel 304	Stainless Steel 316	EPDM	Viton
Caustic Potash	✓	✓	✓	✓
Caustic Soda 20%	✓	✓	✓	✓
Caustic Soda 50%	✓	✓	✓	✓
Caustic Soda 80%	✓	✓	✓	✓
Chlorine (Dry)	?	?	✓	✓
Chlorine (Wet)	✗	✗	✗	✓
Chloroacetic Acid	?	✓	?	✗
Chlorobenzene	✓	✓	✗	✓
Chloroform	?	?	✗	✓
Chromic Acid 50%	✗	✗	?	✓
Chromic Acid 10%	✓	✓	✗	?
Citric Acid	?	✓	✓	✓
Copper Chloride	✗	✗	✓	✓
Copper Cyanide	✓	✓	✓	✓
Copper Nitrate	✓	✓	~	✓
Copper Sulphate	✓	✓	✓	✓
Cottonseed Oil	~	~	✗	✓
Cresol	~	~	✗	✗
Cyclohexanone	?	✓	✗	✗
Cyclohexane	✓	✓	✗	✓
Diethylamine	?	?	?	✗
Disodium Phosphate	~	~	✓	✓
Distilled Water	✓	✓	✓	✓
Ethyl Acetate	✓	✓	?	✗
Ethylene Chloride	✓	✓	✗	?
Ethylene Glycol	✓	✓	✓	✓
Fatty acids (Cb)	✓	✓	✗	✓
Ferric Sulphate	✓	✓	✓	✓
Fluorene Gas (Wet)	✗	✗	✓	?
Formaldehyde 37%	✓	✓	✓	✓
Formic Acid 90%	✗	✓	✓	?
Freon 12	✓	✓	✓	✓
Fruit Juices & Pulp	?	✓	~	✓
Furfural	✓	✓	✗	✗
Gasoline (Refined)	✓	✓	✗	✓
Glucose	✓	✓	✓	✓
Glycerine	✓	✓	✓	✓

**Material Resistance Chart**

Reagent	Stainless Steel 304	Stainless Steel 316	EPDM	Viton
Hydrobromic Acid 20%	✗	✗	✓	✓
Hydrochloric Acid 40%	✗	✗	✗	✓
Hydrocyanic Acid	✓	✓	?	✓
Hydrogen Peroxide 90%	✓	✓	✗	✓
Hydroquinone	~	~	✗	✓
Hypochlorous Acid (Chlorine Water )	~	~	✗	✓
Iodine	✗	?	?	✓
Kerosene	✓	✓	✗	✓
Lactic Acid 25%	✓	✓	✓	✓
Linseed Oil	✓	✓	✗	✓
Magnesium Chloride	?	?	✓	✓
Magnesium Sulphate	✓	✓	✓	✓
Maleic Acid	?	?	✗	✓
Methyl Chloride	?	?	✗	✗
Methyl Ethyl Ketone	~	~	✓	✗
Milk	✓	✓	✓	✓
Minerals Oils	~	~	✗	✓
Nickel Chloride	?	?	✓	✓
Nickel Sulphate	✓	✓	✓	✓
Oils and Fats	✓	✓	✗	✓
Oleic Acid	✓	✓	✓	✓
Oleum	~	~	✗	✓
Oxalic Acid	?	?	✓	✓
Palmitic Acid 10%	~	~	✓	✓
Perchloric Acid 10%	✗	✗	?	✓
Perchloric Acid 70%	✗	✗	?	✓
Petroleum Oils	✓	✓	✗	✓
Phenol 5%	✓	✓	?	✓
Phosphorous Trichloride	✓	✓	✓	✓
Photographic Solutions	?	?	✓	✓
Picric Acid	✓	✓	✓	✓
Plating Solutions	~	~	~	✓
Potassium Carbonate	✓	✓	✓	✓
Potassium Chloride	✓	✓	✓	✓
Potassium Cyanide	✓	✓	✓	✓
Potassium Dichromate	✓	✓	✓	✓
Potassium Hydroxide	✓	✓	✓	✓
Potassium Permanganate	✓	✓	✓	✓
Potassium Sulphate	✓	✓	✓	✓
Propane Gas	~	~	~	✓
Propyl Alcohol	~	~	✓	✓
Sea Water (Natural)	✗	?	✓	✓
Silver Nitrate	✓	✓	✓	✓

