



# 2024 Product Brochure



**The UK's Leading  
Expansion Specialists**

**Tel: 01524 389 494**

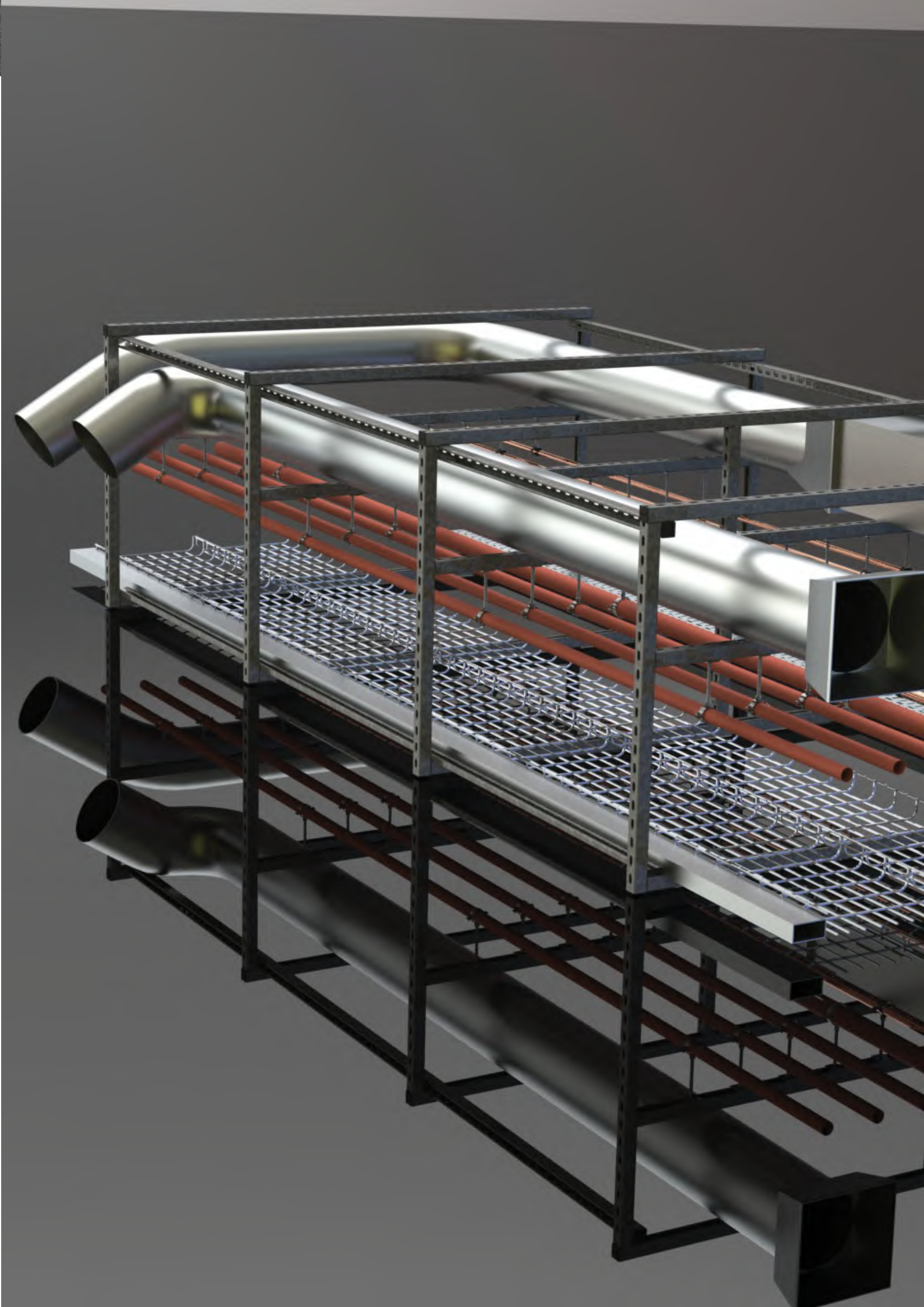
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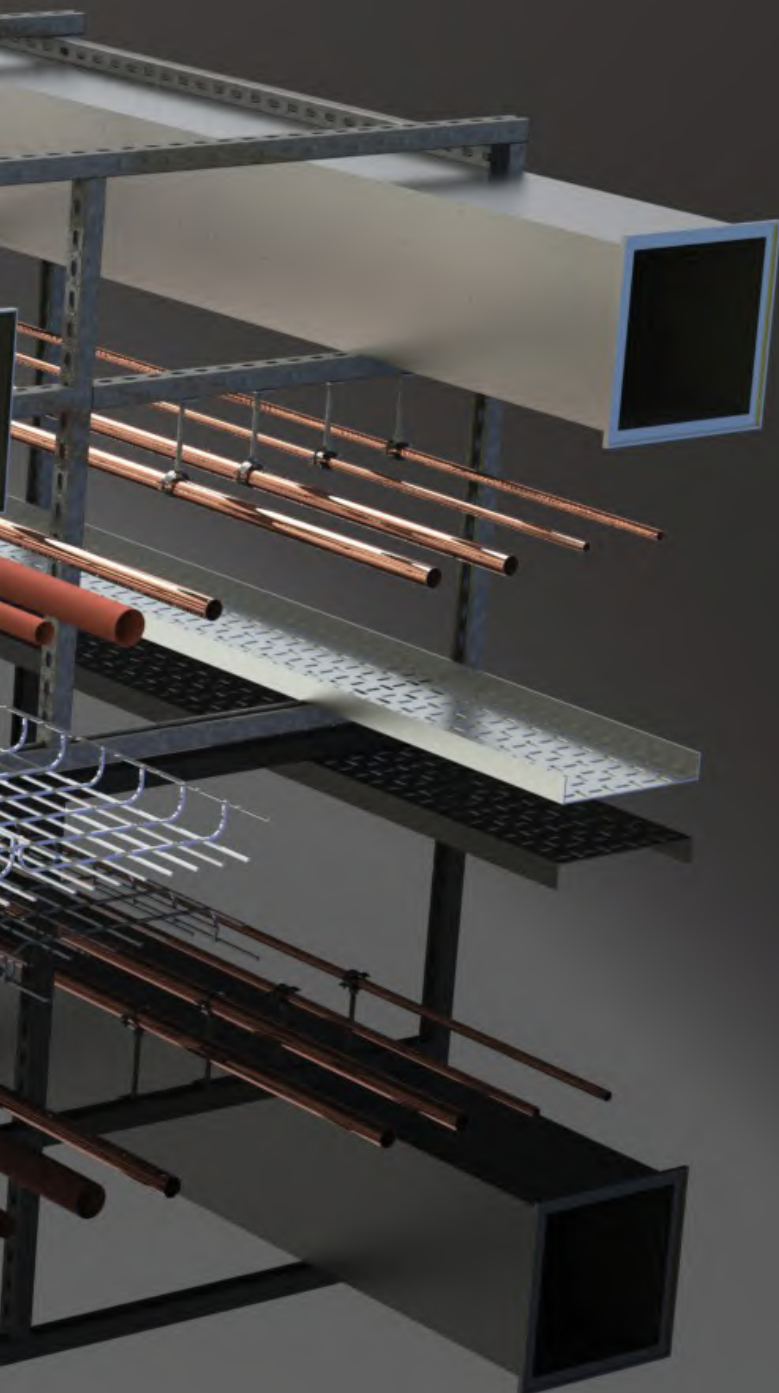
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Certificate Number **4185**  
**ISO 9001 14001 45001**







Since its opening in 1993 DST Group Ltd has been committed to providing quality products and services, professional technical support and the highest level of customer service.

DST Group Ltd is one of the leading manufacturers and distributors of engineering equipment in the UK today.

Our diverse range of products include:

1. Brackets & Pipe Support Systems
2. Expansion & Anti-vibration Equipment
3. Air & Dirt Removal Equipment

Based upon a firm technical background, our engineers can help, advise and design solutions to many aspects of site installation. We can offer stress analysis pipework systems.

In September 2004 we moved to our new 19,000 square foot warehouse and distribution centre in Morecambe, housing in excess of 1500 tonnes of stock. From this location we can supply equipment from stock on a next day service anywhere within mainland UK.

In May 2004, DST Group Ltd attained ISO 9001: 2000 Quality Management System and in February 2011, this was extended to include ISO 14001 and ISO45001 thus offering a totally integrated management system including Environmental Control and Health and Safety.

In addition we have a purpose built sales office which was completed in 2022, which we believe will help us exceed customer service levels beyond our current levels.





Pipe Support Systems

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Expansion & Anti Vibration

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Expansion Guide

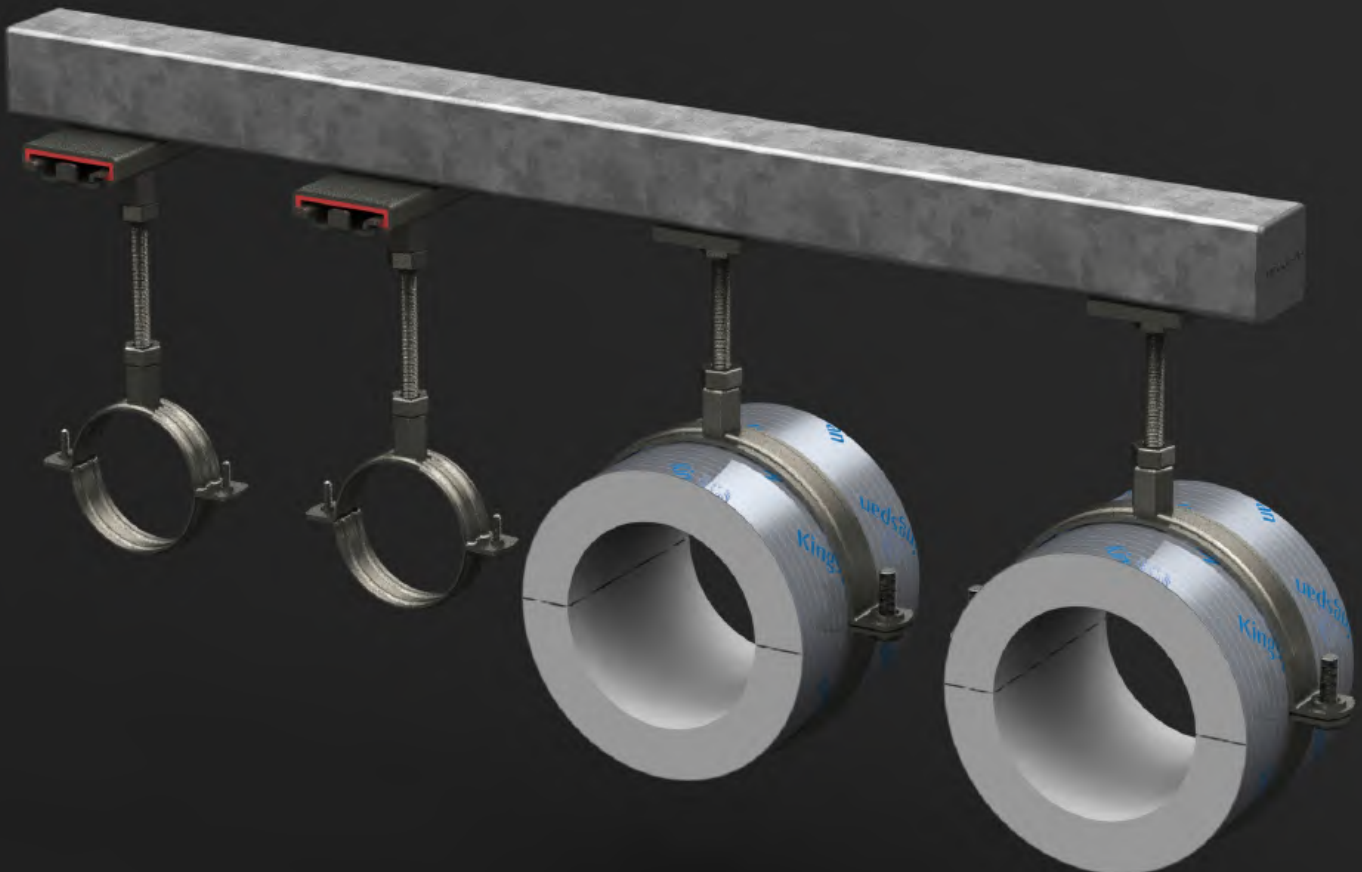
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## Construction

Mild Steel  
BZP Finish

## For Use With

Steel & Cast Iron Tubes  
Insulated Pipe Supports



Pipe Size	Grip Range (mm)	Boss Type	Screw (mm)	Material (mm)	Part Code
3/8"	15-20	M8/M10	M5 x 25	1 x 20	ULXL010
1/2"	19-23	M8/M10	M5 x 25	1 x 20	ULXL015
22mm	23-28	M8/M10	M5 x 25	1 x 20	ULXL020
3/4"	26-30	M8/M10	M5 x 25	1 x 20	ULXL022
1"	32-35	M8/M10	M5 x 25	1 x 20	ULXL025
1 1/4"	39-43	M8/M10	M5 x 25	1 x 20	ULXL032
1 1/2"	45-51	M8/M10	M5 x 25	1.2 x 20	ULXL040
54mm	54-58	M8/M10	M5 x 25	1.2 x 20	ULXL054
2"	60-65	M8/M10	M5 x 25	1.2 x 20	ULXL050
70mm	67-71	M8/M10	M5 x 25	1.2 x 20	ULXL070
2 1/2"	74-82	M8/M10	M6 x 30	1.5 x 25	ULXL065
85mm	82-89	M8/M10	M6 x 30	1.5 x 25	ULXL075
3"	91-98	M8/M10	M6 x 30	1.5 x 25	ULXL080
95mm	93-101	M8/M10	M6 x 30	1.5 x 25	ULXL095
105mm	102-109	M8/M10	M6 x 30	1.5 x 25	ULXL105
4"	109-117	M8/M10	M6 x 30	1.5 x 25	ULXL100
120mm	116-125	M8/M10	M6 x 30	1.5 x 25	ULXL120
130mm	129-141	M8/M10	M6 x 30	2 x 25	ULXL130
5"	136-146	M8/M10	M6 x 30	2 x 25	ULXL125
145mm	142-154	M8/M10	M6 x 30	2 x 25	ULXL145
6"	158-169	M8/M10	M6 x 30	2 x 25	ULXL150
175mm	166-177	M8/M10	M6 x 30	2 x 25	ULXL176

# Surefix XL Rubber Lined Clip

For Copper, Plastic and Stainless Steel Pipes

Created on: 15 Oct 2018  
Version: 5.05  
Last Updated: 16/12/2024



## Construction

Mild Steel

BZP Finish

## For Use With

Copper & Plastic Tubes

## Special Features

Rubber Lining tested to  
DIN4109 for Acoustic Use



Pipe Size	Grip Range (mm)	Boss Type	Screw (mm)	Material (mm)	Part Code
15cu	13-20	M8/M10	M5 x 25	1 x 20	RLXL015
18mm	17-23	M8/M10	M5 x 25	1 x 20	RLXL018
22cu	21-26	M8/M10	M5 x 25	1 x 20	RLXL022
28cu	26-30	M8/M10	M5 x 25	1 x 20	RLXL028
35cu	33-37	M8/M10	M5 x 25	1 x 20	RLXL035
42cu	40-46	M8/M10	M5 x 25	1.2 x 20	RLXL042
1 1/2"	48-53	M8/M10	M5 x 25	1.2 x 20	RLXL040
54cu	53-59	M8/M10	M5 x 25	1.2 x 20	RLXL054
2"	60-66	M8/M10	M5 x 25	1.2 x 20	RLXL050
67cu	67-77	M8/M10	M6 x 30	1.5 x 25	RLXL067
76cu	75-84	M8/M10	M6 x 30	1.5 x 25	RLXL076
3"	83-93	M8/M10	M6 x 30	1.5 x 25	RLXL080
95mm	94-104	M8/M10	M6 x 30	1.5 x 25	RLXL095
108cu	102-111	M8/M10	M6 x 30	1.5 x 25	RLXL108
4"	109-119	M8/M10	M6 x 30	1.5 x 25	RLXL100
120cu	122-135	M8/M10	M6 x 30	2 x 25	RLXL120
133cu	128-139	M8/M10	M6 x 30	2 x 25	RLXL133
5"	135-148	M8/M10	M6 x 30	2 x 25	RLXL125
159cu	151-164	M8/M10	M6 x 30	2 x 25	RLXL159
6"	158-170	M8/M10	M6 x 30	2 x 25	RLXL150





# 316 Stainless Steel Unlined Clip



## Construction

316 Stainless Steel

## For Use With

Trubore & Iso Stainless Steel  
tubes

Outdoor and salt water  
environments

Pipe Size	Grip Range (mm)	Boss Type	Screw (mm)	Material (mm)	Part Code
3/8"	15-19	M8/M10	M6x20	1.8x20	ULSS018
1/2"	20-25	M8/M10	M6x20	1.8x20	ULSS022
3/4"	26-30	M8/M10	M6x20	1.8x20	ULSS028
1"	32-36	M8/M10	M6x20	1.8x20	ULSS035
1-1/4"	38-43	M8/M10	M6x20	1.8x20	ULSS040
1-1/2"	47-51	M8/M10	M6x20	1.8x20	ULSS048
54mm	53-58	M8/M10	M6x20	1.8x20	ULSS054
2"	60-64	M8/M10	M6x20	1.8x20	ULSS060
70mm	68-72	M8/M10	M6x20	1.8x20	ULSS070
2-1/2"	75-80	M8/M10	M6x20	1.8x20	ULSS075
83mm	81-86	M8/M10	M6x20	1.8x20	ULSS083
3"	87-92	M8/M10	M6x20	1.8x20	ULSS090
3-1/2"	99-105	M8/M10	M6x20	1.8x20	ULSS100
110mm	107-112	M8/M10	M6x20	1.8x20	ULSS110
4"	113-118	M8/M10	M6x20	1.8x20	ULSS115
125mm	125-130	M8/M10	M6x20	1.8x20	ULSS125
5"	138-142	M8/M10	M6x20	1.8x20	ULSS140
6"	159-166	M8/M10	M6x20	1.8x20	ULSS160

# 316 Stainless Steel Backplate



## Construction

316 Stainless Steel

## Sizes

M8/M10 Dual Boss

**Part Code** - MRSF0810



## Construction

316 Stainless Steel  
EPDM Rubber Lining

## For Use With

Trubore & Iso Stainless Steel  
tubes  
Outdoor and salt water  
environments

Pipe Size	Grip Range (mm)	Boss Type	Screw (mm)	Material (mm)	Part Code
3/8"	15-19	M8/M10	M6x20	1.8x20	RLSS015
1/2"	20-25	M8/M10	M6x20	1.8x20	RLSS022
3/4"	26-30	M8/M10	M6x20	1.8x20	RLSS028
1"	32-36	M8/M10	M6x20	1.8x20	RLSS035
1-1/4"	38-43	M8/M10	M6x20	1.8x20	RLSS042
1-1/2"	47-51	M8/M10	M6x20	1.8x20	RLSS048
54mm	53-58	M8/M10	M6x20	1.8x20	RLSS054
2"	60-64	M8/M10	M6x20	1.8x20	RLSS060
67mm	68-73	M8/M10	M6x20	1.8x20	RLSS067
2-1/2"	75-80	M8/M10	M6x20	1.8x20	RLSS076
83mm	81-86	M8/M10	M6x20	1.8x20	RLSS090
3"	87-92	M8/M10	M6x20	1.8x20	RLSS095
3-1/2"	99-105	M8/M10	M6x20	1.8x20	RLSS100
110mm	107-112	M8/M10	M6x20	1.8x20	RLSS110
4"	113-118	M8/M10	M6x20	1.8x20	RLSS115
125mm	125-130	M8/M10	M6x20	1.8x20	RLSS125
5"	138-142	M8/M10	M6x20	1.8x20	RLSS140
160mm	159-166	M8/M10	M6x20	1.8x20	RLSS160



# Heavy Duty Surefix HD Unlined Clip

## For Steel Pipes & Insulated Pipe Supports

### Construction

Mild Steel  
BZP Finish

### For Use With

Steel & Cast Iron Tubes  
Insulated Pipe Supports



Pipe Size	Grip Range (mm)	Boss Type	Screw (mm)	Material (mm)	Part Code
50nb / 2"	60-68	M12	M8 x 25	25 x 2	HDUL050
67mm	66-73	M12	M8 x 25	25 x 2	HDUL060
65nb / 2 1/2"	74-81	M12	M8 x 25	25 x 2	HDUL065
85mm	82-88	M12	M8 x 25	25 x 2	HDUL075
80nb / 3"	88-97	M12	M8 x 25	25 x 2	HDUL080
100mm	93-100	M12	M8 x 25	25 x 2	HDUL085
105mm	101-109	M12	M8 x 25	30 x 2.5	HDUL095
100nb / 4"	110-118	M12	M8 x 25	30 x 2.5	HDUL100
120mm	116-126	M12	M10 x 40	30 x 3	HDUL110
135mm	130-141	M12	M10 x 40	30 x 3	HDUL120
125nb / 5"	136-145	M12	M10 x 40	30 x 3	HDUL125
145mm	144-154	M12	M10 x 40	30 x 3	HDUL140
150nb / 6"	160-169	M12	M10 x 40	30 x 3	HDUL150
175mm	170-180	M16	M10 x 40	30 x 3	HDUL180
200nb / 8"	219-230	M16	M10 x 40	30 x 3	HDUL200
210mm	202-214	M16	M10 x 40	30 x 3	HDUL210
245mm	245-255	M16	M10 x 40	30 x 3	HDUL245
250nb / 10"	273-283	M16	M10 x 40	30 x 3	HDUL250



# Heavy Duty Surefix HD Rubber Lined Clip

For Copper, Plastic and Stainless Steel Pipes

Created on: 15 Oct 2018  
Version: 5.05  
Last Updated: 16/12/2024



## Construction

Mild Steel BZP Finish

## For Use With

Copper & Plastic Tubes

## Special Features

Rubber Lining tested to DIN4109 for Acoustic Use



Pipe Size	Grip Range (mm)	Boss Type	Screw (mm)	Material (mm)	Part Code
67cu / 2"	60-69	M12	M8 x 25	25 x 2	HDRL050
76cu / 2 1/2"	75-81	M12	M8 x 25	25 x 2	HDRL065
80nb / 3"	83-91	M12	M8 x 25	25 x 2	HDRL075
108cu	102-112	M12	M8 x 25	30 x 2.5	HDRL105
125mm	122-138	M12	M10 x 40	30 x 3	HDRL110
125nb / 5"	136-147	M12	M10 x 40	30 x 3	HDRL125
155mm	153-164	M12	M10 x 40	30 x 3	HDRL140
200mm	196-209	M16	M10 x 40	30 x 3	HDRL180