Reagent	Stainless Steel 304	Stainless Steel 316	EPDM	Viton
Silver Sulphate	✓	✓	✓	✗
Sodium Bicarbonate	✓	✓	✓	✓
Sodium Bisulphite	✓	✓	✓	✗
Sodium Carbonate	✓	✓	✓	✓
Sodium Cyanide	✓	✓	✓	✓
Sodium Ferrocyanide	~	~	?	✓
Sodium Hydroxide	✓	✓	✓	✓
Sodium Hypochlorite	?	✓	?	✓
Sodium Sulphate	✓	✓	✓	✓
Sodium Sulphide	?	✗	✓	✓
Sodium Sulphite	?	✓	✓	✓
Sodium Thiosulphate	✓	✓	✓	✓
Stannous Chloride	?	?	✗	✓
Stearic Acid	✓	✓	?	✓
Sulphurous Acid	?	✓	?	✓
Sulphur	?	✓	~	✓
Sulphur Dioxide (Dry)	?	✓	✓	✓
Sulphur Dioxide (Wet)	?	✓	✓	✓
Sulphuric Acid 50%	✗	✗	?	✓
Sulphuric Acid 70%	✗	✗	?	✓
Sulphuric Acid 93%	✗	✗	?	✓
Tannic Acid	✓	✓	✓	✓
Tanning Liquors	✓	✓	✓	✓
Tartaric Acid	~	~	?	✓
Toluene	~	~	✗	✗
Trichloroethylene	✓	✓	✗	✗
Triethylamine	✓	✓	✓	✗
Trisodium Phosphate	~	~	✓	✓
Turpentine	✓	✓	✗	✓
Urea	✓	✓	✓	✓
Urine	✓	✓	✓	✓
Vinegar	✓	✓	✓	✓
Water (Fresh)	✓	✓	✓	✓
Water (Mine-acid)	✓	✓	✓	✓
Water (Salt)	~	~	✓	✓
Whisky	✓	✓	✓	✓
Wines	✓	✓	✓	✓
Xylene	~	~	✗	✗
Zinc Chloride	✗	✗	✓	✓
Zinc Sulphate	?	✓	✓	✓



## APLEX Wall Seals

### Introduction



APLEX Wall Seal systems provide water and gas-tight pipe feed-throughs for all industrial and commercial applications and are fully compatible with the ACO Pipe® stainless steel pipe system.

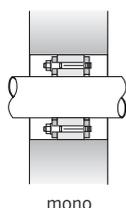


### Benefits

- Prevents damp and water entering building above or below damp proof course levels.
- Quick and easy to install.
- Fully compatible with ACO Pipe® stainless steel pipe systems.
- Single (mono) and double (duo) seal configurations for above and below ground applications respectively.
- Minimises number of joints required for movement of hazardous chemicals/gasses in and around buildings.
- High quality EPDM seal arrangement accommodates up to 8° off-axis alignment.
- Pipe OD sizes 15mm to 275mm accommodated.
- Suitable for new or refurbishment applications.
- Full range of polyester resin concrete and stainless steel wall liners available.

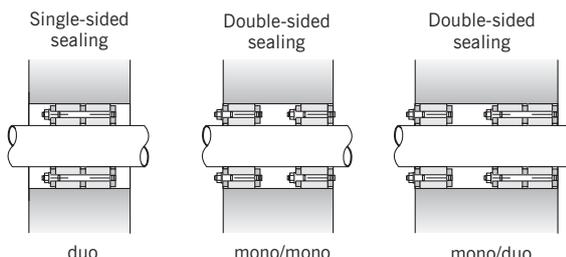
### Typical installation schemes

#### Above ground applications



mono

#### Below ground applications - water table resistant



Single-sided sealing

Double-sided sealing

Double-sided sealing

duo

mono/mono

mono/duo

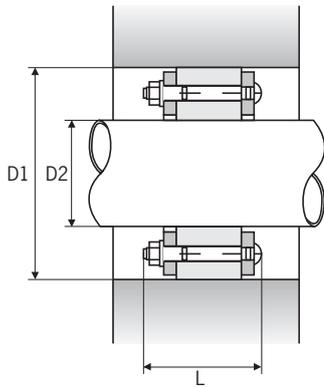


- Heavy duty zinc plated mild steel compression flanges.
- Wide area footprint EPDM bushings for ultimate reliability.
- Stainless steel nuts and washers.
- Temperature resistant to 130°C.
- Each product marked for pipe diameter and receiving core hole diameter.
- Split variant for in-situ pipe installation applications.

## APLEX Mono Wall Seals - For Above Ground Installation

### Assembly recommendations

Due to the possibility of micro-cracks present in core-bored holes (D1) in concrete or brick openings, the bore surface should be treated with a suitable sealant prior to installation of the APLEX Wall Sleeve.