# DST 100 - Split Band

For Steel Pipes and Insulated Pipe Supports



## Construction

Mild Steel  
BZP Finish  
c/w HT Sets & Nuts

## For Use With

Steel Tubes  
Cast Iron Tubes  
Insulated Pipe Supports

Other sizes available on request

Size ID (mm)	Size NB	Hole Centres (mm)	Bolt Size (mm)	Material Width & Thickness (mm)	Safe Working Load (Kg)	Part Code
21	15NB / 1/2"	50	M8 x 25	25 x 3	150	100ZP021
27	20NB / 3/4"	60	M8 x 25	25 x 3	150	100ZP027
34	25NB / 1"	64	M8 x 25	25 x 3	150	100ZP034
42	32NB / 1 1/4"	85	M10 x 30	30 x 3	150	100ZP042
45		88	M10 x 30	30 x 3	150	100ZP045
48	40NB / 1/2"	90	M10 x 30	30 x 3	150	100ZP048
54		90	M10 x 30	30 x 3	150	100ZP054
60	50NB / 2"	115	M10 x 30	30 x 3	150	100ZP060
65		115	M10 x 30	30 x 3	150	100ZP065
76	65NB / 2 1/2"	125	M10 x 30	30 x 3	260	100ZP076
83		130	M10 x 30	30 x 3	260	100ZP083
89	80NB / 3"	137	M10 x 30	30 x 3	260	100ZP089
95		143	M10 x 30	30 x 3	260	100ZP095
102		156	M10 x 30	30 x 3	280	100ZP102
108		162	M10 x 30	40 x 3	280	100ZP108
114	100 NB / 4"	175	M10 x 30	40 x 3	280	100ZP114
121		187	M10 x 30	40 x 3	280	100ZP121
127		190	M10 x 30	40 x 3	280	100ZP127
133		200	M10 x 30	40 x 3	280	100ZP133
140		205	M10 x 30	40 x 3	280	100ZP140
146		210	M10 x 30	40 x 3	280	100ZP146
152		218	M10 x 30	40 x 3	280	100ZP152
159		228	M12 x 40	40 x 3	380	100ZP159
168	150 NB / 6"	230	M12 x 40	40 x 3	410	100ZP168
173		240	M12 x 40	40 x 3	410	100ZP173
178		248	M12 x 40	40 x 3	440	100ZP178
186		258	M12 x 40	40 x 5	510	100ZP186
193		265	M12 x 40	40 x 5	540	100ZP193
199		276	M12 x 40	40 x 5	540	100ZP199
208		284	M12 x 40	40 x 5	540	100ZP208
216		290	M12 x 40	40 x 5	600	100ZP216
220	200 NB / 8"	300	M12 x 40	40 x 5	600	100ZP220
225		302	M12 x 40	40 x 5	600	100ZP225
232		310	M12 x 40	40 x 5	600	100ZP232
244		313	M12 x 40	40 x 5	600	100ZP244
252		318	M12 x 40	40 x 5	600	100ZP252
259		320	M12 x 40	40 x 5	600	100ZP259
268		336	M12 x 40	40 x 5	600	100ZP268
273	250 NB / 10"	360	M16 x 50	50 x 6	600	100ZP273
283		364	M16 x 50	50 x 6	700	100ZP283
290		374	M16 x 50	50 x 6	700	100ZP290
298		383	M16 x 50	50 x 6	700	100ZP298
308		405	M16 x 50	50 x 6	700	100ZP308
323	300 NB / 12"	420	M16 x 50	50 x 6	800	100ZP323
332		412	M16 x 50	50 x 6.5	800	100ZP332
344		424	M16 x 50	50 x 6.5	800	100ZP344
356	350 NB / 14"	436	M16 x 50	50 x 6.5	800	100ZP356
363		443	M16 x 50	50 x 6.5	800	100ZP363
373		453	M16 x 50	50 x 6.5	800	100ZP373
394		474	M16 x 50	50 x 6.5	800	100ZP394
406		486	M16 x 50	50 x 6.5	800	100ZP406

Tolerance +/-5mm

DST Group Ltd Reserves the right to alter / amend product data without prior notification

# DST 105 - Bossed Split Band

For Steel Pipes & Insulted Pipe Supports

Created on: 15 Oct 2018  
Version: 5.05  
Last Updated: 16/12/2024



## Construction

Mild Steel  
BZP Finish  
c/w HT Sets & Nuts

## For Use With

Steel Tubes  
Cast Iron Tubes  
Insulated Pipe Supports

Size ID (mm)	Size NB	Hole Centres (mm)	Bolt Size (mm)	Material Width & Thickness (mm)	Safe Working Load (Kg)	Part Code 105ZP(ANGLE)__(BOSS NUT)
21	15NB / 1/2"	50	M8 x 25	25 x 3	150	021 (M10)
27	20NB / 3/4"	60	M8 x 25	25 x 3	150	027 (M10)
34	25NB / 1"	64	M8 x 25	25 x 3	150	034 (M10)
42	32NB / 1 1/4"	85	M10 x 30	30 x 3	150	042 (M10)
45		88	M10 x 30	30 x 3	150	045 (M10)
48	40NB / 1/2"	90	M10 x 30	30 x 3	150	048 (M10)
54		90	M10 x 30	30 x 3	150	054 (M10)
60	50NB / 2"	115	M10 x 30	30 x 3	150	060 (M10)
65		115	M10 x 30	30 x 3	150	065 (M10)
76	65NB / 2 1/2"	125	M10 x 30	30 x 3	260	076 (M10)
83		130	M10 x 30	30 x 3	260	083 (M10)
89	80NB / 3"	137	M10 x 30	30 x 3	260	089 (M10)
95		143	M10 x 30	30 x 3	260	095 (M10)
102		156	M10 x 30	30 x 3	280	102 (M10)
108		162	M10 x 30	40 x 3	280	108 (M10)
114	100 NB / 4"	175	M10 x 30	40 x 3	280	114 (M10)
121		187	M10 x 30	40 x 3	280	121 (M12)
127		190	M10 x 30	40 x 3	280	127 (M12)
133		200	M10 x 30	40 x 3	280	133 (M12)
140		205	M10 x 30	40 x 3	280	140 (M12)
146		210	M10 x 30	40 x 3	280	146 (M12)
152		218	M10 x 30	40 x 3	280	152 (M12)
159		228	M12 x 40	40 x 3	380	159 (M12)
168	150 NB / 6"	230	M12 x 40	40 x 3	410	168 (M12)
173		240	M12 x 40	40 x 3	410	173 (M12)
178		248	M12 x 40	40 x 3	440	178 (M12)
186		258	M12 x 40	40 x 5	510	186 (M12)
193		265	M12 x 40	40 x 5	540	193 (M12)
199		276	M12 x 40	40 x 5	540	199 (M12)
208		284	M12 x 40	40 x 5	540	208 (M12)
216		290	M12 x 40	40 x 5	600	216 (M12)
220	200 NB / 8"	300	M12 x 40	40 x 5	600	220 (M12)
225		302	M12 x 40	40 x 5	600	225 (M12)
232		310	M12 x 40	40 x 5	600	232 (M12)
244		313	M12 x 40	40 x 5	600	244 (M12)
252		318	M12 x 40	40 x 5	600	252 (M12)
259		320	M12 x 40	40 x 5	600	259 (M12)
268		336	M12 x 40	40 x 5	600	268 (M12)
273	250 NB / 10"	360	M16 x 50	50 x 6	600	273 (M16)
283		364	M16 x 50	50 x 6	700	283 (M16)
290		374	M16 x 50	50 x 6	700	290 (M16)
298		383	M16 x 50	50 x 6	700	298 (M16)
308		405	M16 x 50	50 x 6	700	308 (M16)
323	300 NB / 12"	420	M16 x 50	50 x 6	800	323 (M16)

Tolerance +/-5mm

DST Group Ltd Reserves the right to alter / amend product data without prior notification





## Construction

Mild Steel

Nylon Coated Finish

c/w HT Sets & Nuts

## For Use With

Copper Tubes

Stainless Steel Tubes



Size ID (mm)	Size NB (cu)	Hole Centres (mm)	Bolt Size (mm)	Material Width & Thickness (mm)	Part Code
15	15	50	M8 x 25	25 x 3	130015
22	22	59	M8 x 25	25 x 3	130022
28	28	65	M8 x 25	25 x 3	130028
35	35	65	M8 x 25	25 x 3	130035
42	42	82	M10 x 30	30 x 3	130040
54	54	90	M10 x 30	30 x 3	130054
67	67	110	M10 x 30	30 x 3	130067
76	76	125	M10 x 30	30 x 3	130076
108	108	163	M10 x 30	40 x 3	130108
133	133	202	M10 x 30	40 x 3	130133
159	159	216	M10 x 30	40 x 3	130159

Tolerance +/-5mm

## Split Band Assembly Components

### DST 190 - Eye Bolt



#### Construction

Mild Steel BZP Finish

#### Sizes Available

M8, M10, M12, M16, M20  
Length - 100mm, 150mm, 200mm

### DST 200 - Link Eye



#### Construction

Cast Malleable Iron  
BZP Finish

#### Sizes Available

M8, M10, M12

### DST 203 - Bow Nut



#### Construction

Mild Steel  
BZP Finish

#### Sizes Available

M10, M12, M16, M20



### Construction

Mild Steel

BZP Finish

### For Use With

Steel Tubes

Cast Iron Tubes

Insulated Pipe Supports



Size ID (mm)	Size NB	Hole Centres (mm)	Max Bolt Size (mm)	Material Width & Thickness (mm)	Part Code
65		119	M12	30 x 3	102ZP065
76	65NB / 2 1/2"	144	M12	30 x 3	102ZP076
83		145	M12	30 x 3	102ZP083
89	80NB / 3"	163	M12	30 x 3	102ZP089
95		159	M12	30 x 3	102ZP095
102		166	M12	30 x 3	102ZP102
108		180	M12	40 x 3	102ZP108
114	100 NB / 4"	204	M12	40 x 3	102ZP114
121		192	M12	40 x 3	102ZP121
127		197	M12	40 x 3	102ZP127
133		204	M12	40 x 3	102ZP133
140		220	M12	40 x 3	102ZP140
146		212	M12	40 x 3	102ZP146
152		221	M12	40 x 3	102ZP152
159		228	M12	40 x 3	102ZP159
168	150 NB / 6"	238	M12	40 x 3	102ZP168
173		237	M12	40 x 3	102ZP173
178		247	M12	40 x 3	102ZP178
186		258	M12	40 x 3	102ZP186
193		262	M12	40 x 5	102ZP193
199		263	M12	40 x 5	102ZP199
208		268	M12	40 x 5	102ZP208
216		286	M12	40 x 5	102ZP216
220	200 NB / 8"	313	M12	40 x 5	102ZP220
225		297	M12	40 x 5	102ZP225
232		305	M12	40 x 5	102ZP232
244		313	M12	40 x 5	102ZP244

All Dimensions shown are indicative and should be confirmed ahead of use



# DST 132 Saddle



## Construction

Mild Steel  
Nylon Coated Finish

## For Use With

Copper Tubes  
Stainless Steel Tubes

Size ID (mm)	Size NB (cu)	Hole Centes (mm)	Bolt Size (mm)	Material Width & Thickness (mm)	Part Code
15	15	53	8	25 x 3	132015
22	22	60	8	25 x 3	132022
28	28	71	8	25 x 3	132028
35	35	74	8	25 x 3	132035
42	42	94	12	30 x 3	132042
54	54	108	12	30 x 3	132054
67	67	120	12	30 x 3	132067
76	76	130	12	30 x 3	132076
108	108	162	12	30 x 3	132108
133	133	197	14	40 x 3	132133
159	159	223	14	40 x 3	132159

All Dimensions shown are indicative and should be confirmed ahead of use

# DST 170 - Filbow Clamp

LPCB Approved for Steel Pipes



## Construction

Cold Rolled Mild Steel  
BZP Finish

## For Use With

Steel Tubes

Nominal Imperial	OD (mm)	Height	Width (mm)	Hole Ø	Material (mm)	Part Code
40nb / 1 1/2"	52	85.9	58.7	10.5	25 x 1.2	FIL040LPCB
50nb / 2"	66	99.9	65.7	10.5	25 x 1.2	FIL050LPCB
65nb / 2 1/2"	78	116	75.5	10.5	25 x 1.5	FIL065LPCB
80nb / 3"	92	132	84.5	10.5	25 x 1.5	FIL080LPCB
100nb / 4"	116	167.5	107.5	10.5	25 x 2	FIL100LPCB
150nb / 6"	170	238	150.5	13	32 x 3	FIL150LPCB



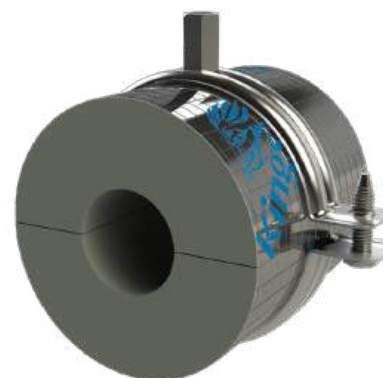


## Properties

CFC/HCFC-free with zero Ozone Depletion Potential (ODP)

High Closed Cell Content

Inert Bore Coated for use on all Pipes Including Copper



### General Physical Properties (Metric)

Property	Test Method	Unit	Typical Value		
Nominal Density		Kg/m <sup>3</sup>	60	80	120
Thermal Conductivity at +10°C	(EN 12667 2001)	W/m-K	0.031	0.036	0.045
Colour			Pink / Grey	Grey	Grey
Closed Cell Content	(EN ISO 4590) Method 1	%	>90%	>90%	>90%
Operating Temperature Limits	Upper Limit	°C	110	110	110
	Lower Limit	°C	-50	-50	-50

\* Factory applied low permeability multiple layer vapour Barrier jacket recommended for applications operating below 0°C.

## Notes:

BS EN ISO 845: 2009 (Cellular plastics and rubbers. Determination of apparent density).

BS EN 12667: 2001 (Thermal performance of building materials and products. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods.

Products of high and medium thermal resistance).

BS EN ISO 4590: 2016 (Rigid cellular plastics. Determination of the volume percentage of open cells and of closed cells).

BS EN ISO 5360: 2016 (Anaesthetic vaporisers. Agent-specific filling systems).

ASTM F 1249: 2020 (Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor).

BS EN 13501-1: 2018 (Fire classification of construction products and building elements - Classification using data from reaction to fire tests).

Size		Thickness							
		15mm	20mm	25mm	30mm	35mm	40mm	45mm	50mm
	15cu	PF015015	PF015020	PF015025	PF015030	PF015035	PF015040	PF015045	PF015050
1/2"	15nb/22cu	PF022015	PF022020	PF022025	PF022030	PF022035	PF022040	PF022045	PF022050
3/4"	20nb/28cu	PF028015	PF028020	PF028025	PF028030	PF028035	PF028040	PF028045	PF028050
1"	25nb/35cu	PF035015	PF035020	PF035025	PF035030	PF035035	PF035040	PF035045	PF035050
1 1/4"	32nb/42cu	PF042015	PF042020	PF042025	PF042030	PF042035	PF042040	PF042045	PF042050
1 1/2"	40nb/48cu	PF048015	PF048020	PF048025	PF048030	PF048035	PF048040	PF048045	PF048050
	54cu	PF054015	PF054020	PF054025	PF054030	PF054035	PF054040	PF054045	PF054050
2"	50nb/60	PF060015	PF060020	PF060025	PF060030	PF060035	PF060040	PF060045	PF060050
	67cu	PF067015	PF067020	PF067025	PF067030	PF067035	PF067040	PF067045	PF067050
2 1/2"	65nb/76cu	PF076015	PF076020	PF076025	PF076030	PF076035	PF076040	PF076045	PF076050
3"	80nb	PF089015	PF089020	PF089025	PF089030	PF089035	PF089040	PF089045	PF089050
4"	100nb/114	PF114015	PF114020	PF114025	PF114030	PF114035	PF114040	PF114045	PF114050
	108cu	PF108015	PF108020	PF108025	PF108030	PF108035	PF108040	PF108045	PF108050
5"	125nb/140	PF140015	PF140020	PF140025	PF140030	PF140035	PF140040	PF140045	PF140050
	133cu	PF133015	PF133020	PF133025	PF133030	PF133035	PF133040	PF133045	PF133050
6"	150nb/168	PF168015	PF168020	PF168025	PF168030	PF168035	PF168040	PF168045	PF168050
	159cu	PF159015	PF159020	PF159025	PF159030	PF159035	PF159040	PF159045	PF159050
8"	200nb/220	PF220015	PF220020	PF220025	PF220030	PF220035	PF220040	PF220045	PF220050

DST Group Ltd Reserves the right to alter / amend product data without prior notification



The **Rocktherm™** thermal pipe support inserts are manufactured from high density Stone Wool to suit a full range of diameters and thicknesses covering Copper, Steel and plastic pipes.

BS5970 2012 thermal insulation code of practice recommends the use of insulated pipe support inserts and that the pipe support bracket be fixed over load bearing insulation of the same material (or compatible with) the insulation on the pipe.

The **Rocktherm™** thermal pipe support inserts are supplied with a factory applied aluminium foil vapour Barrier and are cut to the required length. A half metal sleeve (or full if required) can be applied, often required from 48mm O/D and above.

The use of factory manufactured Stone Wool insulated load bearing thermal pipe support inserts will greatly reduce the risk of condensation on cold/chilled water pipe applications, providing continuous insulation and vapour resistance as well as enhancing the thermal insulation performance of the system. The thermal pipe support inserts should also be used on hot and heating pipe work for continuous thermal insulation and reduction in heat loss.

## Manufacturing Process

The **Rocktherm™** thermal pipe support inserts are manufactured from Paroc Pro Slab with a density of 200kg/m<sup>3</sup> as standard, an aluminium foil vapour Barrier is then adhered to the outer surface with an aqueous inorganic, non-combustible adhesive.

## Dimensional Stability

Although the material has a maximum service temperature of 660°C and maintains dimensional stability in slab form, the maximum service temperature for dimensional Stability as a pipe insert is **250 °C**

## Product Characteristics

PROPERTY	DESCRIPTION
Standard O/D Range	15mm to 205mm
	Other diameters available on request
Standard Wall Thickness	20mm to 100mm
	Other thicknesses available on request
Standard Lengths	80mm & 100mm
Nominal Density	200kg/m <sup>3</sup>

## Fire Test Classification (Rocktherm™ Pipe Support)

PROPERTY	TEST METHOD	RESULT
Reaction to fire	(BS EN 13501-1: 2018)	B <sub>L</sub> - s1, d0

# ROCKTHERM™





## Material

Hardwood - Kiln Dried

## Length

100mm (Tolerance of -1.5mm Maximum)

## Thickness

15, 20, 25, 30, 40, 50, 63, 75 (Other Thicknesses available upon request)

Tolerance on thickness not exceeding +/-1.5mm

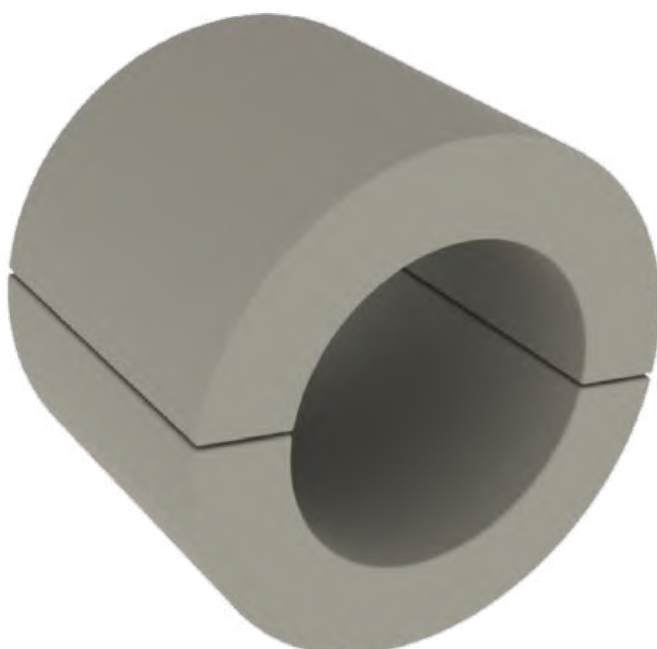
## Bore Sizes

Steel - 15nb, 20nb, 25nb, 32nb, 40nb, 50nb, 65nb, 80nb, 100nb, 125nb, 150nb, 200nb, 250nb, 300nb

Copper - 15cu, 22cu, 28cu, 35cu, 42cu, 54cu, 67cu, 76cu, 108cu, 133cu, 159cu.

Plastic - Available upon request.

# Calcium Silicate Insulation



## Description

A tough and durable calcium silicate insulation offering exceptional thermal efficiency on hot process applications. Non combustible, it is an inert material, containing no asbestos.

## Appearance

White/off white rigid insulation.

## Product Application

Calcium Silicate is an ideal insulation material for high temperature pipes. Used throughout the Petrochemical, Power Generation, Furnace and primary aluminium sectors, Calcium Silicate combines excellent thermal efficiency with high compressive strength, able to withstand foot traffic.

Typical Product Performance		
	Insulite 650	Promasil 1000
Maximum Service Temp:	650°C	1050°C
Age Density:	220kg/m <sup>3</sup>	265kg/m <sup>3</sup>
Compressive Strength:	0.8 Mpa	1.6Mpa
Combustibility:	Non-comb	Non-comb
Linear Shrinkage:	<2%	1.4%
Flexural Strength:	0.4 Mpa	0.8 Mpa
Thermal Conductivity @ 200°C	0.06W/mK	0.07W/mK



# DST 104 S/E 'U' Bolt

For Steel Pipes & Insulated Pipe Supports

## Construction

Mild Steel  
BZP Finish  
c/w 4 hex nuts

## For Use With

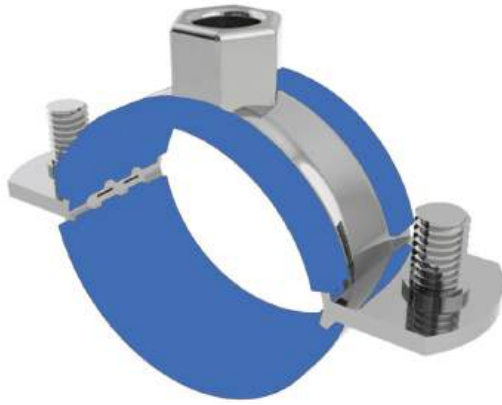
Steel Tubes  
Cast Iron Tubes  
Insulated Pipe Supports

Size ID (mm)	Rod Dia (mm)	Thread Length (mm)	Stock Code
21	M6	30	104ZP 21 030 06
27	M6	30	104ZP 27 030 06
34	M6	30	104ZP 34 030 06
42	M10	40	104ZP 42 040 10
45	M10	89	104ZP 45 089 10
48	M10	40	104ZP 48 040 10
51	M10	89	104ZP 51 089 10
56	M10	89	104ZP 56 089 10
60	M10	40	104ZP 60 040 10
62	M10	89	104ZP 62 089 10
67	M10	89	104ZP 67 089 10
72	M10	89	104ZP 72 089 10
76	M10	40	104ZP 76 040 10
78	M10	89	104ZP 78 089 10
85	M10	89	104ZP 85 089 10
86	M10	89	104ZP 86 089 10
89	M12	40	104ZP 89 040 12
91	M10	103	104ZP 91 103 10
97	M10	89	104ZP 97 089 10
104	M10	89	104ZP 104 089 10
110	M10	89	104ZP 110 089 10
114	M12	40	104ZP 114 040 12
116	M10	89	104ZP 116 089 10
123	M10	89	104ZP 123 089 10
129	M12	89	104ZP 129 089 12
135	M12	89	104ZP 135 089 12
140	M12	40	104ZP 140 040 12
141	M12	103	104ZP 141 103 12
146	M12	89	104ZP 146 089 12
150	M12	89	104ZP 150 089 12
154	M12	89	104ZP 154 089 12
161	M12	103	104ZP 161 103 12
166	M12	89	104ZP 166 089 12
168	M12	50	104ZP 168 050 12
170	M12	103	104ZP 170 103 12
175	M12	103	104ZP 175 103 12
180	M12	103	104ZP 180 103 12
185	M12	103	104ZP 185 103 12
191	M12	103	104ZP 191 103 12
195	M12	103	104ZP 195 103 12
201	M12	103	104ZP 201 103 12
208	M12	103	104ZP 208 103 12
212	M12	103	104ZP 212 103 12
216	M12	103	104ZP 216 103 12
220	M12	50	104ZP 220 050 12
222	M12	117	104ZP 222 117 12



Size ID (mm)	Rod Dia (mm)	Thread Length (mm)	Stock Code
225	M16	50	104ZP 225 050 16
228	M12	103	104ZP 228 103 12
234	M12	103	104ZP 234 103 12
240	M12	103	104ZP 240 103 12
246	M12	103	104ZP 246 103 12
254	M16	103	104ZP 254 103 16
260	M16	103	104ZP 260 103 16
264	M16	103	104ZP 264 103 16
268	M16	103	104ZP 268 103 16
273	M16	50	104ZP 273 050 16
275	M16	117	104ZP 275 117 16
277	M16	50	104ZP 277 050 16
285	M16	117	104ZP 285 117 16
292	M16	117	104ZP 292 117 16
301	M16	117	104ZP 301 117 16
310	M16	117	104ZP 310 117 16
323	M16	50	104ZP 323 050 16
325	M16	117	104ZP 325 117 16





## Construction

Mild Steel  
BZP Finish

## For Use With

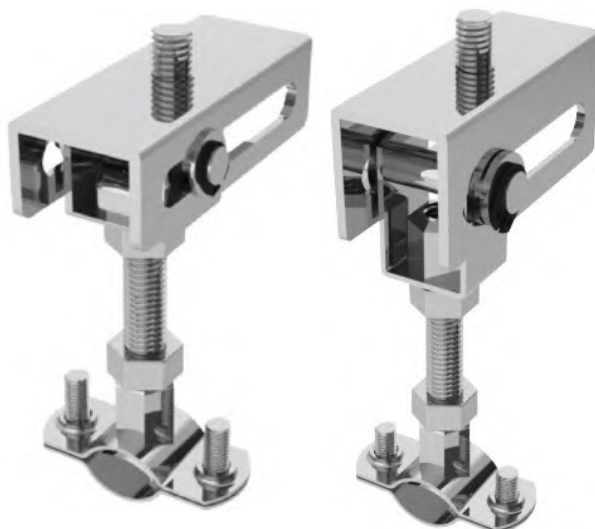
Copper & Plastic Tubes

## Special Features

Silicon Low Friction Lining

Size (mm)	Boss Size	Material Type	Temperature Limits °C	Part Code
16	M10	20 x 1	-10 to +90	GC16
20	M10	20 x 1	-10 to +90	GC20
25	M10	20 x 1	-10 to +90	GC25
32	M10	20 x 1	-10 to +90	GC32
40	M10	20 x 1.2	-10 to +90	GC40
50	M10	20 x 1.2	-10 to +90	GC50
56	M10	20 x 1.2	-10 to +90	GC56
63	M10	25 x 1.5	-10 to +90	GC63

## Expansion Products DSTMS1 & 2 Modular Slide Guide



MS1 Slimline

MS2 Standard

## Construction

Mild Steel  
BZP Finish

## For Use With

Unlined & Rubber Lined  
Brackets to Create a Guided  
System

Type	Internal Thread	Max Travel	SWL
MS1	M10	50mm	0.25kN
MS2	M8/M10	50mm	0.25kN

## Construction

Mild Steel BZP Finish

## For Use With

Unlined & Lined Clip Range &  
Hanging brackets to reduce  
drop rod lateral loads

## DST - Ball Hanger



Size	Movement	SWL
M8	+/-5°	1.5kN
M10	+/-5°	2.0kN
M12	+/-5°	2.5kN



### Construction

Mild Steel BZP Finish  
Low Friction Slide Insert

### For Use With

Unlined & Rubber Lined Clips  
Surefix HD on Larger Sizes

### Special Features

Dual & Triple Bossed  
Lockable for transport



Type	Internal Thread	External Thread	Max Travel	SWL
LF1	M8/M10	N/A	65mm	0.5kN
LF2-1	M10	M16	90mm	2.0kN
LF2-2	M10	M16	120mm	2.0kN
LF3-1	M12/M16	1/2"	120mm	6.0kN
LF3-2	M12/M16	1/2"	135mm	6.0kN

LF1		LF2-*		LF3-*	
		LF2-1	LF2-2	LF3-1	LF3-2

Steel		Steel	CU						
NB	NB	OD	OD	LF1-***UL	LF1-***RL	LF2-*-***UL	LF2-*-RL	LF3-*-UL	LF3-*-RL
			15		LF1-015RL		LF2-*-015RL		LF3-*-015RL
		18		LF1-018UL	LF1-018RL	LF2-*-018UL	LF2-*-018RL	LF3-*-018UL	LF3-*-018RL
	15	21	22	LF1-021UL	LF1-022RL	LF2-*-021UL	LF2-*-022RL	LF3-*-021UL	LF3-*-022RL
3/4"	20	27	28	LF1-027UL	LF1-028RL	LF2-*-027UL	LF2-*-028RL	LF3-*-027UL	LF3-*-028RL
1"	25	34	35	LF1-034UL	LF1-035RL	LF2-*-034UL	LF2-*-035RL	LF3-*-034UL	LF3-*-035RL
1 1/4"	32	42	42	LF1-042UL	LF1-042RL	LF2-*-042UL	LF2-*-042RL	LF3-*-042UL	LF3-*-042RL
1 1/2"	40	48		LF1-048UL	LF1-048RL	LF2-*-048UL	LF2-*-048RL	LF3-*-048UL	LF3-*-048RL
			54		LF1-054RL		LF2-*-054RL		LF3-*-054RL
2"	50	60		LF1-060UL	LF1-060RL	LF2-*-060UL	LF2-*-060RL	LF3-*-060UL	LF3-*-060RL
			67				LF2-*-067RL		LF3-*-067RL
2 1/2"	65	76	76			LF2-*-076UL	LF2-*-076RL	LF3-*-076UL	LF3-*-076RL
3"	80	89				LF2-*-089UL	LF2-*-089RL	LF3-*-089UL	LF3-*-089RL
			108				LF2-*-108RL		LF3-*-108RL
4"	100	114				LF2-*-114UL	LF2-*-114RL	LF3-*-114UL	LF3-*-114RL

### HEAVY DUTY

				LF3-*-***HDUL		LF3-*-***HDRL	
			133				LF3-*-133HDRL
5"	125	140				LF3-*-140HDUL	LF3-*-140HDRL
			159				LF3-*-159HDRL
6"	150	168				LF3-*-168HDUL	LF3-*-168HDRL
8"	200	220				LF3-*-220HDUL	LF3-*-220HDRL
10"	250	273				LF3-*-273HDUL	LF3-*-273HDRL
MAXIMUM TRAVEL				60mm	LF2-1 90mm	LF2-2 120mm	LF3-1 120mm
							LF3-2 135mm

# DST AAB - Adjustable Anchor Bracket

For Steel, Copper & Stainless Steel Pipes

Created on: 15 Oct 2018  
 Version: 5.05  
 Last Updated: 16/12/2024



The DST AAB Adjustable Anchor Bracket banks either 2 or 3 Split bands on a set of Steel cleats which can be adjusted for height and fall.

As a standard up to 159mm od bands will be powder coated, with other sizes BZP up to 168mm od for Steel pipes or powder coated for Copper & Stainless Steel.

Other band combinations are available upon request including brass, Stainless Steel & thicker profile Steel bands.

DST Group recommends the use of "STOPS" to prevent the pipe from slipping through anchor brackets. The safe working load indicated is based on the capability of the anchor without stops fitted.

## Construction

Mild Steel BZP Finish

High Tensile BZP Set Screws

## For Use With

Copper, Steel & Stainless Steel pipes

## Special Features

Adjustable Height & Angle to facilitate fall in pipework.

Pipe Size	Band Material	Band QTY	Finish	SWL (kN)	Part Code	Torque Settings
15	25 x 3	2	Black Powder Coat	2.0	AAB1NC015	40nm
22	25 x 3	2	Black Powder Coat	2.0	AAB1NC022	40nm
28	25 x 3	2	Black Powder Coat	2.0	AAB1NC028	40nm
15	25 x 3	2	Black Powder Coat	2.0	AAB1NC022	40nm
20	25 x 3	2	Black Powder Coat	2.0	AAB1NC028	40nm
25	25 x 3	2	Black Powder Coat	2.0	AAB2NC035	40nm
15	25 x 3	3	Black Powder Coat	3.0	AAB2NC015	40nm
22	25 x 3	3	Black Powder Coat	3.0	AAB2NC022	40nm
28	25 x 3	3	Black Powder Coat	3.0	AAB2NC028	40nm
35	25 x 3	3	Black Powder Coat	3.0	AAB2NC035	40nm
42	30 x 3	3	Black Powder Coat	6.5	AAB2NC042	60nm
54	30 x 3	3	Black Powder Coat	6.5	AAB2NC054	60nm
67	30 x 3	3	Black Powder Coat	6.5	AAB2NC067	60nm
76	30 x 3	3	Black Powder Coat	6.5	AAB2NC076	60nm
108	40 x 3	3	Black Powder Coat	8.0	AAB2NC108	60nm
133	40 x 3	3	Black Powder Coat	8.0	AAB2NC133	60nm
159	40 x 3	3	Black Powder Coat	8.0	AAB2NC159	60nm
15	25 x 3	3	Black Powder Coat	3.0	AAB2NC022	40nm
20	25 x 3	3	Black Powder Coat	3.0	AAB2NC028	40nm
25	25 x 3	3	Black Powder Coat	3.0	AAB2NC035	40nm
32	30 x 3	3	Black Powder Coat	3.0	AAB2NC042	60nm
40	30 x 3	3	BZP	6.5	AAB2ZP048	60nm
50	30 x 3	3	BZP	6.5	AAB2ZP060	60nm
65	30 x 3	3	BZP	6.5	AAB2ZP076	60nm
80	30 x 3	3	BZP	6.5	AAB2ZP080	60nm
100	40 x 3	3	BZP	8.0	AAB2ZP114	60nm
125	40 x 3	3	BZP	8.0	AAB2ZP140	60nm
150	40 x 3	3	BZP	8.0	AAB2ZP168	60nm





## DST 240 G/M/B/C - Munsen Rings



240G = Galvanised    240M = Malleable Iron    240B = Cast Brass

240C = Chrome

Size	Thread	Stock Code
15mm	M10	MR (Finish) 015
20mm	M10	MR (Finish) 020
25mm	M10	MR (Finish) 025
32mm	M10	MR (Finish) 032
40mm	M10	MR (Finish) 040
50mm	M10	MR (Finish) 050
65mm	M12	MR (Finish) 065
80mm	M12	MR (Finish) 080
100mm	M12	MR (Finish) 100
125mm	M12	MR (Finish) 125
150mm	M12	MR (Finish) 150

## 241 G/M/B/C - School Board Clips



241G = Galvanised    241M = Malleable Iron    241B = Cast Brass

241C = Chrome

Size	Stock Code
15mm	SB (Finish) 015
20mm	SB (Finish) 020
25mm	SB (Finish) 025
32mm	SB (Finish) 032
40mm	SB (Finish) 040

Size	Stock Code
50mm	SB (Finish) 050
65mm	SB (Finish) 065
80mm	SB (Finish) 080
100mm	SB (Finish) 100





DST 242 G/M/B/C - Backplates



242G = Galvanised    242M = Malleable Iron    242B M10 Male & Female Threads



242C M10 Male & Female Threads

Fixing	Thread	Finish	Stock Code
Male	M10	Brass	MRBM10
Female	M10	Brass	MRBF10
Female	M10	Malleable	MRMF10
Female	M10	Galvanised	MRGF10
Female	M8/M10	BZP	MRZF0810
Female	M10	Chrome	MRCPF10
Male	M10	Chrome	MRCPM10



## Construction

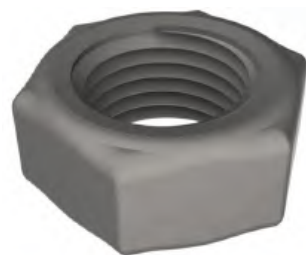
Steel Grade 8.8 DIN934.  
Cold Formed.  
BZP Finish

## Sizes Available

M4, M5, M6, M8, M10,  
M12, M16, M20, M24

Size	Part Code
M4	NUZP04
M6	NUZP06
M8	NUZP08
M10	NUZP10
M12	NUZP12
M16	NUZP16
M20	NUZP20

## High Tensile Nut



## Construction

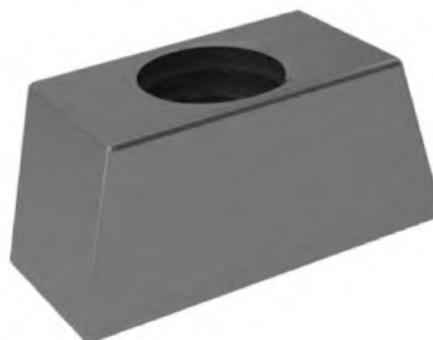
Mild Steel  
BZP Finish

## Sizes Available

M6, M8, M10 & M12

Size	Part Code
M6	WNEL06
M8	WNEL08
M10	WNEL10
M12	WNEL12

## Wedge Nut



## Construction

Mild Steel  
Electro Plated

## Sizes Available

M8, M10 & M12

Size	Part Code
M8	FC08
M10	FC10
M12	FC12

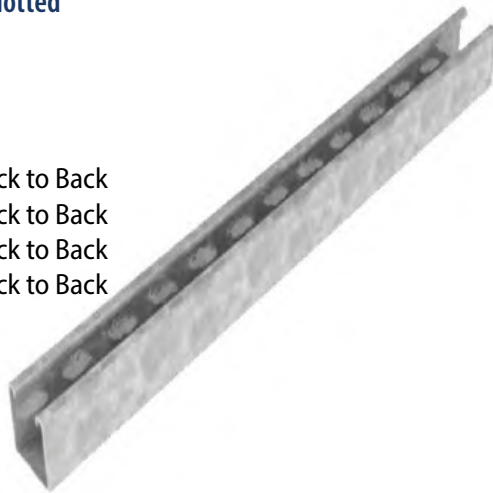
## Flange Clamp





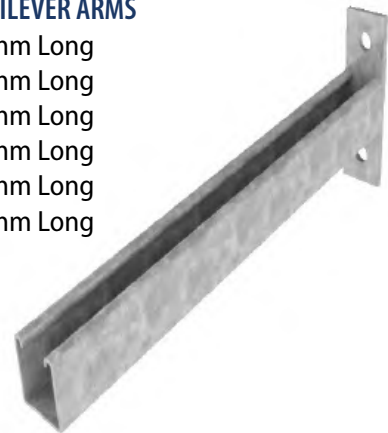
## STRUT: Plain or Slotted

41 x 41 x 6m  
41 x 41 x 3m  
41 x 21 x 6m  
41 x 21 x 3m  
41 x 41 x 6m Back to Back  
41 x 41 x 3m Back to Back  
41 x 21 x 6m Back to Back  
41 x 21 x 3m Back to Back



## CANTILEVER ARMS

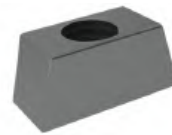
150mm Long  
300mm Long  
450mm Long  
600mm Long  
750mm Long  
900mm Long



STUDDING 1m & 3m



NUTS



WEDGE NUTS



WASHERS



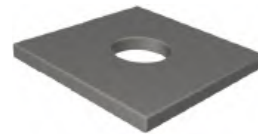
BOLTS & SETS



PURLIN CLIPS



CHANNEL NUTS



DST01



DST02



DST03



DST04



DST05



DST06



DST07



DST08



DST09  
41 x 21



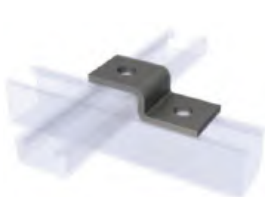
DST10  
41 x 41 DST11



DST12



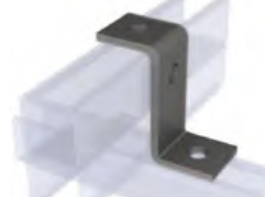
DST13



DST14



DST15



DST16



DST17



DST18



DST19



DST20



DST21



DST23



DST25



DST26



DST27



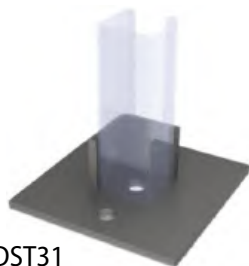
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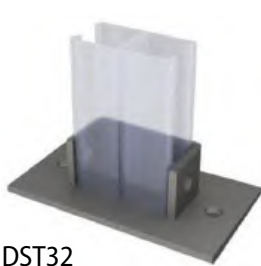
DST29



DST30



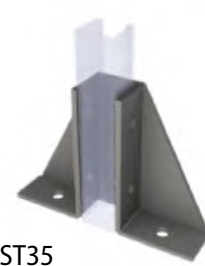
DST31



DST32



DST33



DST35



DST37



DST38



DST39



DST40



DST41



DST42



DST42



DST44



DST45



DST46



DST47



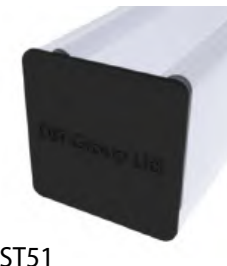
DST48



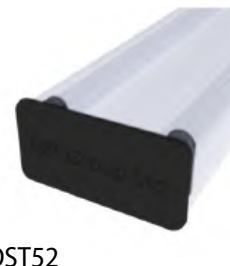
DST49



DST50

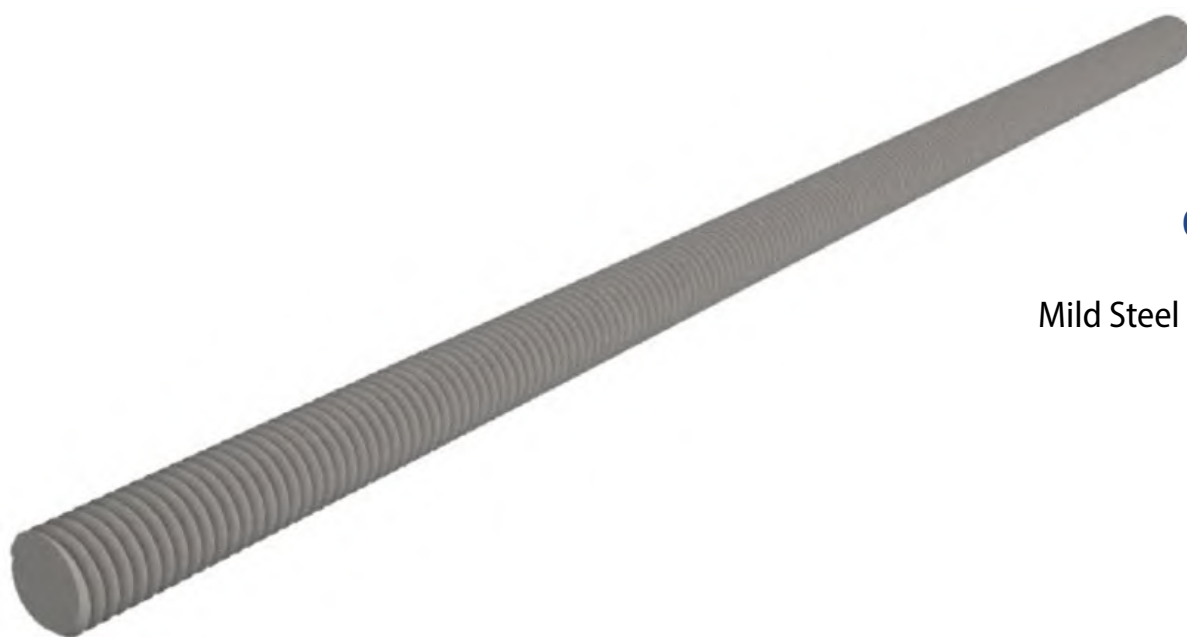


DST51



DST52





## Construction

Mild Steel 4.8 Grade to  
DIN 975

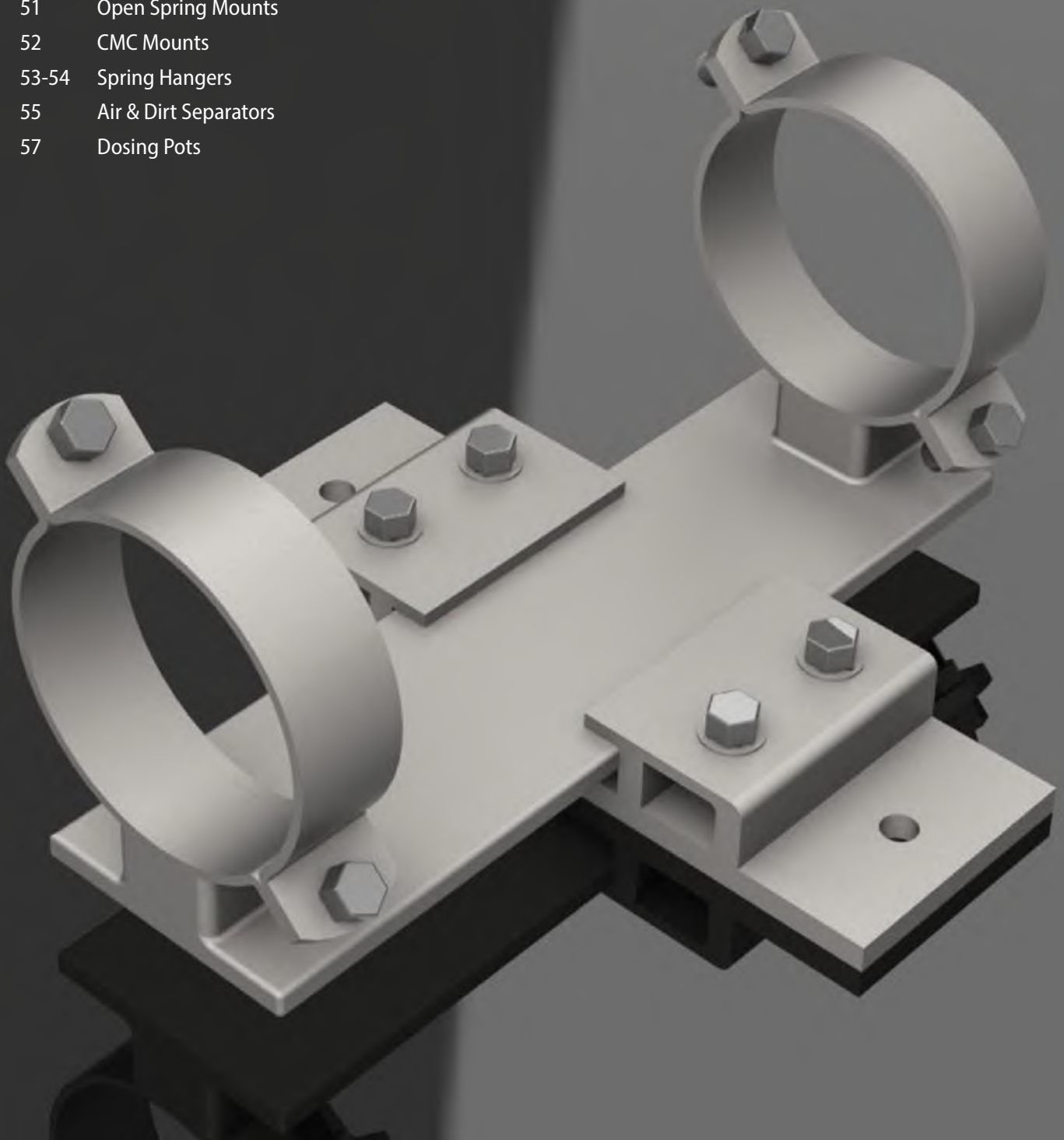
BZP Finish

Standard Lengths	Cut Lengths (mm)		
Size (Part Code)	Size (Part Code)	Size (Part Code)	Size (Part Code)
M6 x 1m (ST061)	M10 x 25 (STCU025)	M10 x 160 (STCU160)	M10 x 350 (STCU350)
M6 x 3m (ST063)	M10 x 30 (STCU030)	M10 x 170 (STCU170)	M10 x 360 (STCU360)
M8 x 3m (ST083)	M10 x 40 (STCU040)	M10 x 180 (STCU180)	M10 x 370 (STCU370)
M10 x 1m (ST101)	M10 x 50 (STCU050)	M10 x 200 (STCU200)	M10 x 390 (STCU390)
M10 x 3m (ST103)	M10 x 60 (STCU060)	M10 x 210 (STCU210)	M10 x 400 (STCU400)
M12 x 1m (ST123)	M10 x 70 (STCU070)	M10 x 220 (STCU220)	M10 x 450 (STCU450)
M16 x 1m (ST161)	M10 x 80 (STCU080)	M10 x 230 (STCU230)	M10 x 465 (STCU465)
M16 x 3m (ST163)	M10 x 90 (STCU090)	M10 x 240 (STCU240)	M10 x 500 (STCU500)
	M10x100 (STCU100)	M10 x 250 (STCU250)	M10 x 550 (STCU550)
	M10 x 110 (STCU110)	M10 x 275 (STCU275)	M10 x 580 (STCU580)
	M10 x 120 (STCU120)	M10 x 280 (STCU280)	M10 x 600 (STCU600)
	M10 x 125 (STCU125)	M10 x 300 (STCU300)	M10 x 650 (STCU650)
	M10 x 130 (STCU130)	M10 x 310 (STCU310)	M10 x 700 (STCU700)
	M10 x 140 (STCU140)	M10 x 320 (STCU320)	M10 x 750 (STCU750)
	M10 x 150 (STCU150)	M10 x 340 (STCU340)	M10 x 800 (STCU800)

# Expansion & Anti-Vibration



33	AX2 Axial Bellows
34	AX3 Screwed Axial Bellows
35	AX3(SPE) Axial Bellows c/w Stainless Pipe Ends
36	FA1 & FA2 Fully Articulated Bellows
37	AN1 & AN2 Angular Bellows
38	GI1 & GI2 Gimbal Bellows
39	Untied EPDM Pump Flexibles
40	Tied EPDM Pump Flexibles
41	Screwed EPDM Pump Flexibles
44	FA3 Stainless Steel Pump Flexibles
45	EPDM Hoses
46	Stainless Steel Hoses
48	Inertia Bases
49	Enclosed Spring Mounts
50	Restrained Spring Mounts
51	Open Spring Mounts
52	CMC Mounts
53-54	Spring Hangers
55	Air & Dirt Separators
57	Dosing Pots





### Key Points

Requires fully guiding

Available for any temperature or pressure

Supplied with CE Certs where applicable

Internal flow liner as standard

Bellows are Pre-cold drawn

### DST Type AX2 Axial Bellows

Designed to accept linear expansion on Copper and Stainless Steel pipe systems.