### APLEX mono wall seal with single sealing element

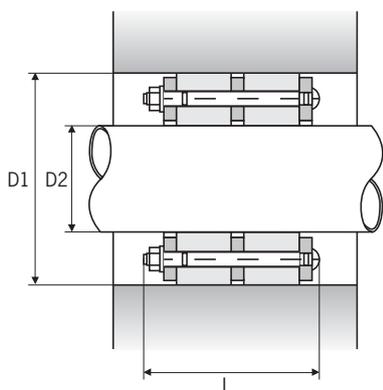
Core Dimension D1 (mm)	Pipe OD Range D2 (mm)	Overall Length L (mm)	Weight (kg)	Part No
50	15 - 18	53	0.10	70704
50	19 - 22	53	0.17	70705
80	25 - 28	53	0.55	70706
80	32 - 35	53	0.54	70707
80	36 - 40	53	0.53	70708
100	41 - 44	53	0.72	70709
100	47 - 51	53	0.71	70710
100	52 - 56	53	0.69	70711
125	57 - 61	53	1.33	70712
125	62 - 65	53	1.30	70713
125	73 - 76	53	1.27	70714
150	78 - 81	53	1.70	70715
150	88 - 91	53	1.65	70716
150	98 - 102	53	1.60	70717
200	108 - 112	53	2.78	70718
200	114 - 118	53	2.72	70719
200	123 - 126	53	2.67	70720
200	128 - 132	53	2.62	70721
200	133 - 136	53	2.59	70722
200	137 - 141	53	2.56	70723
250	142 - 146	53	4.46	70724
250	158 - 162	53	4.35	70725
250	165 - 170	53	4.23	70726
250	177 - 181	53	4.11	72692
300	200 - 204	53	5.59	70727
300	209 - 212	53	5.49	70728
300	218 - 221	53	5.40	70729
300	222 - 225	53	5.31	70730
350	248 - 252	53	7.00	72956
350	272 - 275	53	6.90	72957



**APLEX Duo Wall Seals - For Below Ground Installation**

**Assembly recommendations**

Due to the possibility of micro-cracks present in core-bored holes (D1) in concrete or brick openings, the bore surface should be treated with a suitable sealant prior to installation of the APLEX Wall Sleeve.



**APLEX duo wall seal with double sealing elements**

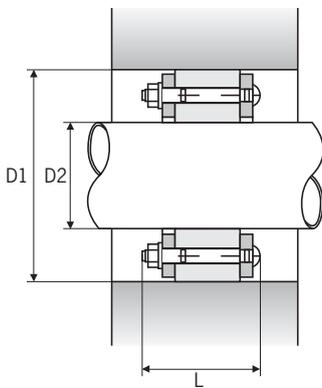
Core Dimension D1 (mm)	Pipe OD Range D2 (mm)	Overall Length L (mm)	Weight (kg)	Part No
50	15 - 18	78	0.22	70731
50	19 - 22	78	0.22	70732
80	25 - 28	78	0.70	70733
80	32 - 35	78	0.68	70734
80	36 - 40	78	0.66	70735
100	41 - 44	78	0.94	70736
100	47 - 51	78	0.92	70737
100	52 - 56	78	0.88	70738
125	57 - 61	78	1.66	70739
125	62 - 65	78	1.60	70740
125	73 - 76	78	1.54	70741
150	78 - 81	78	2.16	70742
150	88 - 91	78	2.04	70743
150	98 - 102	78	1.92	70744
200	108 - 112	78	3.56	70745
200	114 - 118	78	3.44	70746
200	123 - 126	78	3.34	70747
200	128 - 132	78	3.24	70748
200	133 - 136	78	3.18	70749
200	137 - 141	78	3.12	70750
250	142 - 146	78	5.64	70751
250	158 - 162	78	5.42	70752
250	165 - 170	78	5.18	70753
250	177 - 181	78	5.10	72693
300	200 - 204	78	6.98	70754
300	209 - 212	78	6.78	70755
300	218 - 221	78	6.60	70756
300	222 - 225	78	6.42	70757
350	248 - 252	78	8.40	72958
350	272 - 275	78	8.30	72959



## APLEX Mono Wall Seals - Split Variant For Above Ground In-situ Pipe Installation

### Assembly recommendations

Due to the possibility of micro-cracks present in core-bored holes (D1) in concrete or brick openings, the bore surface should be treated with a suitable sealant prior to installation of the APLEX Wall Sleeve.