Standard product details are shown below, although these may vary dependant upon application and PED requirements.



### Material Specification

Flanges:	Carbon Steel PN16 with Stainless Steel facings (Stainless Steel to all wetted areas)
Convolutions:	316 Stainless Steel
Internal Sleeve:	316 Stainless Steel

### Working Conditions

Pressure:	16 Bar
Temperature:	120 Degrees C
Test:	1.5x Working

### PED Requirements

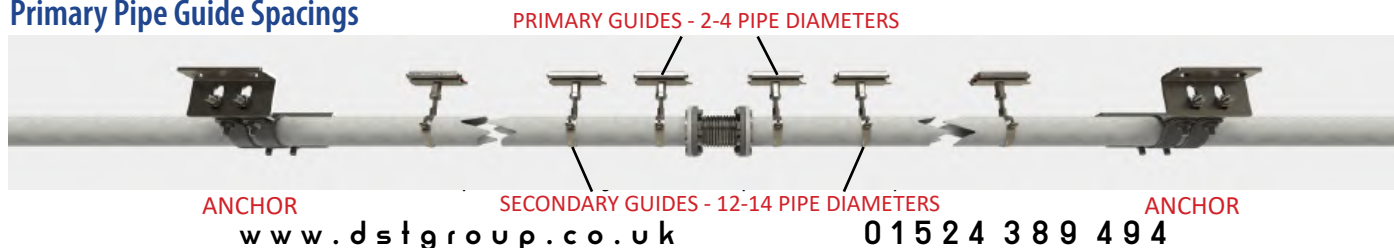
All Bellows supplied by DST Group Ltd are manufactured and certified in accordance with EU PED Legislation and as such carry the relevant CE certification where required.

Size (mm)	Axial Compression (mm)	Installed Length	Effective Area cm <sup>2</sup>	Force to Compress N/mm	Part Code
32nb / 35cu	30	130	12.8	37	AX2032
40nb / 42cu	30	130	19.0	37	AX2040
50nb / 54cu	50	225	35.6	55	AX2050
65nb / 67cu	50	225	46.5	87	AX2065
80nb / 76cu	50	230	61.7	90	AX2080
100nb / 108cu	50	230	103.2	116	AX2100
125nb / 133cu	60	240	177.5	118	AX2125
150nb / 159cu	60	240	253.6	166	AX2150
200nb	70	275	453.5	176	AX2200
250nb	50	306	684.6	276	AX2250

The anchor loads generated by this type of axial expansion compensator are high. A bracket guide with a low frictional resistance should be used.

Please note these units are not suitable for use on a drop rod system and need to be suitably guided (e.g. DST LF Slide Guide or DST 253 Slide Guide). Please consult the expansion compensator application guide for positioning of anchor points and subsequent support centres.

### Primary Pipe Guide Spacings





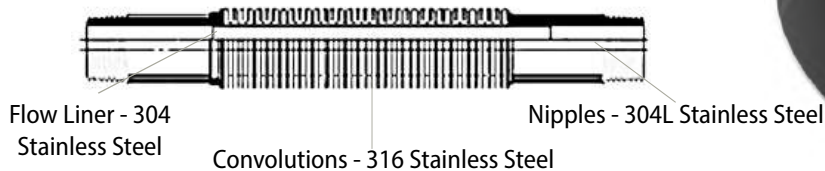


### Key Points

- Requires fully guiding
- Available in any temperature or pressure
- Supplied with CE certs where applicable
- Internal flow liner as standard
- Bellows are pre-cold drawn



### Material Specification



### DST Type AX3 Axial Bellows

Designed to accept linear expansion on Steel & Copper pipe systems.

### Working Conditions

Pressure:	Standard 10 Bar (Upto 16 Bar - Dependant on PED conditions)
Temperature:	120 Degrees C
Test:	1.5x Working

### PED Requirements

All Bellows supplied by DST Group Ltd are manufactured and certified in accordance with EU PED Legislation and as such carry the relevant CE certification where required.

Size (mm)	Axial Compression (mm)	Installed Length	Effective Area cm <sup>2</sup>	Force to Compress N/mm	Part Code
15	25	200	3	11.76	AX325015
20	25	200	6	7.84	AX325020
25	25	200	9	8.82	AX325025
32	25	210	13	10.78	AX325032
40	25	220	20	21.56	AX325040
50	25	250	30	17.64	AX325050
15	50	300	3	11.76	AX3N5015
20	50	300	6	7.84	AX3N5020
25	50	300	9	8.82	AX3N5025
32	50	310	13	10.78	AX3N5032
40	50	320	20	21.56	AX3N5040
50	50	350	30	17.64	AX3N5050

The anchor loads generated by using this type of axial expansion compensator are high. It is worth keeping in mind the type of pipe-work bracketry that will be used. A guide bracket with a low frictional resistance should be used such as DST LF Slide guides or DST Guide Clips.

Please note these units are not suitable for use on a drop rod system and need to be suitably guided.

### Primary Pipe Guide Spacings



DST Group Ltd Reserves the right to alter / amend product data without prior notification



### Key Points

Requires fully guiding

Available for any temperature or pressure

Supplied with CE Certs where applicable

Internal flow liner as standard

Bellows are pre-cold drawn

### DST Type AX3 (SPE) Axial Bellows

Designed to accept linear expansion on Steel & Copper pipe systems.

### Working Conditions

Pressure: Standard 10 Bar (Upto 16 Bar - Dependant on PED conditions)  
Temperature: 120 Degrees C  
Test: 1.5x Working

### PED Requirements

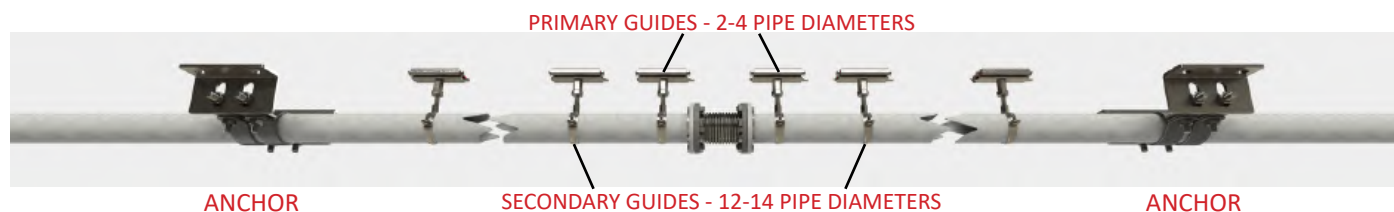
All Bellows supplied by DST Group Ltd are manufactured and certified in accordance with EU PED Legislation and as such carry the relevant CE certification where required.

Size (mm)	Axial Compression (mm)	Installed Length	Effective Area cm <sup>2</sup>	Force to Compress N/mm	Part Code
15	25	200	3.0	11.76	AX3P015
22	25	200	6	7.84	AX3P022
28	25	200	9	8.82	AX3P028
35	25	210	13	10.78	AX3P035
42	25	220	20	21.56	AX3P042
54	25	250	30	17.64	AX3P054

The anchor loads generated by using this type of axial expansion compensator are high. It is worth keeping in mind the type of pipework bracketry that will be used. A guide bracket with a low frictional resistance should be used such as DST LF Slide guides or DST Guide Clips.

Please note these units are not suitable for use on a drop rod system and need to be suitably guided.

### Primary Pipe Guide Spacings



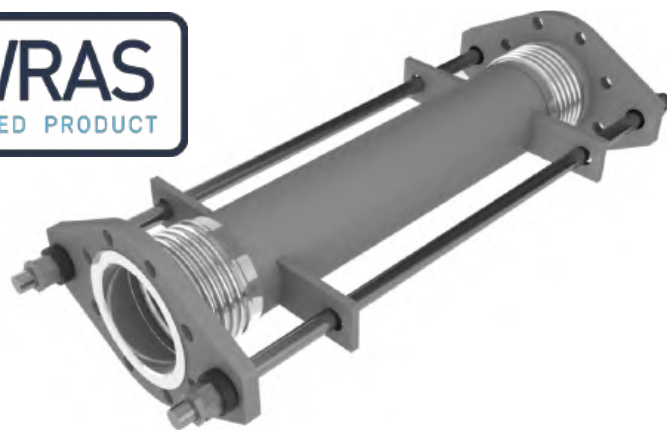


## Key Points

FA2 for Copper, Stainless Steel & Steel pipes

Supplied with CE certs where applicable

Internal flow liner as standard



Size	Installed Length +/- 50 (mm)	Force to Deflect +/- 50 (mm)	Effective Area (cm <sup>2</sup> )	Part Code
50 / 2"	410	2.59	31.1	FA2I050
65 / 2 1/2"	450	4.63	48.5	FA2I065
80 / 3"	470	5.53	66.3	FA2I080
100 / 4"	520	9.98	122.3	FA2I100
125 / 5"	570	11.82	175.1	FA2I125
150 / 6"	590	19.99	257.9	FA2I150
200 / 8"	630	26.16	417.3	FA2I200
250 / 10"	690	44.53	658.2	FA2I250

## Material Specification

Connections:	PN16 Van-stone Flanged
Convolutions:	316 Stainless Steel
Internal Sleeve:	316 Stainless Steel
Tie Rods:	Carbon Steel
Hemispherical washers:	Carbon Steel
Connecting Spool:	316 Stainless Steel

The DST Type FA2 lateral expansion Compensator is suitable for use on systems up to 250°C at 16 Bar pressure PED certification supplied dependent upon application.

All units are supplied at installation lengths and are pre stressed. Please note DST Group Ltd can design and supply lateral expansion compensators to accommodate higher system temperatures / pressures and other rates of lateral movement or special dimensions. Please advise at the time of your enquiry / order, the system temperature and pressure to allow the correct selection of compensator required.

## Standard Installation

These units are often used when new mains are being connected to existing mains. They allow a lateral movement to occur. These units are also useful for connections from boilers and plant, which will compensate any stresses put onto the "headers". Advice should always be sought when using these units to ensure the units will allow the amount of movement which will occur. Please consult the expansion compensator application guide for positioning of the anchor points and subsequent support centres.



## Key Points

AN1 for Steel pipes

AN2 for Copper & Stainless Steel

Supplied with CE Certs where applicable

Internal flow liner as standard



Size (mm)	Angular Deflection	Installed Length	Effective Area cm <sup>2</sup>	Force to Deflect (Nm/°)	Part Code
25	+/- 5°	195	40	1.27	AN2 028
32	+/- 5°	195	40	3.04	AN1/2 035
40	+/- 5°	200	40	3.04	AN1/2 040
50	+/- 5°	133	40	3.34	AN1/2 054
65	+/- 5°	133	62	1.47	AN1/2 067
80	+/- 5°	133	81	1.47	AN1/2 076
100	+/- 5°	133	127	1.27	AN1/2 108
125	+/- 6.5°	199	195	3.04	AN1/2 125
150	+/- 6.5°	199	273	3.04	AN1/2 159
200	+/- 7.5°	212	469	3.34	AN1/2 220
250	+/- 7.5°	212	700	3.04	AN1/2 273

## Material Specification

Connections:	Carbon Steel drilled PN16 (Van-stone facings on AN2) Other flanges available if required
Convolutions:	321 Stainless Steel (316 Stainless Steel on AN2)
Internal Sleeve:	321 Stainless Steel (316 Stainless Steel on AN2)
Hinge Pins:	Carbon Steel

The DST Type AN1 & AN2 Angular Expansion Compensators are suitable for use on systems up to 200°C at 16 Bar pressure. All units are supplied at installation lengths and are pre stressed. Please note DST Group Ltd can design and supply angular expansion compensators to accommodate higher system temperatures / pressures or special dimensions. Please advise at the time of enquiry / order, the system temperature and pressure to allow correct selection of compensator required.

## PED Requirements

CE Certificates issued if required. All units are categorised to PED standards, and we require accurate temperatures and pressures at the time of your order to enable the correct selection and certification.

## Standard Installation

These units are commonly used in pairs, although three pin systems can be designed if required. Please contact our sales office for application and design advice. These units can be used on a drop rod system. Please consult the expansion compensator application guide for positioning of anchor points.





### Key Points

GI1 for Steel Pipes

GI2 for Copper & Stainless Steel supplied

Supplied with CE Certs where applicable

Internal flow liner as standard



Size (mm)	Angular Deflection	Installed Length	Force to Deflect Nm/deg	Part Code
50	+/- 5°	180	8.3	GISQ050
65	+/- 5°	180	10.1	GISQ065
80	+/- 5°	180	31.4	GISQ080
100	+/- 5°	180	60.8	GISQ100
125	+/- 6.5°	225	36.2	GISQ125
150	+/- 6.5°	225	55.3	GISQ150
200	+/- 7.5°	250	107.1	GISQ200
250	+/- 7.5°	250	192	GISQ250

### Material Specification

Connections:	Carbon Steel Drilled PN16 (van-stone facings on GI2) Other Flanges Available If Required
Convolutions:	321 Stainless Steel (316 Stainless Steel on GI2)
Internal Sleeve:	321 Stainless Steel (316 Stainless Steel on GI2)
Hinge Pins:	Carbon Steel

The DST Type GI1 & GI2 Gimbal Expansion compensators are suitable for use on systems up to 200°C at 16 Bar pressure. All units are supplied at installation lengths and are pre stressed.

Please note DST Group Ltd can design and supply gimbal expansion compensators to accommodate higher system temperatures / pressures or special dimensions. Please advise at the time of your enquiry / order the system temperature and pressure to allow the correct selection of your compensator.

### PED Requirements

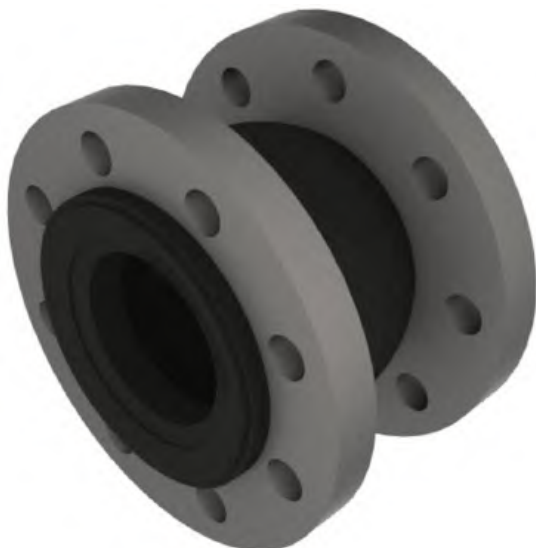
CE Certificates issued if required. All units are catagorised to PED standards, and we require accurate temperatures and pressures at the time of your order to enable the correct selection and certification.

### Standard Installation

These units are commonly used in pairs, although three pin systems can be designed if required. Please contact our sales office for application and design advice. These units can be used on a drop rod system.



### Key Points



Flanges: Carbon Steel - drilled PN16 or PN6  
(other flanges available )

Nylon re-inforced EPDM rubber body

Steel reinforced collars

Round flanges - no tie bars

Size (mm)	Installed Length	Material Type	Temperature Limits °C	Part Code
32	130	Nylon Reinforced EPDM	-10 to +90	PF6/16 U 032
40	130	Nylon Reinforced EPDM	-10 to +90	PF6/16 U 040
50	130	Nylon Reinforced EPDM	-10 to +90	PF6/16 U 050
65	130	Nylon Reinforced EPDM	-10 to +90	PF6/16 U 065
80	130	Nylon Reinforced EPDM	-10 to +90	PF6/16 U 080
100	130	Nylon Reinforced EPDM	-10 to +90	PF6/16 U 100
125	130	Nylon Reinforced EPDM	-10 to +90	PF6/16 U 125
150	130	Nylon Reinforced EPDM	-10 to +90	PF6/16 U 150

DST D-Flex Pump Flexibles are installed to absorb vibration and noise levels caused by “plant” upon which they are fitted. These are suitable for use on systems carrying chilled & heating Water. Please see above for temperature & pressure limits.

DST D-Flex units are not suitable for use with potable water, water with oil additives, compressed air and food applications.

DST D-Flex Untied units should not be installed on pumps located on inertia bases

DST D-Flex units are manufactured from spherical moulded EPDM, which is a soft compound to offer a high isolation efficiency and high noise absorbing properties.

The units are a full bore thus removing pressure drop problems. The EPDM rubber is nylon re-inforced, and has a Steel wire re-inforced collar.

Flanges BZP coated carbon Steel PN16.

D-Flex units have up to 10 year design life\* and are warrantied for a period of 12 months\*\* from supply.

DST D-Flex units are stamped with origin of manufacture, date of manufacture, batch number and size.

Please note no torsion forces should be applied to these units.

DST Group Ltd also supply DIN 4809 approved Pump Flexibles. Please contact our sales office for further information.

\* Design life is guidance only. This guidance assumes the unit will not be working at the extremes of its working capacity. This in no way implies a warranty or a guarantee.

\*\* 12 Months warranty is against manufacturing defect only and is limited to the supply only of a replacement product of the same type.



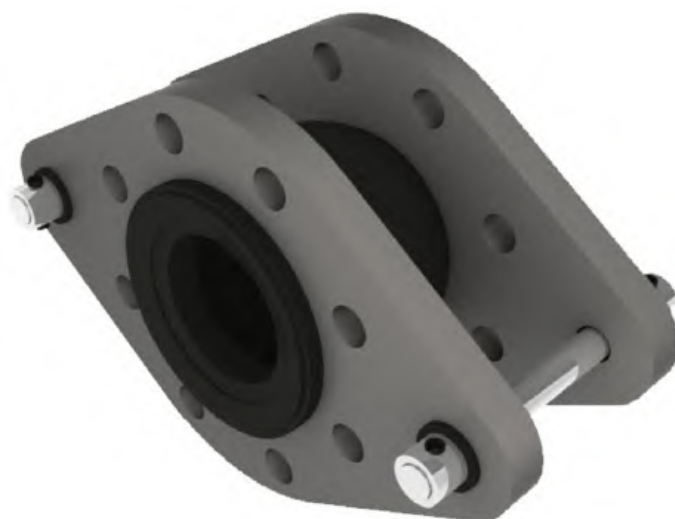
### Key Points

Flanges: Carbon Steel - drilled PN16  
(Other Flanges Available )

Nylon re-inforced EPDM rubber body

Steel reinforced collars

Tie Bars: Anti-Tamper Carbon Steel



Size (mm)	Installed Length	Material Type	Temperature Limits°C	Part Code
32	130	Nylon Reinforced EPDM	-10 to +90	PF16 T 032
40	130	Nylon Reinforced EPDM	-10 to +90	PF16 T 040
50	130	Nylon Reinforced EPDM	-10 to +90	PF16 T 050
65	130	Nylon Reinforced EPDM	-10 to +90	PF16 T 065
80	130	Nylon Reinforced EPDM	-10 to +90	PF16 T 080
100	130	Nylon Reinforced EPDM	-10 to +90	PF16 T 100
125	130	Nylon Reinforced EPDM	-10 to +90	PF16 T 125
150	130	Nylon Reinforced EPDM	-10 to +90	PF16 T 150
200	130	Nylon Reinforced EPDM	-10 to +90	PF16 T 200
250	130	Nylon Reinforced EPDM	-10 to +90	PF16 T 250
300	On Request	Nylon Reinforced EPDM	-10 to +90	PF16 T 300
350	On Request	Nylon Reinforced EPDM	-10 to +90	PF16 T 350

DST D-Flex Pump Flexibles are installed to reduce vibration and noise levels caused by "plant" upon which they are fitted. These are suitable for use on systems carrying chilled & heating water. Please see above for temperature & pressure limits. DST D-Flex units are not suitable for use with potable water, water with oil additives, compressed air and food applications.

DST D-Flex units are manufactured from spherical moulded EPDM, which is a soft compound to offer a high isolation efficiency and high noise absorbing properties.

The D-flex units tied type has specially designed anti tamper Tie Bars. This will only allow the units to be installed at their optimal length and avoid elongation of the unit. These units rated to maximum 10 Bar working pressure, 15Bar test pressure

The units are a full bore thus removing pressure drop problems. The EPDM rubber is nylon re-inforced, and has a Steel wire re-inforced collar.

Flanges BZP coated carbon Steel PN16.

D-Flex units have up to 10 year design life\* and are warrantied for a period of 12\*\* months from supply.

DST D-Flex units are stamped with origin of manufacture, date of manufacture, batch number and size.

Please note no torsion forces should be applied to these units.

DST Group Ltd also supply DIN 4809 approved Pump Flexibles. Please contact our sales office for further information.

\* Design life is guidance only. This guidance assumes the unit will not be working at the extremes of its working capacity. This in no way implies a warranty or a guarantee.

\*\* 12 Months warranty is against manufacturing defect only and is limited to the supply only of a replacement product of the same type.



# D-Flex Screwed Pump Flexible

## Key Points



Unions: Carbon Steel

Nylon Re-inforced EPDM rubber body

Steel Reinforced Collars

6 Bar working pressure

Size (mm)	Installed Length	Material Type	Temperature Limits °C	Part Code
15	200	Nylon Reinforced EPDM	-10 to +90	PFS 015
20	200	Nylon Reinforced EPDM	-10 to +90	PFS 020
25	200	Nylon Reinforced EPDM	-10 to +90	PFS 025
32	200	Nylon Reinforced EPDM	-10 to +90	PFS 032
40	200	Nylon Reinforced EPDM	-10 to +90	PFS 040
50	200	Nylon Reinforced EPDM	-10 to +90	PFS 050

DST D-Flex Pump Flexibles are installed to absorb vibration and noise levels caused by “plant” upon which they are fitted. These are suitable for use on systems carrying chilled & heating water. Please see above for temperature & pressure limits.

DST D-Flex units are not suitable for use with potable water, water with oil additives, compressed air and food applications.

DST D-Flex Screwed units should not be installed on pumps located on inertia bases

DST D-Flex units are manufactured from spherical moulded EPDM, which is a soft compound to offer a high isolation efficiency and high noise absorbing properties.

The units are a full bore thus removing pressure drop problems. The EPDM rubber is nylon re-inforced, and has a Steel wire re-inforced collar.

Unions BZP coated carbon Steel PN16.

D-Flex units have up to 10 year design life and are warranted for a period of 12 months from supply.

DST D-Flex units are stamped with origin of manufacture, date of manufacture, batch number and size.

Please note no torsion forces should be applied to these units.

DST Group Ltd also supply DIN 4809 approved Pump Flexibles. Please contact our sales office for further information.

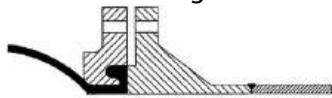




Upto 10 years Design Life\* on LTHW & CHW systems. - 12 Months Warranty\*\* from date of supply. - Not suitable for potable water.

### Flange Suitability:

Weld Neck Flanges



Slip on Flange



Slip-on Flange with Gasket



### Pre-installation check

#### 1. Selection

Prior to installation, check you have the right flexibles for the particular duty. All DST D-Flex Rubber Pump Flexibles have temperature and pressure limitations. Please see the appropriate data sheets for your particular product. This is **NOT** a product for taking up pipework expansion.

All rubber flexibles will extend under pressure. This creates thrust forces which can be very substantial. We recommend at pressures above 2 Bar and diameters above 65mm nominal bore size, unless the pipe work can be sufficiently anchored directly after the unit, the DST D-Flex Anti-Tamper Tied pump flexibles should be used.

#### 2. Mating Flanges

We recommend the rubber flexibles are mated up against full-bore weld neck flanges. If installed in this manner no additional gaskets are required.

We advise against using slip-on or screwed flanges as mating flanges, as these can damage the rubber bellows. Once the sealing face has been damaged, water/medium will penetrate the reinforcement layers and destroy the integrity of the flexibles.

If it is unavoidable to use this type of mating flange, a gasket must be installed (this should be a hard gasket and be at least 3mm thick). The gasket should reach the internal bore of the rubber bellows. Another option is to fill the gap of the slip-on flange with weld and grind it flush. However, the surface finish must be level and smooth to ensure that the bellow is not damaged once installed.

#### 3. Misalignment

Check the two mating flanges are parallel and that they are in line (maximum allowed offset is 5mm in any direction). The gap between flanges should be within +/- 5mm of the flexibles neutral. Compression or extension should be avoided.

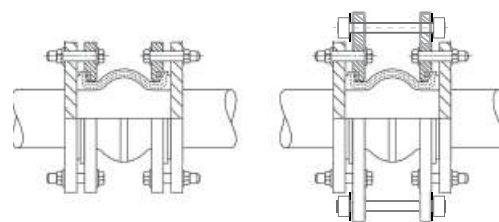
Under no circumstances must the pump flexible be used to take up misalignment. Ensure the pipework is adequately supported. The flexible must not support pipes or plant.

### Installation -(To Be Performed by Qualified Personnel)

#### 1. Bolts

Bolts should be inserted from the bellows side (as shown on the diagram below). On some larger bolt lengths this may not be possible. In these cases a bolt of the exact and correct length needs to be selected.

An alternative is to use studding cut to length and fitted with a nut at both sides. Please select the bolt length carefully; even if there is space between the bolt and the rubber body of the bellow in an un-pressurised state, they may foul when pressurised and cause failure. Bolts of the right diameter must be used to ensure correct alignment.



#### 2. Alignment

Take care when inserting the flexibles into the gap between the two mating flanges. Sharp edges can damage the sealing face of the rubber flexibles. Before tightening the bolts, ensure the flexible sits evenly in its flange groove and does not get pinched between flanges. The sealing face of the flexibles must be concentric with the sealing face of the mating flanges.

#### 3. Tightening the Bolts

Great care must be taken with the tightening of the flange bolts. Remember you are tightening against a rubber face. As with gaskets, over tightening will cause the joints to leak and it will damage the bellows. Tighten opposite bolts to get an even pressure all round (check the gap between the flanges). Rubber will set and the bolts will have to be retightened after 24 hours.

#### 4. Tie Bars

Do not fit aftermarket tie Bars to a DST D-Flex Pump Flexible. D-Flex Tied Pump Flexibles are supplied with Tie Bars, if you need to fit Tie Bars to an untied unit, it should be changed for a D-Flex Tied Unit. When three or more tie Bars are fitted it may be necessary to remove one tie Bar to install the bellows. Ensure that washers are re-assembled in the right order and orientation.

\* Design life is guidance only. This guidance assumes the unit will not be working at the extremes of its working capacity. This in no way implies a warranty or a guarantee.

\*\* 12 Months warranty is against manufacturing defect only and is limited to the supply only of a replacement product of the same type.



### Taking care of rubber flexibles:

1. Paint - do not paint rubber flexibles. The paint will attack the rubber (this also applies to paint splatter).
2. Welding - protect the rubber from weld spatter.
3. Lagging - do not lag rubber flexibles on heating systems. The increased temperature will reduce life.
4. Tie Bar check - once the system is filled but not under pressure, check the tie Bars are still tight (pipe work on springs may have dropped due to the weight of the water).

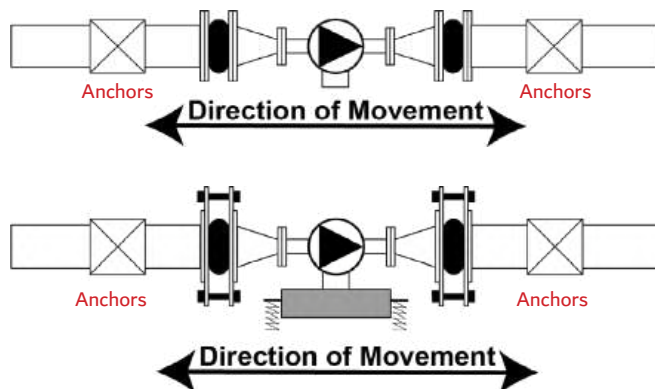
**Note:** Tied Pump Flexibles are supplied with anti-tamper tie Bars, therefore the Tie Bars cannot be slackened off and should not be removed, doing so could lead to, major damage to the unit thus damaging equipment.

5. Water Treatment – The pump flexible range incorporates an EPDM inner liner. EPDM is a proven material in heating and chilled water systems. It is resistant to glycol and to most chemicals used in water treatment, when used in normal concentrations. We cannot approve any specific chemical, and suggest you always check with the chemical supplier that the additives are suitable for use with EPDM rubber.

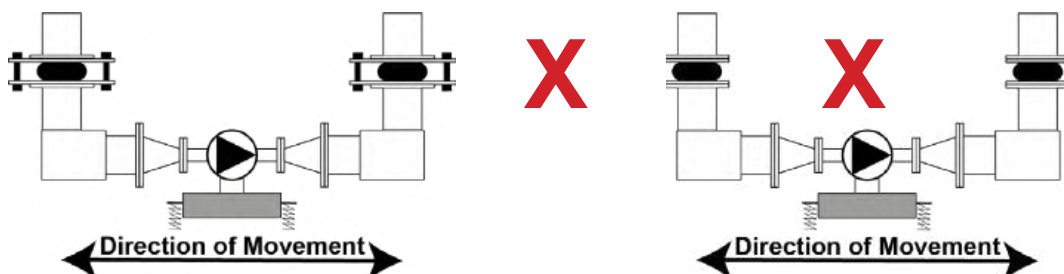
### Best Practice

The following are only recommendations but if followed they will ensure proper installation and maximum service life of the rubber bellows. We recommend the use of spool pieces to align mating flanges and to ensure the correct gap.

1. Pump flexibles should **NEVER** be used to counter mis-alignment in pipework.
2. Pump flexibles should never be used to support the pipework. Correct guiding and anchoring should be installed close to the pump flexibles.
3. PUMPS - When the pump flexibles are installed on rotating equipment such as pumps to absorb noise and vibration, the first bracket position after the flexibles should be an anchor. This allows the flexibles to absorb vibration but, limits their ability to extend under pressure acting as an acoustic break. If pumps are not mounted on springs or inertia bases untied pump flexibles can be used.
4. INERTIA BASES - Where pumps are installed on inertia bases, tied pump flexibles should be used. The flexible connection should be directly onto the pump or as near as possible, with anchor points installed after the flexible.
5. IN A RISE - Where pumps are installed on inertia bases, care should be taken **NOT** to install pump flexibles in vertical pipework on either the return to the pump or flow from the pump, the reasons for this are:
  - i. The movement direction changes from axial to lateral.
  - ii. As a result, dependent upon where in the rise the flexibles are, a greater amount of movement can be expressed on the unit laterally, and can be a compound movement with angulation too.
  - iii. Pipe has a greater tendency to use the flexible as a support, as any rigid support would stop the inertia base from working.



In these circumstances neither tied or untied versions are suggested, although, if there is no alternative, a tied unit will offer a better degree of protection.



5. PIPE RUNS - Where pump flexibles are being installed to compensate for pipe borne vibration, the flexible still requires anchor on each side to restrict the possibility of extension under pressure. All pipework should be correctly supported between anchors with slide guides to allow movement.



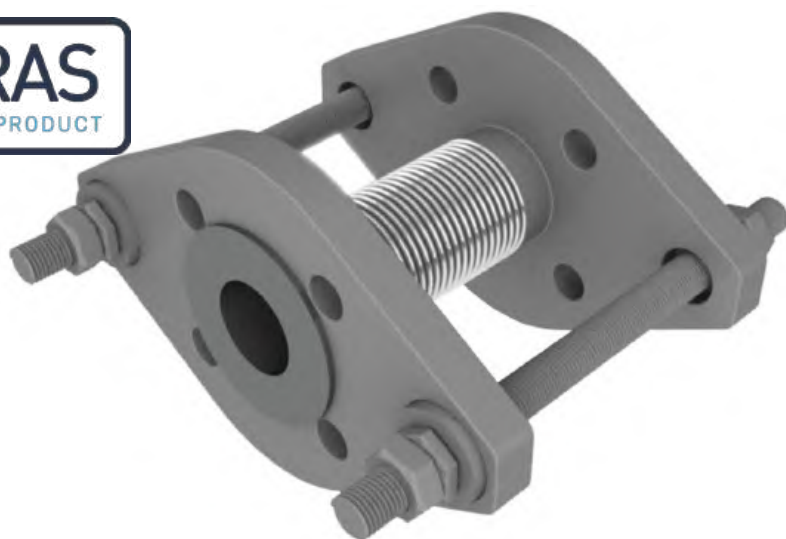
## Key Points

Suitable for potable water

Suitable for high temperatures

PED Certified as required

Stainless Steel to all wetted areas



Size (mm)	Installed Length	Material Type	Temperature Limits °C	Part Code
32nb / 35cu	150	316 St/Steel to all Wet Areas	-10 to +200	FA3 032
40nb / 42cu	150	316 St/Steel to all Wet Areas	-10 to +200	FA3 040
50nb / 54cu	150	316 St/Steel to all Wet Areas	-10 to +200	FA3 050
65nb / 67cu	150	316 St/Steel to all Wet Areas	-10 to +200	FA3 065
80nb / 76cu	150	316 St/Steel to all Wet Areas	-10 to +200	FA3 080
100nb / 108cu	150	316 St/Steel to all Wet Areas	-10 to +200	FA3 100
125nb / 133cu	150	316 St/Steel to all Wet Areas	-10 to +200	FA3 125
150nb / 159cu	150	316 St/Steel to all Wet Areas	-10 to +200	FA3 150
200nb	150	316 St/Steel to all Wet Areas	-10 to +200	FA3 200
250nb	On Request	316 St/Steel to all Wet Areas	-10 to +200	FA3 250
300nb	On Request	316 St/Steel to all Wet Areas	-10 to +200	FA3 300
350nb	On Request	316 St/Steel to all Wet Areas	-10 to +200	FA3 350
400nb	On Request	316 St/Steel to all Wet Areas	-10 to +200	FA3 400

DST D-Flex Pump Flexibles are installed to reduce vibration and noise levels caused by "plant" upon which they are fitted. These are suitable for use on systems carrying high temperature water or potable water systems. Please see above for temperature & pressure limits. DST FA3 units are suitable for use with potable water, water with oil additives, compressed air and food applications.

## Material Specification

Connections:	Carbon Steel Drilled PN16 Van-stone facings
Convolutions:	316 Stainless Steel
Internal Sleeve:	316 Stainless Steel
Tie Rods:	Carbon Steel
Hemispherical Washers:	Carbon Steel
Connecting Spool:	316 Stainless Steel

The DST Type FA3 Pump Flexible is suitable for use on systems up to 200°C at 16 Bar pressure. PED certification supplied dependent upon application.

All units are supplied at installation lengths and are pre stressed. Please note, DST Group Ltd can design and supply flexible connections to accommodate higher system temperatures / pressures. Please advise at time of your enquiry / order the system temperature and pressure to allow the correct selection of your compensator.



## Key Points



EPDM Rubber Core

304 Stainless Steel Overbraid

WRAS approved components

Manufactured by DST in the UK

0 - 100°C @ 10 Bar

Description -	EPDM rubber hose with 304 Stainless Steel overbraid, swaged fittings to clients requirements.
Testing -	Hydrostatic batch test to minimum 20 Bar cold. Test Certificate can be submitted upon request.
Approvals -	All components WRAS approved.
Applications -	Fan Coil Connections Radiant Panel Connections Tap Connections
Insulation	Hoses for CHW applications can be insulated with ArmaFlex® Class 0 nitrile rubber

## Fittings

### FIT001

Fixed Taper Male



### FIT004

Compression



### FIT002

Swivel Flat Face Female



### FIT005

Brass Standpipe



### FIT006

Flat Face 90° Female Elbow







## Key Points

321 Stainless Steel Core

304 Stainless Steel Overbraid

Manufactured in the UK

0 - 100°C @ 10 Bar



Description -	321 Stainless Steel hose with 304 Stainless Steel overbraid. Welded fittings to client requirements.
Testing -	Hydrostatic batch test to minimum 20 Bar cold. Test certificate can be submitted upon request.
Applications -	Fan Coil Connections Radiant Panel Connections Tap Connections Final Connections to Equipment

## Fittings

### FIT001

Fixed Taper Male



### FIT006

Flat Face 90° Female Elbow



### FIT002

Swivel Flat Face Female



### FIT007

Coned Face 90° Female Elbow



### FIT003

Swivel Coned Seat Female





# Flexible Hose Fitting Instructions

## Key Points

10 year guarantee for EPDM. 2 year guarantee for Stainless Steel

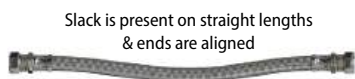
25 Year design life

ISO9001 quality system

Manufactured at DST Group Ltd in the UK

## Installation

Installation conditions as below must be adhered to, to ensure longevity of the product.



Avoid bending radius becoming too small by using elbows



Hose is long enough to allow smooth curve

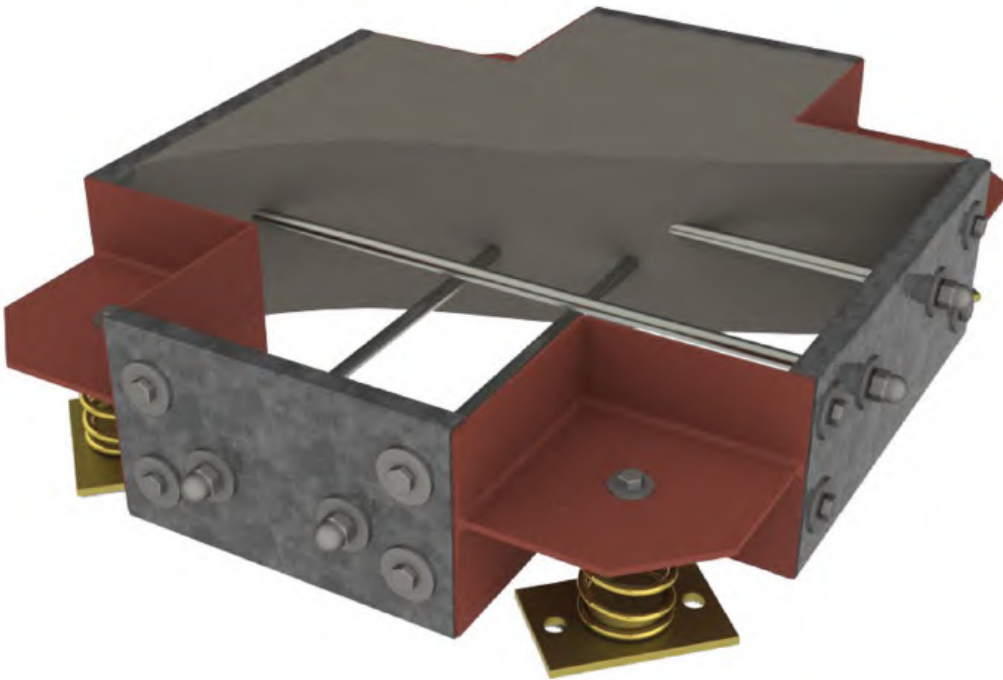


Do not bend hose too close to crimped end



Observe minimum bend radius





DST Group Ltd Inertia Bases are supplied and delivered assembled to allow ease of installation on site, but can be delivered flat-packed if required. These are supplied with spring mounts and all fixings required to assemble the inertia base.

DST Group Ltd can calculate the size of the inertia base you required. Please forward the pump details to the DST Group Ltd Sales Office. As standard the DST Ltd Group inertia bases are supplied either 150mm or 300mm deep.

DST Group Ltd inertia bases are supplied to provide no less than 1.5 : 1.0 Rate of inertia. As standard these bases are supplied with springs.

DST Group Ltd can, if required supply these bases fully assembled and cast with a 24N mix of concrete.

DST Group Ltd advise that DST/\*\*\*/PN16T Tied DST D-Flex Pump Flexibles are used for isolating vibration from pump connections.

## Please Note:

Spring selection should be based upon equipment weight - DST Group Ltd can advise on selection at time of ordering.

Plant and pipework can be loaded unevenly, therefore different spring loads maybe required at different locations - again DST Group Ltd can advise on selection at time of ordering.

Standard springs and housings are BZP with yellow passivate, other coatings can be offered for external use. Please advise if your application is external.

Springs when fitted should be loaded equally, installing one spring before another will lead to an uneven load.



### Key Points

Anti-Vibration Mount for Plant & Machinery

Enclosed spring for greater stability.

Standard 25mm deflection

Can be used in conjunction with inertia bases



Model	Overall Width (mm)	Bolt Centres (mm)	Bolt Ø	Fixing Bolt Ø	Weight Range (Kg)	Deflection (mm)
DS/0-0050	130	110	M10	M12	11-23	25
DS/0-0080	130	110	M10	M12	18-37	25
DS/0-0130	130	110	M10	M12	30-60	25
DS/0-0200	130	110	M10	M12	45-91	25
DS/0-0300	130	110	M10	M12	68-137	25
DS/0-0500	130	110	M10	M12	114-228	25
DS/0-0630	130	110	M10	M12	148-296	25
DS/0-0800	130	110	M10	M12	182-364	25
DS/1-0150	173	148	M12	M12	34-69	25
DS/1-0200	173	148	M12	M12	45-91	25
DS/1-0300	173	148	M12	M12	68-137	25
DS/1-0500	173	148	M12	M12	114-228	25
DS/1-0750	173	148	M12	M12	170-341	25
DS/1-1000	173	148	M12	M12	227-455	25
DS/1-1200	173	148	M12	M12	273-546	25
DS/1-1400	173	148	M12	M12	318-637	25
DS/1-2-1700	173	148	M12	M12	386-773	25
DS/1-2-1900	173	148	M12	M12	432-864	25

### Please Note

Spring selection should be based upon equipment weight - DST Group Ltd can advise on selection at time of ordering.

Plant and pipework can be loaded unevenly, therefore different spring loads maybe required at different locations - DST Group Ltd can advise on your selection when your order is placed.

Standard housing is powder coated, the standard spring is BZP, other coatings can be offered for external use. Please advise if your application is external.

Springs when fitted should be loaded equally, installing one spring before another will lead to an uneven load.





## Key Points

2 Year Guarantee

25 Year Design Life

ISO9001 Quality System

Manufactured in the UK



Model	Overall Width (mm)	Bolt Centres (mm)	Bolt Ø	Fixing Bolt Ø	Weight Range (Kg)	Deflection (mm)
RS/0-0050	230	198	M12	M12	11-23	30
RS/0-0080	230	198	M12	M12	18-37	30
RS/0-0130	230	198	M12	M12	30-60	30
RS/0-0200	230	198	M12	M12	45-91	30
RS/0-0300	230	198	M12	M12	68-137	30
RS/0-0500	230	198	M12	M12	114-228	30
RS/0-0630	230	198	M12	M12	148-287	30
RS/0-0800	230	198	M12	M12	182-364	30
RS/0-1100	230	198	M12	M12	250-500	30
RS/1-0425	230	198	M12	M12	97-194	30
RS/1-0600	230	198	M12	M12	136-273	30
RS/1-0750	230	198	M12	M12	170-341	30
RS/1-1000	230	198	M12	M12	227-455	30
RS/1-1400	230	198	M12	M12	318-637	30
RS/1-1700	230	198	M12	M12	386-773	30
RS/1-2000	230	198	M12	M12	455-910	30
RS/1-2400	230	198	M12	M12	545-1091	30

## Please Note:

Spring selection should be based upon equipment weight - DST Group Ltd can advise on your selection at the time of ordering.

Plant and pipework can be loaded unevenly, therefore different spring loads maybe required at different locations - DST Group Ltd can advise on your selection when your order is placed.

Standard springs and housings are BZP with yellow passivate, other coatings can be offered for external use. Please advise if your application is external.

Springs when fitted should be loaded equally, installing one spring before another will lead to an uneven load.



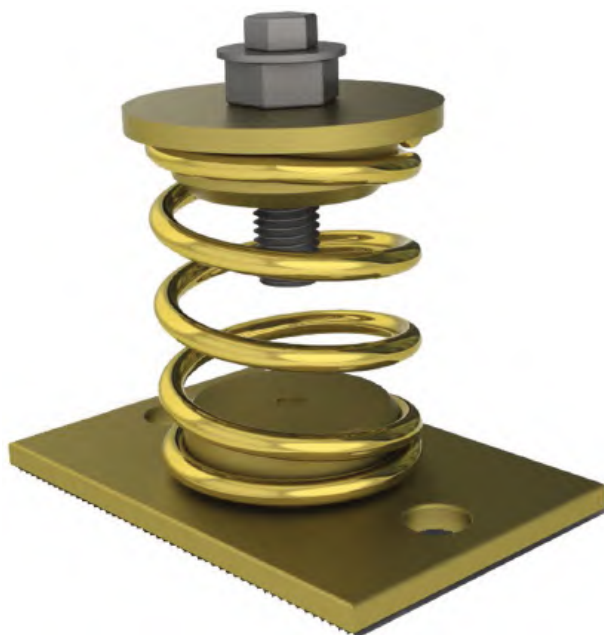
## Key Points

2 Year Guarantee

25 Year Design Life

ISO9001 Quality System

Manufactured in the UK



Model	Overall Width (mm)	Bolt Centres (mm)	Bolt Ø	Fixing Bolt Ø	Weight Range (Kg)	Deflection (mm)
OS/0-0050	130	92	M12	M10	11-23	30
OS/0-0080	130	92	M12	M10	18-37	30
OS/0-0130	130	92	M12	M10	30-60	30
OS/0-0200	130	92	M12	M10	45-91	30
OS/0-0300	130	92	M12	M10	68-137	30
OS/0-0500	130	92	M12	M10	114-228	30
OS/0-0630	130	92	M12	M10	148-287	30
OS/0-0800	130	92	M12	M10	182-364	30
OS/0-1100	130	92	M12	M10	250-500	30
OS/1-0425	165	120	M12	M12	97-194	30
OS/1-0600	165	120	M12	M12	136-273	30
OS/1-0750	165	120	M12	M12	170-341	30
OS/1-1000	165	120	M12	M12	227-455	30
OS/1-1400	165	120	M12	M12	318-637	30
OS/1-1700	165	120	M12	M12	386-773	30
OS/1-2000	165	120	M12	M12	455-910	30
OS/1-2400	165	120	M12	M12	545-1091	30

### Please Note:

Spring selection should be based upon equipment weight - DST Group Ltd can advise on your selection at time of ordering.

Plant and pipework can be loaded unevenly, therefore different spring loads maybe required at different locations - DST Group Ltd can advise on your selection when your order is placed.

Standard springs and housings are BZP with yellow passivate, other coatings can be offered for external use. Please advise if your application is external.

Springs when fitted should be loaded equally, installing one spring before another will lead to an uneven load.



## Key Points

Suitable for isolating vibration from packaged units

Pressurisation Units

Please advise the weight and plant footprint requiring isolation for mount recommendations



Weight (Kg)	Material Type	Hole Tapping Size	Dimensions (mm) Width x Height	Part Code
150	Neoprene Commercial Grade Black Rubber	M10	75 x 32	CMC/150/M
300	Neoprene Commercial Grade Black Rubber	M12	90 x 40	CMC/300/M

## CMC Mount Boxed

### Key Points

Isolating vibration from pipework

Please advise the weight of plant requiring isolation for hanger recommendations



Weight (Kg)	Material Type	Hole Tapping Size	Dimensions (mm) Width x Height	Part Code
150	Neoprene Commercial Grade Black Rubber	M10	75 x 32	CMC/150/M
300	Neoprene Commercial Grade Black Rubber	M12	90 x 40	CMC/300/M

### Please Note:

Mount selection should be based upon equipment weight - DST Group Ltd can advise on selection when your order is placed.

Plant and pipework can be loaded unevenly, therefore different mount loads maybe required at different locations - again DST Group Ltd can advise when you place your order.

Mounts when fitted should be loaded equally, installing one mount before another will lead to an uneven load.

DST Group Ltd Reserves the right to alter / amend product data without prior notification



# Standard Spring Hangers

## Key Points

2 Year Guarantee

25 Year Design Life

ISO9001 Quality System

Manufactured in the UK



Model	Overall Width (mm)	Bolt Centres (mm)	Bolt Ø	Fixing Bolt Ø	Weight Range (Kg)	Deflection (mm)
SHO S/0-0050	150	180	M12	M12	11-23	30
SHO S/0-0080	150	180	M12	M12	18-37	30
SHO S/0-0130	150	180	M12	M12	30-60	30
SHO S/0-0200	150	180	M12	M12	45-91	30
SHO S/0-0300	150	180	M12	M12	68-137	30
SHO S/0-0500	150	180	M12	M12	114-228	30
SHO S/0-0630	150	180	M12	M12	148-287	30
SHO S/0-0800	150	180	M12	M12	182-364	30
SHO S/0-1100	150	180	M12	M12	250-500	30
SHO S/1-0425	250	250	M16	M16	97-194	30
SHO S/1-0600	250	250	M16	M16	136-273	30
SHO S/1-0750	250	250	M16	M16	170-341	30
SHO S/1-1000	250	250	M16	M16	227-455	30
SHO S/1-1400	250	250	M16	M16	318-637	30
SHO S/1-1700	250	250	M16	M16	386-773	30
SHO S/1-2000	250	250	M16	M16	455-910	30
SHO S/1-2400	250	250	M16	M16	545-1091	30

### Please Note:

Spring selection should be based upon equipment weight - DST Group Ltd can advise on your selection when your order is placed.