### APLEX mono wall seal with single sealing element

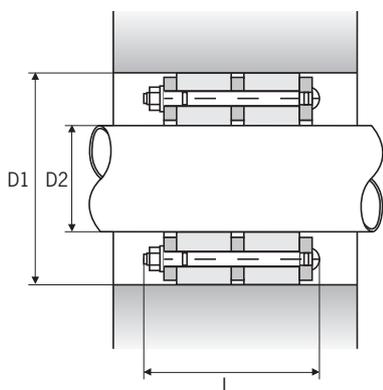
Core Dimension D1 (mm)	Pipe OD Range D2 (mm)	Overall Length L (mm)	Weight (kg)	Part No
80	25 - 28	53	0.55	401126
80	32 - 35	53	0.54	401127
80	36 - 40	53	0.53	401128
100	41 - 44	53	0.72	401129
100	47 - 51	53	0.71	401130
100	52 - 56	53	0.69	401131
125	57 - 61	53	1.33	401132
125	62 - 65	53	1.30	401133
125	73 - 76	53	1.27	401134
150	78 - 81	53	1.70	401135
150	88 - 91	53	1.65	401136
150	98 - 102	53	1.60	401137
200	108 - 112	53	2.78	401138
200	114 - 118	53	2.72	401139
200	123 - 126	53	2.67	401140
200	128 - 132	53	2.62	401141
200	133 - 136	53	2.59	401142
200	137 - 141	53	2.56	401143
250	142 - 146	53	4.46	401144
250	158 - 162	53	4.35	401145
250	165 - 170	53	4.23	401146
250	177 - 181	53	4.11	401321
300	200 - 204	53	5.59	401147
300	209 - 212	53	5.49	401148
300	218 - 221	53	5.40	401149
300	222 - 225	53	5.31	401150
350	248 - 252	53	7.00	401151
350	272 - 275	53	6.90	401152



### APLEX Duo Wall Seals - Split Variant For Below Ground In-situ Pipe Installation

#### Assembly recommendations

Due to the possibility of micro-cracks present in core-bored holes (D1) in concrete or brick openings, the bore surface should be treated with a suitable sealant prior to installation of the APLEX Wall Sleeve.



#### APLEX duo wall seal with double sealing elements

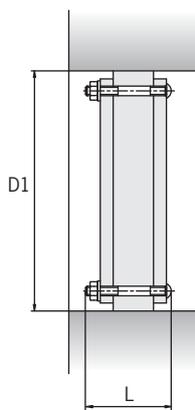
Core Dimension D1 (mm)	Pipe OD Range D2 (mm)	Overall Length L (mm)	Weight (kg)	Part No
80	25 - 28	78	0.70	401153
80	32 - 35	78	0.68	401154
80	36 - 40	78	0.66	401155
100	41 - 44	78	0.94	401156
100	47 - 51	78	0.92	401157
100	52 - 56	78	0.88	401158
125	57 - 61	78	1.66	401159
125	62 - 65	78	1.60	401160
125	73 - 76	78	1.54	401161
150	78 - 81	78	2.16	401162
150	88 - 91	78	2.04	401163
150	98 - 102	78	1.92	401164
200	108 - 112	78	3.56	401165
200	114 - 118	78	3.44	401166
200	123 - 126	78	3.34	401167
200	128 - 132	78	3.24	401168
200	133 - 136	78	3.18	401169
200	137 - 141	78	3.12	401170
250	142 - 146	78	5.64	401171
250	158 - 162	78	5.42	401172
250	165 - 170	78	5.18	401173
250	177 - 181	78	5.10	401322
300	200 - 204	78	6.98	401174
300	209 - 212	78	6.78	401175
300	218 - 221	78	6.60	401176
300	222 - 225	78	6.42	401177
350	248 - 252	78	8.40	401178
350	272 - 275	78	8.30	401179



## APLEX Mono Wall Seals - Solid Blanking Plug Variant

### Assembly recommendations

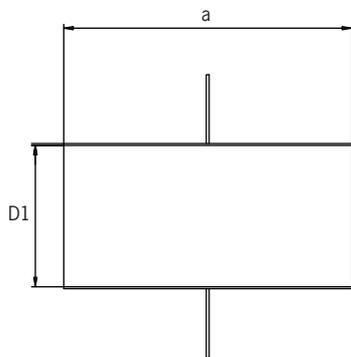
Due to the possibility of micro-cracks present in core-bored holes (D1) in concrete or brick openings, the bore surface should be treated with a suitable sealant prior to installation of the APLEX Wall Sleeve.