Plant and pipework can be loaded unevenly, therefore different spring loads maybe required at different locations - DST Group Ltd can advise on your selection when your order is placed.

Standard springs and housings are BZP with yellow passivate, other coatings can be offered for external use. Please advise if your application is external.

Springs when fitted should be loaded equally, installing one spring before another will lead to an uneven load.



## Key Points

2 Year Guarantee

25 Year Design Life

ISO9001 Quality System

Manufactured in the UK



Model	Overall Width (mm)	Bolt Centres (mm)	Bolt Ø	Fixing Bolt Ø	Weight Range (Kg)	Deflection (mm)
SHOS/0/P-0050	150	180	M12	M12	11-23	30
SHOS/0/P-0080	150	180	M12	M12	18-37	30
SHOS/0/P-0130	150	180	M12	M12	30-60	30
SHOS/0/P-0200	150	180	M12	M12	45-91	30
SHOS/0/P-0300	150	180	M12	M12	68-137	30
SHOS/0/P-0500	150	180	M12	M12	114-228	30
SHOS/0/P-0630	150	180	M12	M12	148-287	30
SHOS/0/P-0800	150	180	M12	M12	182-364	30
SHOS/0/P-0110	150	180	M12	M12	250-500	30
SHOS/1/P-0425	250	250	M16	M16	97-194	30
SHOS/0/P-0600	250	250	M16	M16	136-273	30
SHOS/1/P-0750	250	250	M16	M16	170-341	30
SHOS/1/P-1000	250	250	M16	M16	227-455	30
SHOS/1/P-1400	250	250	M16	M16	318-637	30
SHOS/1/P-1700	250	250	M16	M16	386-773	30
SHOS/1/P-2000	250	250	M16	M16	455-910	30
SHOS/1/P-2400	250	250	M16	M16	545-1091	30

## Please Note:

Spring selection should be based upon equipment weight - DST Group Ltd can advise on your selection when your order is placed.

Plant and pipework can be loaded unevenly, therefore different spring loads maybe required at different locations - DST Group Ltd can advise on your selection when your order is placed.

Standard springs and housings are BZP with yellow passivate, other coatings can be offered for external use. Please advise if your application is external.

Springs when fitted should be loaded equally, installing one spring before another will lead to an uneven load.





## Key Points

Micro bubble Type

Flanged PN16

10 Bar Working Pressure

110°C

C/W Auto Air Vent, Angled Radiator Valve  
and Male x Female Lever Ball Valve



For use in sealed heating and cooling systems. Air and Dirt Separators protect against damage caused by the deposit of dirt particles, and large amounts of dissolved and undissolved air. The Rapidvent is also used to remove dirt particles from heating & chilled water systems. Installed it will eliminate all dirt down to 10 microns.

### Reduction in:

- Corrosion of pipe and fittings.
- Dependence on chemicals.
- Unwanted dirt build up in equipment & pipe

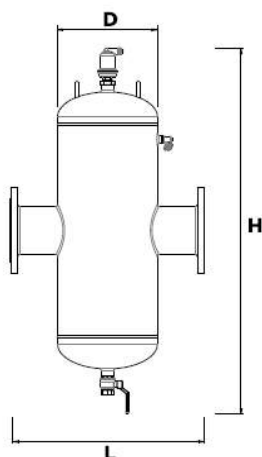
### Whilst increasing efficiency of:

- Boilers & Heat Exchangers.
- Chillers
- Pumps

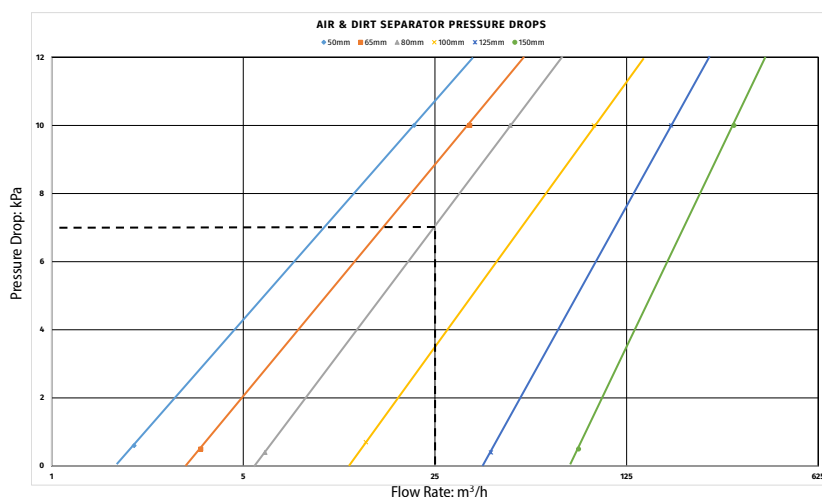
Air and Dirt Separators are essential when refurbishing older systems or when an open system is converted to a closed system.

- Flanged connection EN 1092-1 PN16.
- Flow Rate up to 1.5 m/s.

Pipe Size	Face to Face L	Body Diameter D	Height H	Flange	Flow Rate @ 1.5m/s	Stock Code
50mm	430mm	168mm	478mm	PN16	12m <sup>3</sup> /h	DAS050
65mm	430mm	168mm	478mm	PN16	20m <sup>3</sup> /h	DAS065
80mm	490mm	220mm	669mm	PN16	28m <sup>3</sup> /h	DAS080
100mm	490mm	220mm	669mm	PN16	47m <sup>3</sup> /h	DAS100
125mm	630mm	325mm	841mm	PN16	70m <sup>3</sup> /h	DAS125
150mm	630mm	325mm	841mm	PN16	100m <sup>3</sup> /h	DAS150



## Pressure Drop Chart



DST Group Ltd Reserves the right to alter / amend product data without prior notification



## RapidVent Air & Dirt Separators

### Selection & Location

1. Micro bubbles are easily released from circulating water where the highest temperature and lowest pressure conditions occur in the system.
2. The separators should normally be fitted where water is at the highest temperature and the lowest pressure available.
3. When selecting the position for the separator please be aware that pressure also has a major effect on the release of microbubbles.
5. Where lower temperatures are involved in cooling applications system pressure becomes the determining factor of the position of the separator.
7. Rapidvent Air and Dirt Separators should be installed in horizontal pipework, the direction of flow is optional.
8. The static head must not exceed 15m for a heating system and 5m for a cooling / Chilled Water system.
9. The efficiency of the unit will be reduced if the system static head exceeds those indicated or system or flow velocity exceeds 1.5m/s.

### Installation (To be performed by qualified personnel)

1. Protect the Rapidvent Air & Dirt Separator from adverse environmental conditions, protect from frost.
2. This equipment will form part of the main system's maintenance regime, do not obstruct access.
3. The main system must be flushed before installation of the air & dirt separator.
4. Rapidvent Air & Dirt Separators are not directional.
5. The equipment must be installed vertically with isolation valves on the inlet and outlet connections to facilitate maintenance inspection and facilitate the venting of separated dirt.
6. To provide the best protection for your system typically this equipment is installed on the hottest side of the heat exchanger, on the suction side of the circulation pump. Please refer to section "location" for more details.
7. For service purposes it is essential to have 100mm access clearance above the air vent when installed.
8. When installing, please take into account the weight of the unit, and use the correct equipment for lifting and fitting. Lifting eyes are provided on sizes 150mm and above.
9. Loose accessories should be fitted to unit using TruTite 313 or suitable thread locking methods.
10. Ensure that the vent cap on the air vent is open when commissioning this equipment.
11. Flexible or fixed pipework should be installed to enable dirty water to be drained to a convenient safe place.

### Maintenance (To Be Performed by Qualified Personnel)

1. It is recommended that the Rapidvent Air & Dirt Separator should be inspected and drained of dirt after 3 months, then annually thereafter.
2. Should particulate debris build up within the air vent valve, and induce a leak, this can be isolated using the vent cap until such time as appropriate maintenance can take place.
3. Before draining the particulate debris first isolate the Rapidvent Air & Dirt Separator from the main system.
4. Where temperatures are likely to cause harm, please allow the unit to cool before discharging the debris.
5. Open the drain valve to release the accumulated debris from the equipment.
7. Once complete, close the drain valve and reintroduce the air & dirt separator to the main system by opening the isolation valves.
8. Never use the drain valve or air vent to reintroduce water to the system.

**WARNING: Any and all maintenance must only take place with the equipment isolated from the main system and when the temperature of the unit and fluid is within safe limits.**



## Key Points

304 Stainless Steel construction

Supplied with tundish & valves

Polished Stainless Steel finish

Wall mounting brackets fitted



Dosing pots are generally installed in closed systems to enable water treatments and other chemicals to be added to the system without the need to shut a system down or part thereof.

The Chempot is a high quality Stainless Steel vessel which is fatigue resistant as a result of its design. The unit is supplied with all components loose so connections can be fitted in an orientation best suited to the system.

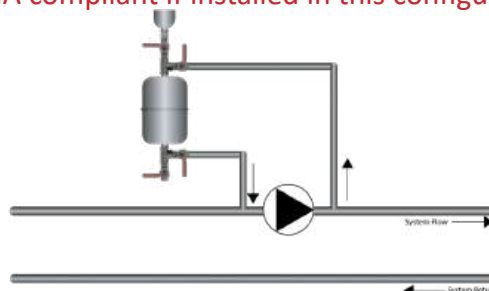
Chempot is fully compliant with the latest BSRIA BG50/2021 recommendations regarding avoiding dead legs and is compliant with Equipment Directive 2014/68/EU Cat SEP and Pressure Equipment (Safety) Regulations 2016.

### Sizing:

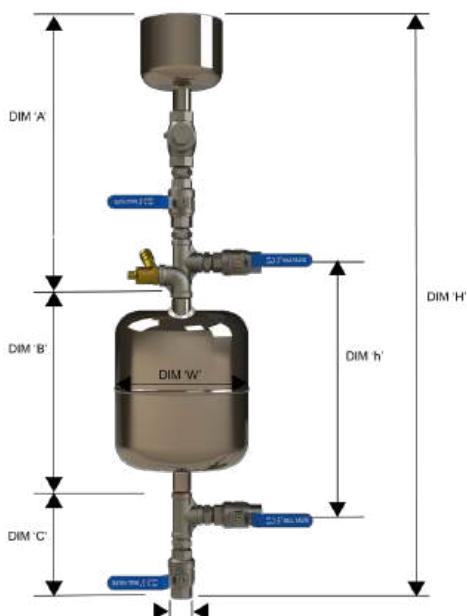
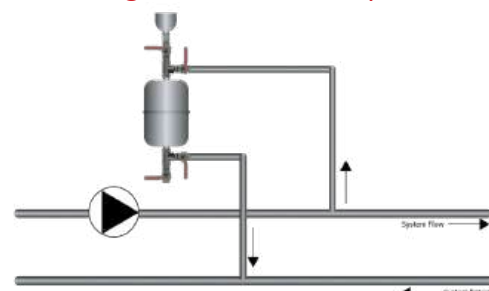
The size of dosing pot installed in a system is not critical as multiple doses of chemicals can be put in to the system to reach the correct concentration.

The benefits of using a smaller unit, is that it is easier to physically handle and also allows for more accurate dosing. However, the time on site for performing multiple doses has to be considered. This factor should influence your decision when selecting dosing pots.

BSRIA compliant if installed in this configuration



Not BSRIA compliant if installed in this configuration - but acceptable



SIZE	Con Size	DIM A	DIM B	DIM C	DIM W	DIM H	DIM h	Working Pressure
3.5L	1/2"	285mm	260mm	130mm	162mm	675mm	310mm	10Bar
6L	1/2"	285mm	260mm	130mm	215mm	675mm	310mm	10Bar
11L	1/2"	285mm	410mm	130mm	215mm	825mm	460mm	10Bar
18L	1/2"	285mm	460mm	130mm	260mm	875mm	510mm	7Bar
25L	1/2"	285mm	590mm	130mm	260mm	1005mm	640mm	7Bar

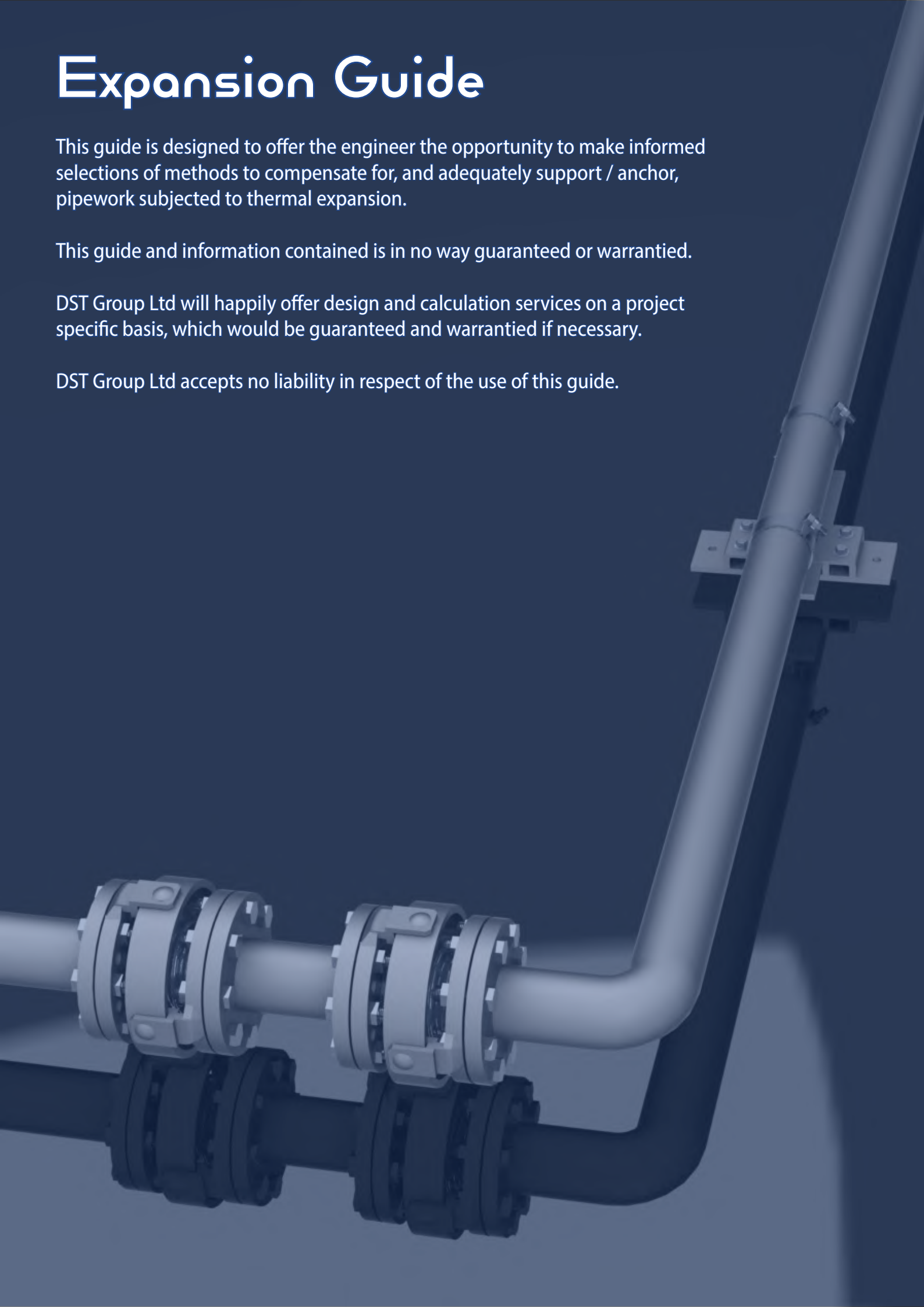
# Expansion Guide

This guide is designed to offer the engineer the opportunity to make informed selections of methods to compensate for, and adequately support / anchor, pipework subjected to thermal expansion.

This guide and information contained is in no way guaranteed or warrantied.

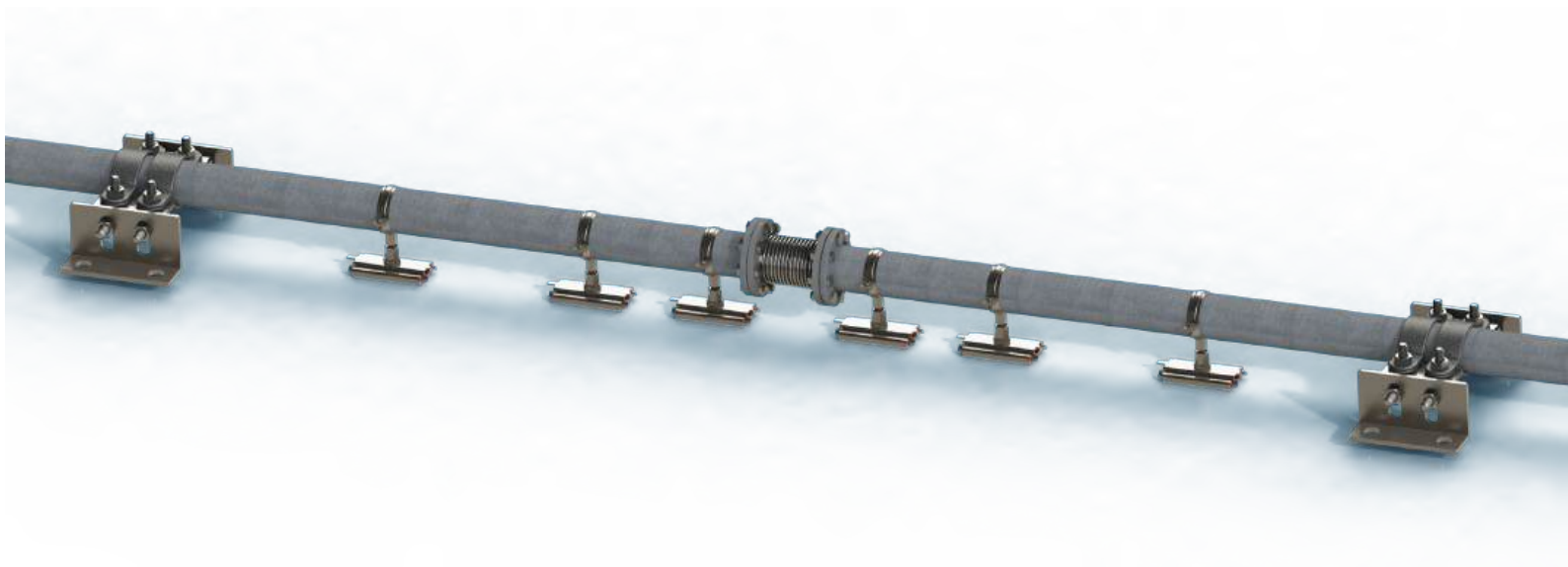
DST Group Ltd will happily offer design and calculation services on a project specific basis, which would be guaranteed and warrantied if necessary.

DST Group Ltd accepts no liability in respect of the use of this guide.





60	Thermal Expansion
61-62	Natural Flexibility
63-64	Flexibility of a pipe with offset
65	Flexibility of pipe with loop
66	Calculating drop rod length
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71	Useful conversion factors
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It is an accepted rule of physics that a material, when subjected to a change of temperature, will expand or contract directly related to the temperature. Pipework is therefore subject to the same principal.

Factors to be considered when calculating the amount of expansion are as follows:

1. The amount of temperature change – based upon the lowest ambient temperature.
2. The overall length of pipe upon which calculations are to be based.
3. The co-efficient of expansion for the required material.

### Carbon Steel Pipes

The co-efficient of expansion for carbon Steel is:

(these co-efficients can be used for standard Stainless Steels)

$$0 - 100^{\circ}\text{C} = \text{Cof}\Delta 1.11$$

$$101^{\circ}\text{C} + = \text{Cof}\Delta 1.21$$

### Copper Pipes

Copper expands at a 50% higher rate, the equation would be:

(these co-efficients can be used for thin wall Stainless Steels)

$$0 - 100^{\circ}\text{C} = \text{Cof}\Delta 1.11 \times 1.5$$

$$101^{\circ}\text{C} + = \text{Cof}\Delta 1.21 \times 1.5$$

### Plastic Pipes

The rate of expansion for plastics differs between materials and manufacturers; it is always advisable to check the rate of thermal expansion with the manufacturer.

The following table shows the expansion ratio in mm/m. This can be used instead of calculating individual sections of pipe.

Expansion Ratio of Pipe			
Steam or Water Temperature		Expansion in mm/m	
$^{\circ}\text{C}$	$^{\circ}\text{F}$	Steel Pipes	Copper Pipes
0	0	0	0
65	149	0.72	1.08
82	180	0.91	1.37
120	248	1.45	2.18
134	272	1.62	2.43
144	290	1.74	2.61
152	305	1.83	2.76
170	338	2.05	3.09
184	363	2.23	3.34
198	388	2.39	n/a
205	405	2.48	n/a
217	422	2.62	n/a
226	439	2.73	n/a

By using the table above we can extract the movement ratio in mm/m and multiply by the total length of pipe-work:

#### Example 1

To calculate the expansion on a 75m length of carbon Steel pipe passing 10Bar steam:

$$\begin{aligned} \text{Temperature Rise} &= 184^{\circ}\text{C} \\ \text{Expansion in mm/m} &= 2.23\text{mm/m} \\ \text{Pipe Length} &= 75\text{m} \\ \text{Total Expansion} &= 75 \times 2.23 = 167.5\text{mm}\Delta \end{aligned}$$

#### Example 2

To calculate the expansion on a 25m length of Copper pipe supplying LTHW at 82°C:

$$\begin{aligned} \text{Temperature Rise} &= 82^{\circ}\text{C} \\ \text{Expansion in mm/m} &= 1.37\text{mm/m} \\ \text{Pipe Length} &= 25\text{m} \\ \text{Total Expansion} &= 25 \times 1.37 = 34.25\text{mm}\Delta \end{aligned}$$

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Pipework systems have various changes in direction within itself. As this occurs pipework systems should have some natural flexibility within it. The following pages will help the engineer use the changes in direction to naturally flex the expansion that will occur.

Expansion within hot pipework is always present. Expansion rates of 74.4mm over a length of 30mtrs Steel pipe-work carrying steam at 205°C needs channelling somewhere.

Items which need to be addressed by the engineer:

- A. Method of pipework bracketing to allow natural flexibility to occur.
- B. Pipework material
- C. Pipework nominal size.
- D. Location and layout of pipework including length.
- E. Minimum and maximum temprature of pipework, media and ambient. Applicable to ambient temperatures 0°C and under.
- F. Working and test pressure of pipework media
- G. Connection points to plant etc.
- H. Structure of building.

Once we have addressed all these items then we can look at solutions.

To help take into account the above items, the engineer should use pipework anchors. Pipework anchors can separate large complicated pipework systems into smaller more manageable systems.

Positioning the anchors so an offset occurs between the anchors could naturally compensate the expansion.

The forces imposed upon an anchor is primarily made up from two areas:

- A. Force to deflect pipework offset.
- B. Frictional force due to pipework bracketry.

Forces subjected onto the anchor positions can be calculated using the following formulae:-

$$F = \frac{24IX}{L^3} \quad \text{For carbon Steel pipes.}$$

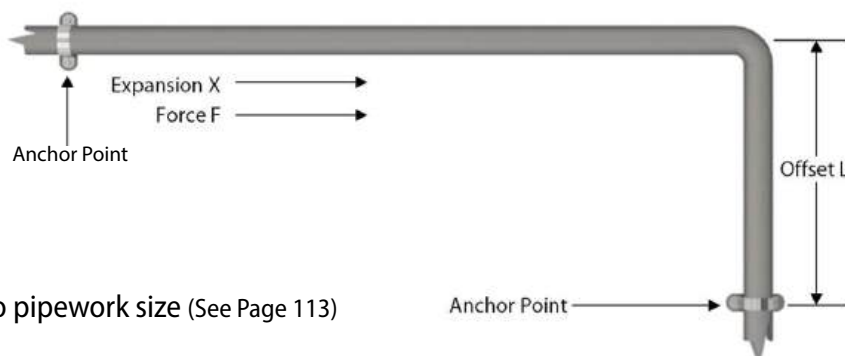
$$F = \frac{8.4IX}{L^3} \quad \text{For Copper pipes.}$$

F = Force in Newtons

I = Moment of Inertia in cm<sup>4</sup> applicable to pipework size (See Page 113)

X = Expansion in mm

L = Length of offset in metres (shortest length)



You will also need to add to this result the force is encountered via frictional resistance of pipework bracketry on the pipework.

Examples of frictional resistance can be calculated using the following formulae:-

$$F = L \times 15 \times \frac{I/D}{25}$$

F = Force in Newtons

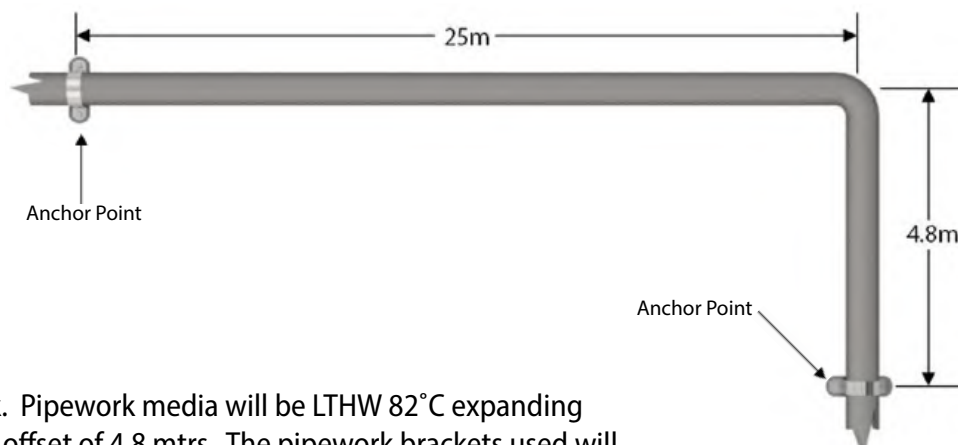
L = Length of pipework (longest length)

15 = 15 Newtons which is the frictional resistance based on the use of a DST-253 Slide Guide

I/D = Inside diameter of the pipework



### Example 1



25 mtrs 65NB steel pipework. Pipework media will be LTHW 82°C expanding (0.91 x 25) 22.75mm with an offset of 4.8 mtrs. The pipework brackets used will be DST 253 Slide Guides.

$$(A) \quad \frac{F = 24IX}{L^3} \quad \frac{F = 24 \times 54.5 \times 22.75}{112.68} = 264.08 \text{ Newtons}$$

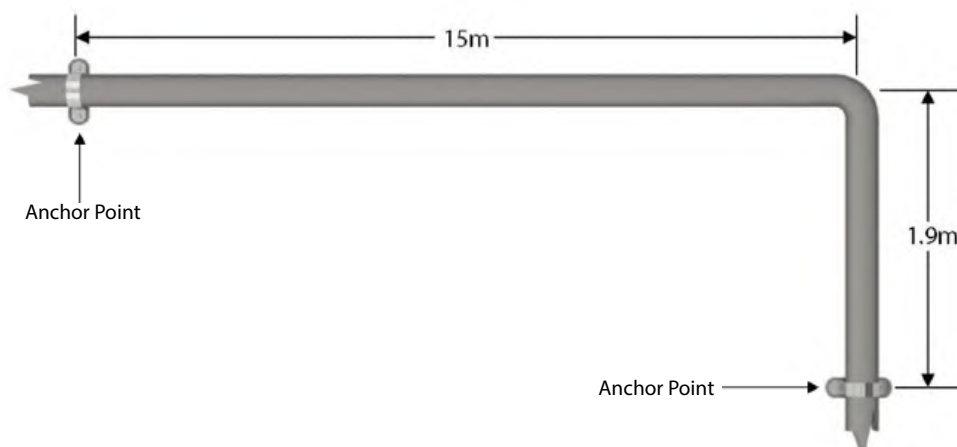
(B) We also need to add the force to overcome frictional resistance:

$$F = L \times 15 \times \frac{I/D}{25} \quad F = \frac{25 \times 15 \times 65}{25} = 937.5 \text{ Newtons}$$

Therefore the total anchor load will be:

$$(A) = 264.08 + (B) = 937.50 = 1201.58 \text{ Newtons}$$

### Example 2



42cu (table Y) Copper pipework. Pipework media LTHW 82°C. expanding (1.37 x 15) = 20.55mm The pipework brackets used will be DST Group Ltd Surefix UL Pipe Clip + DST Ball Hanger.

$$(A) \quad \frac{F = 8.4IX}{L^3} \quad \frac{F = 8.4 \times 3.93 \times 20.55}{6.86} = 98.89 \text{ Newtons}$$

(B) We also need to add the force to overcome frictional resistance.

$$F = L \times 30 \times \frac{I/D}{25} \quad F = \frac{15 \times 30 \times 42}{25} = 675.00 \text{ Newtons}$$

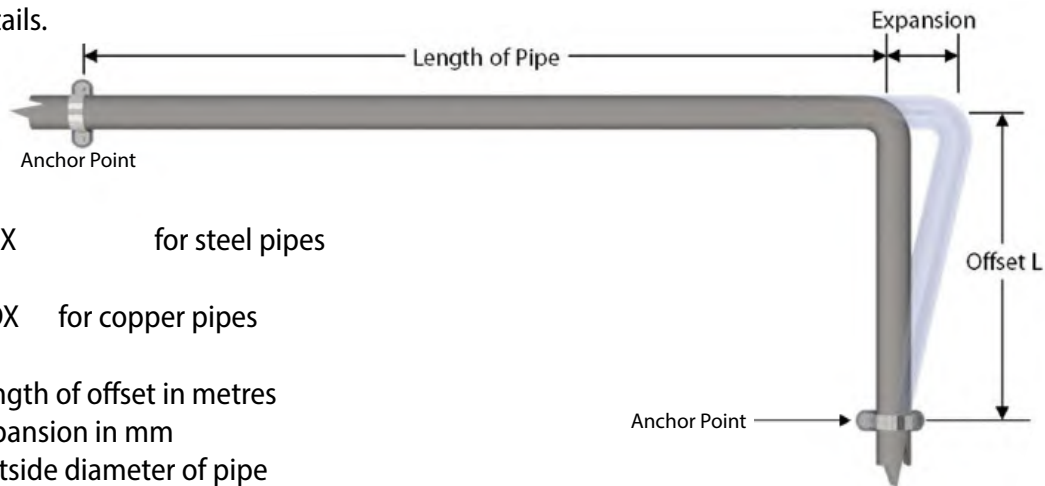
Therefore the total anchor load will be:

$$(A) = 98.89 + (B) = 675.00 = 773.89 \text{ Newtons}$$



If natural offsets occur within the design of the pipework system, it may be possible to utilise this to take up thermal expansion by using the natural flexibility of the pipework. The tables below show the minimum length of offset required for Steel and Copper pipes subjected to thermal expansion.

A system utilising an offset to take up expansion can be bracketed utilising most common types of brackets including drop rods, sliding and rolling supports. For more information, please see the first section of this product guide for more details.



Offset  $L = 0.1 \sqrt{DX}$  for steel pipes

Offset  $L = 0.06 \sqrt{DX}$  for copper pipes

L = Length of offset in metres  
X = Expansion in mm  
D = Outside diameter of pipe

Table showing single offset for steel pipes (without cold draw)

Expansion	Pipe Nominal Bore											
X	15nb	20nb	25nb	32nb	40nb	50nb	65nb	80nb	100nb	125nb	150nb	200nb
1mm	0.46	0.52	0.58	0.65	0.69	0.77	0.87	0.94	1.09	1.18	1.29	1.48
3mm	0.79	0.90	1.01	1.12	1.20	1.34	1.51	1.63	1.84	2.05	2.24	2.57
5mm	1.02	1.16	1.30	1.45	1.55	1.73	1.95	2.11	2.39	2.65	2.89	3.32
10mm	1.45	1.64	1.84	2.04	2.19	2.44	2.75	2.98	3.38	3.74	4.09	4.69
15mm	1.77	2.01	2.25	2.51	2.68	3.00	3.38	3.65	4.13	4.58	5.01	5.74
20mm	2.05	2.32	2.61	2.89	3.09	3.46	3.89	4.22	4.77	5.90	5.79	6.63
30mm	2.51	2.84	3.19	3.54	3.79	4.24	4.77	5.16	5.85	6.48	7.09	8.12
40mm	2.89	3.29	3.69	4.09	4.38	4.89	5.51	5.97	6.75	7.48	8.19	9.38
60mm	3.55	4.02	4.02	5.01	5.36	6.00	6.75	7.31	8.27	9.17	10.04	11.49
80mm	4.09	4.65	4.65	5.79	6.19	6.92	7.79	8.43	9.54	10.58	11.59	13.27
100mm	4.58	5.19	5.19	6.48	6.92	7.75	8.71	9.43	10.67	11.83	12.96	14.83

Table showing single offset for copper pipes (without cold draw)

Expansion	Pipe Nominal Bore											
X	15nb	22nb	28nb	35nb	42nb	54nb	67nb	76nb	108nb	133nb	159nb	219nb
1mm	0.23	0.28	0.32	0.35	0.39	0.44	0.49	0.52	0.62	0.69	0.76	0.89
3mm	0.40	0.49	0.55	0.61	0.67	0.76	0.85	0.91	1.08	1.19	1.31	1.54
5mm	0.52	0.63	0.71	0.79	0.87	0.99	1.09	1.17	1.39	1.55	1.69	1.99
10mm	0.73	0.89	1.00	1.12	1.22	1.39	1.55	1.65	1.97	2.19	2.39	2.81
15mm	0.90	1.09	1.23	1.37	1.52	1.71	1.90	2.02	2.41	2.68	2.93	3.44
20mm	1.03	1.26	1.42	1.59	1.74	1.97	2.19	2.34	2.78	3.09	3.38	3.97
30mm	1.28	1.54	1.74	1.94	2.12	2.41	2.69	2.86	3.42	3.79	4.14	4.86
40mm	1.47	1.78	2.01	2.24	2.45	2.79	3.11	3.31	3.98	4.38	4.78	5.62
60mm	1.80	2.18	2.46	2.75	3.01	3.42	3.80	4.05	4.83	5.36	5.86	6.88
80mm	2.07	2.52	2.84	3.17	3.48	3.94	4.39	4.68	5.58	6.19	6.77	7.94
100mm	2.32	2.81	3.17	3.55	3.89	4.41	4.91	5.23	6.24	6.92	7.56	8.88



Example of how cold draw can be used:

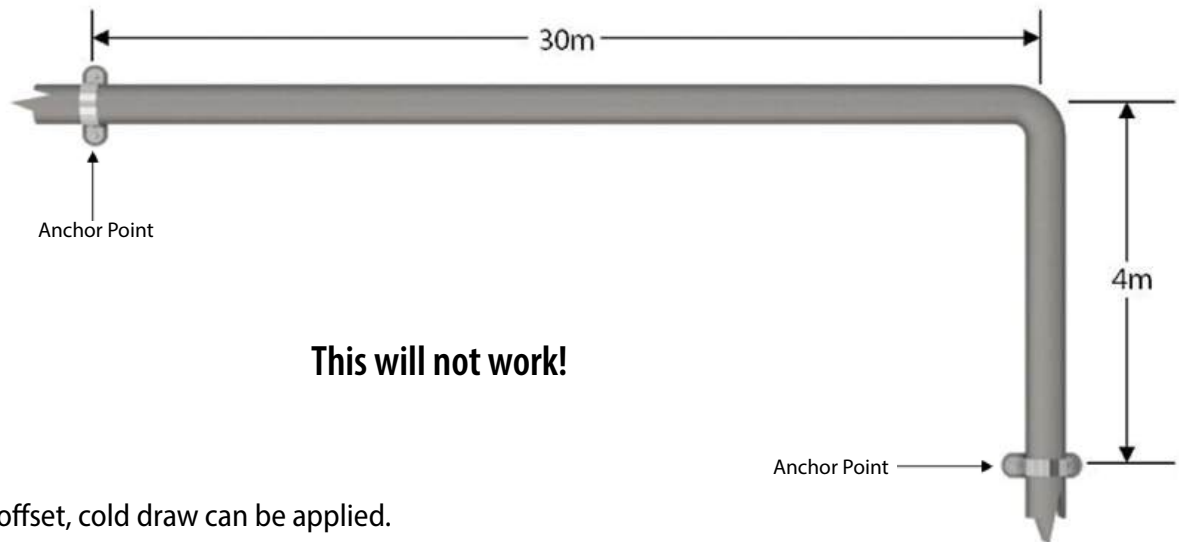
30m of 100NB steel pipework

82°C LTHW

$\Delta = L \times T \times C \text{ of } \Delta$

$$\Delta = 30 \times 82 \times 1.11 = 27.3\text{mm } \Delta$$

27.3mm will require a 5.85m offset (according to the table on the previous page)

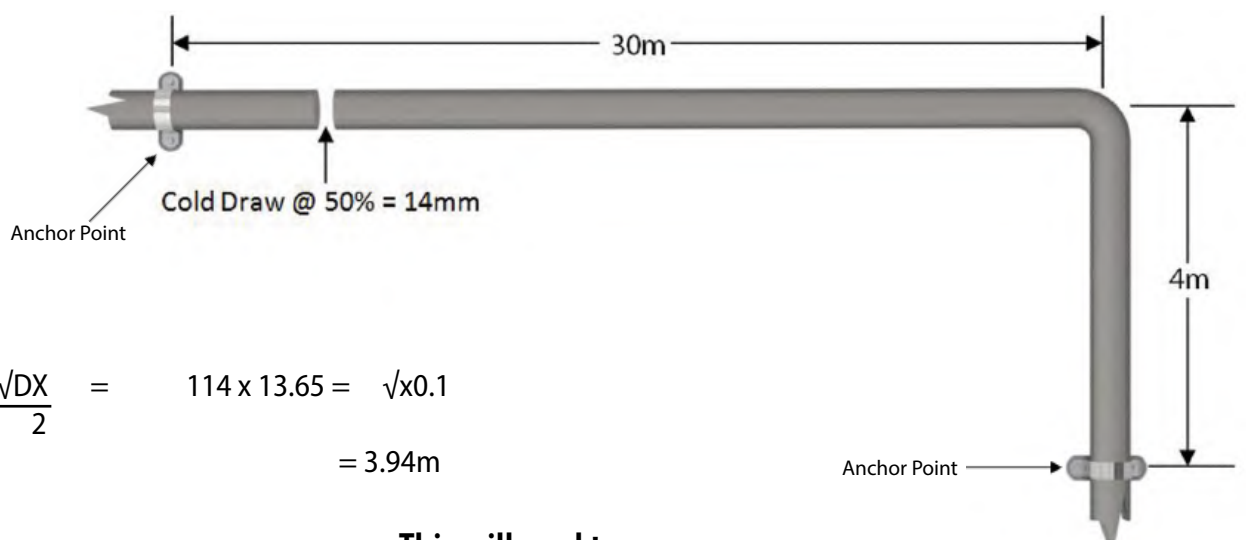


If there is insufficient offset, cold draw can be applied.

Standard practice would be to reduce the length of the pipework or "COLD DRAW" it by 50% of the expected expansion.

Once applied, the pipework is in effect pre-stressed, allowing the offset to take up twice the amount of expansion.

Therefore, if 27.3mm of expansion will require a 5.85m Offset, with 50% cold draw, the expansion is effectively 13.65mm, therefore the offset required will be 3.94m.



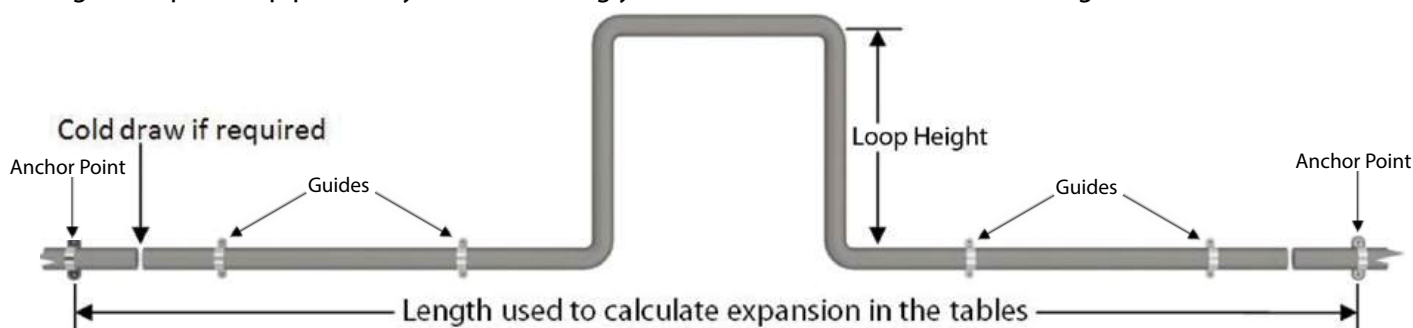
$$\text{Offset } L = 0.1 \frac{\sqrt{DX}}{2} = 114 \times 13.65 = \sqrt{x0.1} = 3.94\text{m}$$





If the use of expansion devices is not suitable for the application, you may be able to utilise expansion loops to take up the thermal expansion of the pipework. Loops should always be positioned in the middle of a pipe run, with anchors at each end of the run.

Loops are often useful on a drop rod system as axial expansion devices cannot be used on such a system. If you design a loop into a pipework system, we strongly recommend the use of DST Ball Hangers to aid movement.



Offset  $L = 0.1 \frac{DX}{2}$  For steel pipes  $L$  = Length of offset in metres  
 $X$  = Expansion in mm

$D$  = Outside diameter of pipe

Offset  $L = 0.06 \frac{DX}{2}$  For copper pipes

Table showing single offset for steel pipes (without cold draw)

Expansion	Pipe Nominal Bore											
X	15nb	20nb	25nb	32nb	40nb	50nb	65nb	80nb	100nb	125nb	150nb	200nb
1mm	0.32	0.36	0.41	0.46	0.49	0.55	0.62	0.67	0.75	0.84	0.92	1.05
3mm	0.56	0.64	0.71	0.79	0.85	0.95	1.07	1.15	1.31	1.45	1.59	1.82
5mm	0.72	0.82	0.92	1.02	1.09	1.22	1.38	1.49	1.69	1.87	2.05	2.35
10mm	1.02	1.16	1.30	1.45	1.55	1.73	1.94	2.11	2.39	2.65	2.89	3.31
15mm	1.25	1.50	1.59	1.77	1.89	2.12	2.39	2.58	2.92	3.24	3.55	4.06
20mm	1.45	1.64	1.84	2.05	2.19	2.45	2.76	2.98	3.38	3.74	4.09	4.69
30mm	1.77	2.01	2.26	2.51	2.68	3.00	3.38	3.65	4.13	4.58	5.01	5.74
40mm	2.05	2.32	2.61	2.89	3.09	3.46	3.89	4.22	4.77	5.29	5.79	6.63
60mm	2.50	2.84	3.19	3.54	3.79	4.24	4.77	5.17	5.58	6.48	7.09	8.12
80mm	2.89	3.29	3.69	4.09	4.38	4.89	5.11	5.97	6.75	7.48	8.19	9.93
100mm	3.24	3.67	4.12	4.58	4.89	5.48	6.16	6.67	7.54	8.37	9.17	10.48

Table showing single offset for copper pipes (without cold draw)

Expansion	Pipe Nominal Bore											
X	15nb	22nb	28nb	35nb	42nb	54nb	67nb	76nb	108nb	133nb	159nb	219nb
1mm	0.16	0.19	0.22	0.25	0.27	0.31	0.35	0.37	0.44	0.49	0.53	0.63
3mm	0.28	0.34	0.38	0.43	0.48	0.54	0.60	0.64	0.76	0.85	0.92	1.08
5mm	0.56	0.44	0.50	0.56	0.61	0.69	0.77	0.83	0.98	1.09	1.19	1.40
10mm	0.59	0.63	0.71	0.79	0.87	0.98	1.09	1.17	1.39	1.55	1.69	1.98
15mm	0.63	0.77	0.87	0.97	1.06	1.21	1.34	1.43	1.71	1.89	2.07	2.43
20mm	0.73	0.89	1.00	1.12	1.22	1.39	1.55	1.65	1.97	2.19	2.39	2.81
30mm	0.90	1.09	1.23	1.37	1.51	1.71	1.90	2.03	2.41	2.67	2.93	3.43
40mm	1.04	1.26	1.42	1.59	1.73	1.97	2.19	2.34	2.79	3.09	3.38	3.97
60mm	1.27	1.54	1.74	1.94	2.12	2.41	2.69	2.86	3.42	3.79	4.14	4.86
80mm	1.47	1.77	2.01	2.24	2.46	2.78	3.11	3.31	3.94	4.38	4.78	5.62
100mm	1.64	1.99	2.24	2.51	2.75	3.12	3.47	3.69	4.41	4.89	5.35	6.28

Cold draw can be used if the size of the loop cannot be accommodated. The rate of cold draw is normally 50% of the total movement. If the pipework is suspended using drop rods, it would be advisable to use DST Ball Hangers to reduce stresses as the pipework moves.



Drop rod calculation example:

Calculation of drop rod length =  $\Delta \times \tan 5^\circ$

To calculate the drop rod length required  
for a length of 50nb pipe expanding 35mm

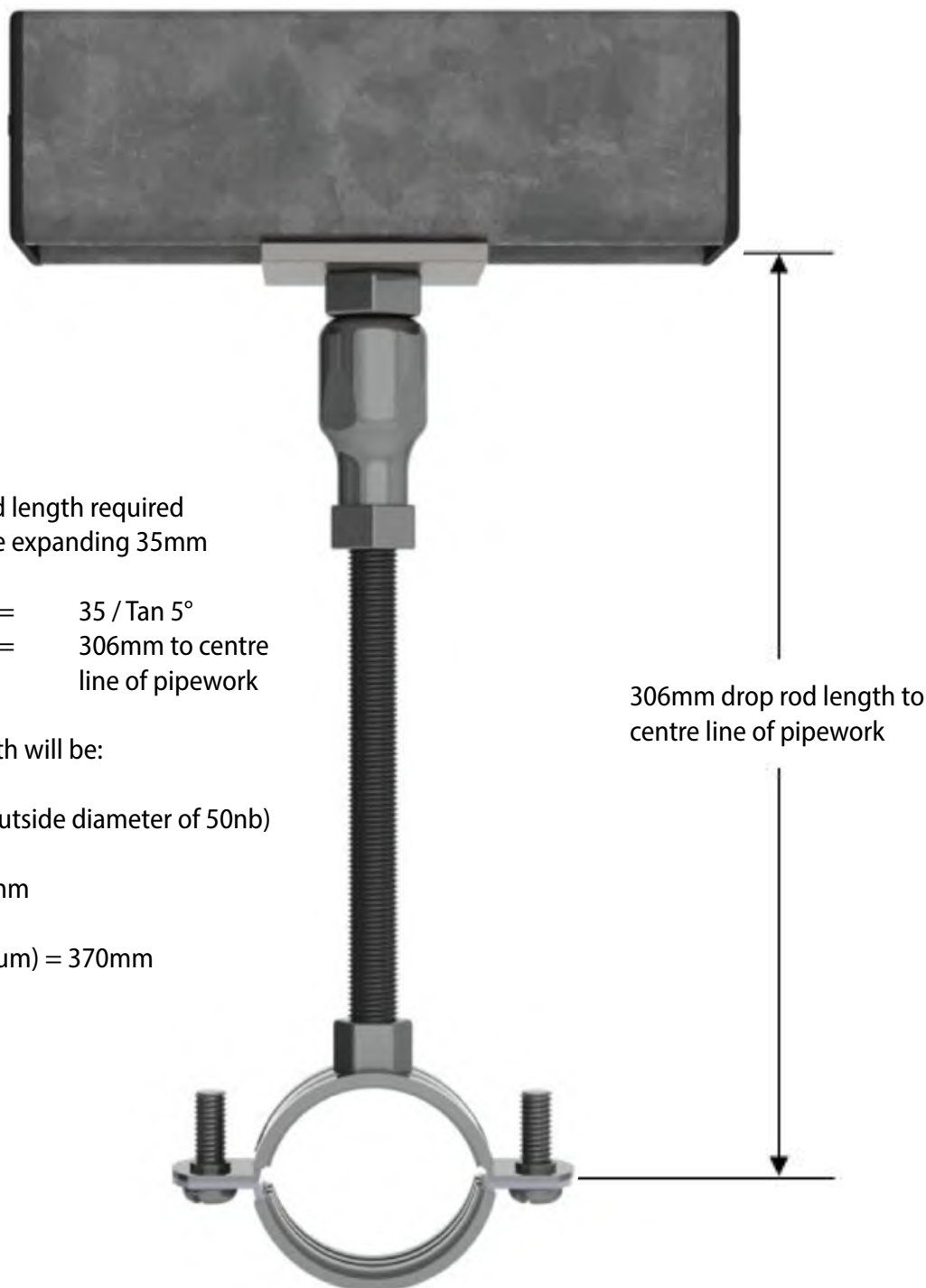
Expansion in mm      =      35 /  $\tan 5^\circ$   
                                 =      306mm to centre  
                                 line of pipework

Therefore drop rod length will be:

400mm – ½ of 60mm (outside diameter of 50nb)

400mm – 30mm = 276mm

Drop rod length (minimum) = 370mm



If the drop rod length required is too long for the installation, DST Ball Hangers or DST Hemispherical Cups and Washers can be used to increase the movement, but decrease the drop rod length. Further advice can be given by one of our technical sales engineers.