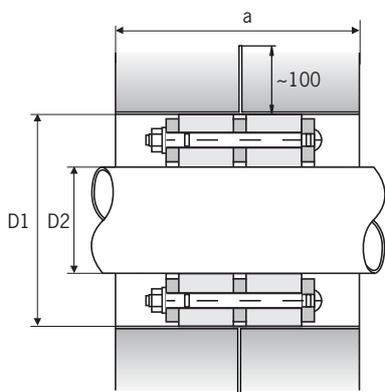
### Solid blanking plug wall seal with single sealing element

Core Dimension D1 (mm)	Overall Length L (mm)	Weight (kg)	Part No
50	53	0.5	401311
80	53	0.8	401312
100	53	1.0	401313
125	53	1.8	401314
150	53	2.6	401315
200	53	4.0	401316
250	53	6.2	401317
300	53	8.5	401318
350	53	11.6	401319

**Stainless Steel Liner**



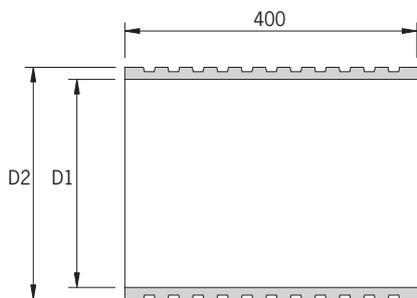
Material: 304 stainless steel



**Stainless steel APLEX wall seal liner**

Overall Liner Length a (mm)	Liner Bore Diameter D1 (mm)	Weight (kg)	Part No
300	50	2.0	98411
300	80	2.7	98412
300	100	3.1	98413
300	125	3.7	98414
300	150	4.3	98415
300	200	5.4	98416
300	250	6.5	98417
300	300	7.7	98418
300	350	8.8	98431
400	50	2.3	98419
400	80	3.1	98420
400	100	3.6	98421
400	125	4.3	98422
400	150	5.1	98423
400	200	6.4	98424
400	250	7.8	98425
400	300	9.2	98426
400	350	10.5	98432

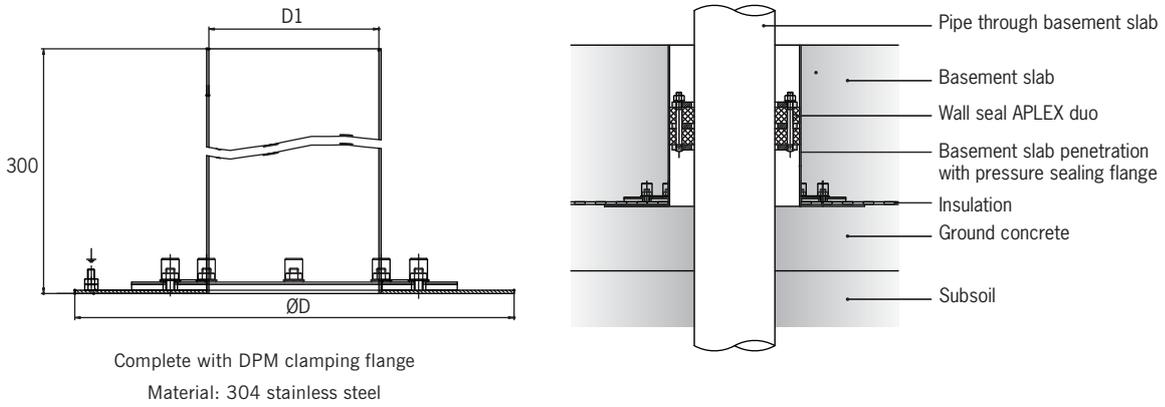
**APLEX wall penetration**



**Polyester resin concrete**

Penetration Bore Diameter D1 (mm)	Diameter D2 (mm)	Weight (kg)	Part No
100	130	4.5	70760
125	155	5.3	70762
200	230	12.5	70764
250	280	14.0	70766

**Basement Slab Penetration Unit**



**Slab penetration unit**

Flange Diameter D (mm)	Liner Bore Diameter D1 (mm)	Weight (kg)	Part No
50	250	2.3	405351
80	280	3.0	405352
100	300	3.6	405353
125	325	4.2	405354
150	350	4.8	405355
200	400	6.0	405356
250	450	7.9	405357
300	500	8.4	405358
350	550	9.7	405359



### Bespoke Roof Penetration Unit

#### Introduction

ACO Building Drainage can supply bespoke penetration solutions to suit individual applications where it is essential to provide waterproof pipe penetrations in roof or ceiling structures.

#### Benefits

- All stainless steel construction, pickle passivated for the ultimate in corrosion resistance.
- Available in fully welded 304 or 316 grade stainless steel.
- Supplied with mechanical waterproof membrane clamp.
- Single or multiple penetrations to suit application as required.