### Pipe Anchors for AX1, AX2 and AX3 Expansion Compensators

Pipe anchors are needed to overcome the forces set up when axial bellows and under pressure. The following conditions can exist:

Pipeline under test pressure

Pipeline under working pressure and temperature

Each condition must be investigated:

- Pipeline under test pressure - this force is made up of test pressure multiplied by the effective area.
- Pipeline under working pressure and temperature - the force is made up of three components;
  - a. The force to overcome internal pressure; i.e working pressure multiplied by effective area.
  - b. The force to compress the expansion joint. This is calculated by using the force to compress in newtons/mm.
  - c. The force to overcome the friction of pipe movement, which can be estimated at 30N per metre of pipeline for each 25mm of pipe diameter. This assumes about the worst possible condition of face to face sliding supports. Coefficient of friction about 0.4. If hangers or rollers are used, reduce the figure of 15N per metre of pipeline.

Thus the total force = a + b + c

Expansion joints should not be removed during a pressure test. The purpose of a pressure test is to put the pipeline under stresses greater than those which occur under working conditions. If the expansion joints are removed the anchors and guides are not subjected to any stresses and therefore faults in their design will not show up.

When positioning anchors, great care should be taken to ensure that the main structure to which the anchor is attached, is in fact strong enough to withstand the forces transmitted by the anchor. Also ensure that when a number of pipes are anchored at one point, the total force under working conditions is considered.

Bellow is an example showing the anchor forces set up under different conditions.

In these examples 1Bar = 100kN/m<sup>2</sup>



Calculate the anchor force for a 25m long pipeline of 32mm nb at 6 Bar working pressure and temperature of 82°C, using modular slide guides.

At 82°C the expansion in mm/metre is 1.0

Therefore the total expansion is 1.0 x 25 = 25mm

Test pressure is 1.5 x working pressure = 1.5 x 6 = 9 Bar (=900 kN/m<sup>2</sup>)

Effective area can be taken from the product catalogue, in this case = 16cm<sup>2</sup>

For a pipeline under the test conditions, TOTAL FORCE = test pressure x effective area = 900 x 16 x 0.1 = 1,440 N  
working pressure of 6 (=600 kN/m<sup>2</sup>)

For a pipeline under working conditions, TOTAL FORCE = a + b + c

a = 600 x 16 x 0.1 = 960 N

b = 15 x 25 = 375N

c = 15 x 25 x  $\frac{32}{25}$  = 480 N

Therefore, TOTAL FORCE = 960 + 375 + 480 = 1,815N



Pipe Anchors using Lateral/Angular Expansion Compensators FA1, FA2, AN1, AN2, GI1, GI2

It is preferable to install the above type of expansion compensators if the engineer has concerns over anchor loads. The anchor loads created by the use of these units are significantly lower than the load created by using an axial expansion compensator.

Anchor loads using lateral / angular expansion compensators are created from two fields.

1. The force to deflect the expansion compensator.
2. The force created due to frictional resistance.

Example



1. The force To deflect. This information can be found earlier in this guide for DST Type DST/AN1/ PN16. In this case 100mm it will be:

$$\begin{aligned}\text{Force to deflect each expansion compensator} &= 98 \text{ N / deg} \times 2 \\ &= 196.00 \text{ newtons}\end{aligned}$$

2. Force to overcome friction. In this example we will be bracketing using DST 114 Roller Chair and Guide, which has a frictional resistance of 30 Newtons.

$$\text{Force to overcome frictional resistance} = 15 \times 90 \times \frac{100}{25} = 5400 \text{ newtons}$$

Therefore the total anchor force will be:

$$1 = 196 \text{ newtons} \quad + \quad 2 = 5400 \text{ newtons}$$

$$\text{Anchor load total} = 5596 \text{ newtons}$$

As you can see the majority of the anchor load is made up from the frictional resistance of pipework bracketry. It is advisable to use pipework bracketry which has a low frictional resistance such as a DST 253 Slide Guide. Please seek further advise from our technical sales team on frictional resistance and futher pipework bracketry.

These types of expansion compensators are can be used on a drop rod system.



DST 102 - Saddle Guide



DST Guide Clips



DST LF1, LF2 & LF3  
Low Friction Slide Guide



DST 132 - Nylon Coated Saddle  
Guide c/w Polypropylene Strip



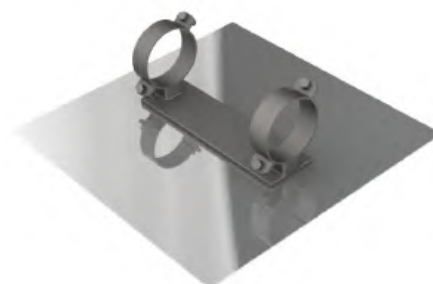
DST240 (O) - Oversized Brass  
Munsen Ring



DST MS1 & MS2  
Modular Slide Guide



DST 253G - PTFE Slide Guide  
Bracket



DST 253S - PTFE Skid Bracket



# Pipework & Expansion Guide

## Flange Data Table

Created on: 15 Oct 2018

Version: 5.05

Last Updated: 16/12/2024



Nominal Size	Flange Table	Outer Ø	Nº of Bolt Holes	Bolt Hole Ø	Bolt Circle (P.C.D.)	Nominal Size	Flange Table	Outer Ø	Nº of Bolt Holes	Bolt Hole Ø	Bolt Circle (P.C.D.)
15mm 1/2"	E	95	4	14	67	80 mm 3"	E	184	4	18	146
	F	95	4	14	67		F	203	8	18	165
	H	114	4	18	83		H	203	8	18	165
	150	89	4	16	60		150	191	4	19	152
	300	95	4	16	67		300	210	8	22	168
	6	80	4	11	55		6	190	4	18	150
	10	95	4	14	65		10	200	8	18	160
	16	95	4	14	65		16	200	8	18	160
	25	95	4	14	65		25	200	8	18	160
20 mm 3/4"	E	101	4	14	73	100 mm 4"	E	216	8	18	178
	F	101	4	14	73		F	229	8	18	191
	H	114	4	18	83		H	229	8	18	191
	150	98	4	16	70		150	229	8	19	191
	300	117	4	19	83		300	254	8	22	200
	6	90	4	11	65		6	210	4	18	170
	10	105	4	14	75		10	220	8	18	180
	16	105	4	14	75		16	220	8	18	180
	25	105	4	14	75		25	235	8	22	190
25 mm 1"	E	115	4	14	83	125 mm 6"	E	254	8	18	210
	F	121	4	18	87		F	279	8	22	235
	H	121	4	18	87		H	279	8	22	235
	150	108	4	16	79		150	254	8	22	216
	300	124	4	19	89		300	279	8	22	235
	6	100	4	11	75		6	240	8	18	200
	10	115	4	14	85		10	250	8	18	210
	16	115	4	14	85		16	250	8	18	210
	25	115	4	14	85		25	270	8	26	220
32 mm 1 1/4"	E	121	4	14	87	150 mm 6"	E	279	8	22	235
	F	133	4	18	98		F	305	12	22	260
	H	133	4	18	98		H	305	12	22	260
	150	117	4	16	89		150	279	8	22	241
	300	133	4	19	98		300	318	12	22	270
	6	120	4	14	90		6	265	8	18	225
	10	140	4	18	100		10	285	8	22	240
	16	140	4	18	100		16	285	8	22	240
	25	140	4	18	100		25	300	8	26	250
40 mm 1 1/2"	E	121	4	14	98	200 mm 8"	E	337	8	22	292
	F	133	4	18	105		F	368	12	22	324
	H	133	4	18	105		H	368	12	22	324
	150	117	4	16	98		150	343	8	22	298
	300	133	4	22	114		300	381	12	25	330
	6	120	4	14	100		6	320	8	18	280
	10	140	4	18	110		10	340	8	22	295
	16	140	4	18	110		16	340	12	22	295
	25	140	4	18	110		25	360	12	26	310
50 mm 2"	E	152	4	18	114	250 mm 10"	E	406	12	22	356
	F	165	4	18	127		F	432	12	25	381
	H	165	4	18	127		H	432	12	25	381
	150	152	4	19	121		150	406	12	25	362
	300	165	8	19	127		300	444	12	29	387
	6	140	4	14	110		6	375	12	18	335
	10	165	4	18	125		10	395	12	22	350
	16	165	4	18	125		16	405	12	26	355
	25	165	4	18	125		25	425	12	30	370
65 mm 2 1/2"	E	165	4	18	127	300 mm 12"	E	457	12	25	406
	F	184	8	18	146		F	489	16	25	438
	H	184	8	18	146		H	489	16	25	438
	150	178	4	19	140		150	482	12	25	432
	300	191	8	22	149		300	521	16	32	451
	6	160	4	14	130		6	440	12	22	395
	10	185	4	18	145		10	445	12	22	400
	16	185	4	18	145		16	460	12	26	410
	25	185	8	18	145		25	485	16	30	430

### Key:

E = BS10 Table 'E'

F = BS10 Table 'F'

H = BS10 Table 'H'

150 = BS1560 Class 150,  
ASA 150, ANSI B16.5  
Class 150

300 = BS1560 Class 300,  
ASA 300, ANSI B16.5  
Class 300

6 = BS4504 PN6, DIN2501  
PN6

10 = BS4504 PN10,  
DIN2501 PN16

16 = BS4504 PN16, DIN  
2501 PN16

25 = BS4504 PN25,  
DIN2501 PN25



### Pressure Units

Symbol	Description	Bar	kPa	kN/m <sup>2</sup>	psi	atm	m wg
1 Bar	Bar		100.0	100.0	14.5037	0.9869	10.1972
1 kPa	Kilopascal	0.01		1.0	0.145	0.0099	0.102
1 kN/m <sup>2</sup>	Kilonewton per square metre	0.01	1.0		0.145	0.0099	0.102
1 psi	Pound per square inch	0.0689	6.8948	6.8948		0.0681	0.07031
1 atm	Atmosphere	1.0133	101.3250	101.3250	14.696		10.3323
1 m wg	Metre water gauge	0.0981	9.8067	9.8067	1.422	0.0968	

### Vacuum Units

Symbol	Description	mm	Hg in Hg	psi	Torr	Bar	atm
1mm Hg	Millimetre of mercury		0.0394	0.49	1.0	0.0013	0.0013
1 in Hg	Inch of mercury	25.4		0.019	25.4	0.00338	0.0334
1 psi	Pound per square inch	51.7	2.04		51.7	0.0689	0.0681
1 Torr	Torr	1.0	0.0394	0.49		0.0013	0.0013
1 Bar	Bar	750	29.53	14.5037	750		0.9869
1 atm	Atmosphere	760	29.92	14.696	760	1.0133	

### Linear Units

Symbol	Description	mm	cm	m	in	ft	yd
1mm	Millimetre		0.1	0.001	0.0394	0.0033	0.0011
1cm	Centimetre	10		0.1	0.3937	0.0328	0.0109
1m	Metre	1000	100		39.3701	3.2808	1.0936
1 in	Inch	25.4	2.54	0.0254		0.0833	0.0278
1 ft	Foot	304.8	30.48	0.3048	12		0.3333
1 yd	Yard	914.4	91.44	0.9144	36	3	

### Weight Units

Symbol	Description	g	kg	t	oz	lb	tn
1g	Gram		0.001	0.000001	0.036	0.0022	0.0000098
1kg	Kilogram	1000		0.001	36.413	2.2047	0.0009843
1 t	Tonne (metric)	1000000	1000		36413.44	2204.7222	0.984251
1oz	Ounce	28.4	0.0284	0.0000284		0.0625	0.0000279
1 lb	Pound	453.6	0.4536	0.0004536	16		10.0004465
1 tn	Ton (imperial)	1016000	1016	1.016	35840	2240	

### Temperature Units

Symbol	Description	°C	°F	°K
°C	Degree Celsius		Times 1.8, plus 32	Plus 273.16
°F	Degree Farenheit	Minus 32 divide 1.8		Divide 1.8 plus 255.38
°K	Degree Kelvin	Minus 273.16	Minus 255.38	

# Pipework & Expansion Guide

## Pipe Data Table

Created on: 15 Oct 2018  
Version: 5.05  
Last Updated: 16/12/2024



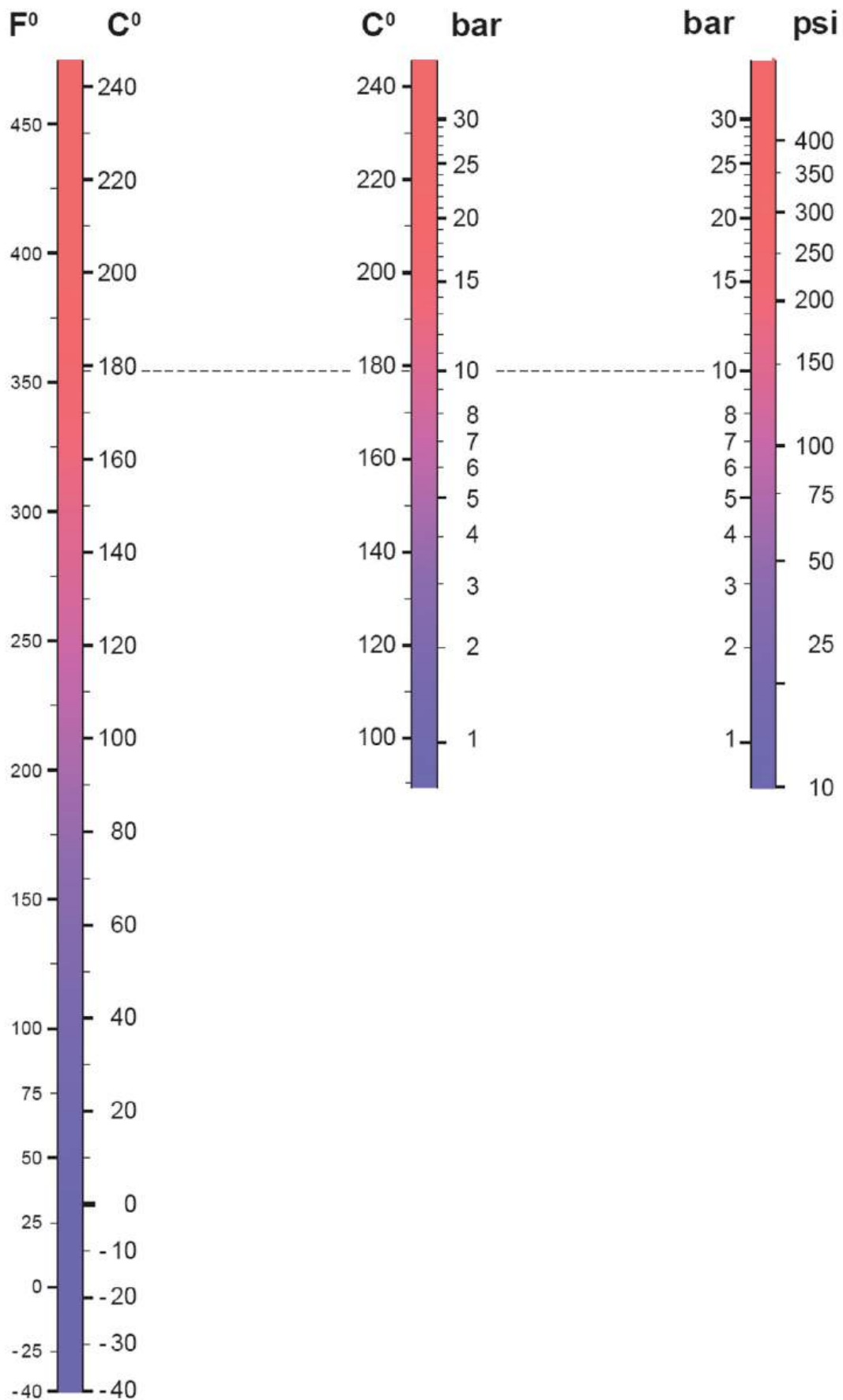
Nominal Size	Material	Wall Thickness	Max O/D	Min O/D	Mean I/D	Int Cross Section Area	Metal Cross Section Area	Surface Area	Moment of Inertia	Section Modulus	Pipe Weight	Water Content
		mm	mm	mm	mm	mm <sup>2</sup>	mm <sup>2</sup>	m <sup>2</sup>	cm <sup>4</sup>	cm <sup>3</sup>	kg/m	l/m
15 mm	Heavy Steel	3.25	21.7	21.1	14.9	175	186	0.067	0.79	0.736	1.45	0.175
1/2"	Medium Steel	2.65	31.7	21.1	16.2	205	155	0.067	0.71	0.656	1.22	0.250
	Copper (Table X)	0.70	15.045	14.965	13.6	145	31.6	0.047	0.08	0.108	0.28	0.145
	Copper (Table Y)	1.00	15.045	14.965	13.0	133	44.1	0.047	0.11	0.145	0.39	0.133
15 mm	Copper (Table Z)	0.50	15.045	14.965	14.0	154	22.9	0.047	0.06	0.080	0.20	0.154
20 mm	Heavy Steel	3.25	27.2	26.6	20.4	326	243	0.085	1.75	1.29	1.90	0.326
3/4"	Medium Steel	2.65	27.2	26.6	21.6	367	203	0.085	1.50	1.11	1.58	0.367
	Copper (Table X)	0.90	22.055	21.975	20.2	321	59.6	0.069	0.33	0.303	0.52	0.321
	Copper (Table Y)	1.20	22.055	21.975	19.6	302	78.3	0.069	0.43	0.387	0.69	0.302
22 mm	Copper (Table Z)	0.60	22.055	21.975	20.8	340	40.2	0.069	0.23	0.210	0.35	0.340
25mm	Heavy Steel	4.05	34.2	33.4	25.7	518	380	0.106	4.29	2.54	2.97	0.518
1"	Medium Steel	3.25	34.2	33.4	27.3	586	312	0.106	3.70	2.20	2.44	0.586
	Copper (Table X)	0.90	28.055	27.975	26.2	540	76.7	0.085	0.71	0.504	0.68	0.540
	Copper (Table Y)	1.20	28.055	27.975	25.6	516	101	0.085	0.91	0.650	0.89	0.516
28 mm	Copper (Table Z)	0.60	28.055	27.975	26.83	565	51.7	0.085	0.49	0.347	0.46	0.565
32 mm	Heavy Steel	4.05	42.9	42.1	34.3	927	490	0.134	9.16	4.31	3.84	0.926
1 1/4"	Medium Steel	3.25	42.9	42.1	35.9	1016	461	0.134	7.74	3.64	3.14	1.016
	Copper (Table X)	0.90	35.07	34.99	32.6	837	128	0.110	1.83	1.043	1.12	0.837
	Copper (Table Y)	1.20	35.07	34.99	32.0	806	158	0.110	2.22	1.270	1.39	0.806
35 mm	Copper (Table Z)	0.70	35.07	34.99	33.6	889	75.5	0.110	1.11	0.635	0.67	0.889
40 mm	Heavy Steel	4.05	48.8	48.0	40.2	1272	566	0.152	13.98	5.79	4.43	1.271
1 1/2"	Medium Steel	3.25	48.8	48.0	41.9	1376	461	0.152	11.78	4.87	3.61	1.376
	Copper (Table X)	1.20	42.07	41.99	39.6	1234	154	0.132	3.21	1.528	1.36	1.234
	Copper (Table Y)	1.50	42.07	41.99	39.0	1197	191	0.132	3.93	1.869	1.69	1.197
42 mm	Copper (Table Z)	0.80	42.07	41.99	40.4	1284	104	0.132	2.20	1.048	0.91	1.284
50 mm	Heavy Steel	4.50	60.8	59.8	51.3	2070	784	0.189	30.8	10.2	6.17	2.070
2"	Medium Steel	3.65	60.8	59.8	53.0	2205	651	0.189	26.2	8.7	5.10	2.205
	Copper (Table X)	1.20	54.07	53.99	51.6	2095	199	0.170	7.0	2.573	1.76	2.095
	Copper (Table Y)	2.00	54.07	53.99	50.0	1965	327	0.170	11.1	4.101	2.88	1.965
54 mm	Copper (Table Z)	0.90	54.07	53.99	52.2	2145	150	0.170	5.3	1.963	1.33	2.145
65 mm	Heavy Steel	4.50	76.6	75.4	67.00	3530	1005	0.239	64.5	170	7.90	3.530
2 1/2"	Medium Steel	3.65	76.6	75.4	68.7	3700	831	0.239	54.5	14.3	6.51	3.700
	Copper (Table X)	1.20	66.75	66.60	64.3	3245	247	0.209	13.2	3.97	2.18	3.245
	Copper (Table Y)	2.00	66.75	66.60	63.1	3125	406	0.209	21.3	6.38	3.58	3.125
67 mm	Copper (Table Z)	1.00	66.75	66.60	64.7	3285	206	0.209	11.1	3.34	1.82	3.285
80 mm	Heavy Steel	4.85	89.5	88.1	79.0	4905	1285	0.279	114	25.6	10.1	4.905
3"	Medium Steel	4.05	89.5	88.1	80.7	5115	1080	0.279	97.0	21.8	8.47	5.115
	Copper (Table X)	1.50	76.3	76.15	73.2	4210	352	0.239	24.4	6.45	3.11	4.210
	Copper (Table Y)	2.00	76.3	76.15	72.2	4100	467	0.239	31.9	8.43	4.11	4.100
76 mm	Copper (Table Z)	1.20	76.3	76.15	73.8	4280	283	0.239	19.9	5.22	2.50	4.280
100 mm	Heavy Steel	5.40	114.9	113.3	103.3	8380	1840	0.358	272	47.7	14.4	8.380
4"	Medium Steel	4.50	114.9	113.3	105.1	8680	1540	0.358	231	40.6	12.1	8.680
	Copper (Table X)	1.50	108.25	108.0	105.1	8680	504	0.340	71.4	13.21	4.45	8.680
	Copper (Table Y)	2.00	108.25	108.0	103.1	8355	832	0.340	115	21.41	7.33	8.355
108 mm	Copper (Table Z)	1.20	108.25	108.0	105.7	8780	405	0.340	71.2	10.66	3.57	8.780
125 mm	Heavy Steel	5.40	140.6	138.7	127.7	13050	2270	0.438	520	73.4	17.8	13.05
5"	Medium Steel	4.85	140.6	138.7	129.8	13250	2065	0.438	470	67.4	16.2	13.25
	Copper (Table X)	1.50	133.5	133.25	130.4	13350	621	0.419	134	20.26	5.47	13.35
	Copper (Table Y)											
133 mm	Copper (Table Z)	1.50	133.5	133.25	130.4	13350	621	0.419	134	20.26	5.47	13.35
150 mm	Heavy Steel	5.40	166.1	164.1	154.3	18700	2700	0.518	862	105	21.2	18.70
6"	Medium Steel	4.85	166.1	164.1	155.3	18950	2065	0.518	787	95.4	19.2	18.95
	Copper (Table X)	2.00	159.5	159.25	155.4	18950	988	0.501	304	38.42	8.71	18.95
	Copper (Table Y)											
159 mm	Copper (Table Z)	1.50	159.5	159.25	156.4	19200	743	0.501	203	29.09	6.55	19.20
200 mm	Steel	4.88			209.3	34400	3280	0.689	1880	172	25.9	34.42
250 mm	Steel	6.35			260.4	53250	5320	0.859	4745	347	42.0	53.24
300 mm	Steel	7.14			309.6	75300	7080	1.018	8865	547	55.8	75.30



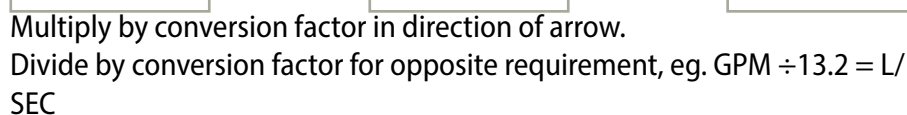
Support spacing - space supports as table

Pipe Bore (mm) Nominal	Maximum Support Spacing (m)					
	Steel Pipe		Copper Pipe		Iron Pipe	
	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
Up to 15	1.8	2.4	1.2	1.8	-	-
20	2.4	3.0	1.4	2.1	-	-
25	2.4	3.0	1.8	2.4	-	-
32	2.7	3.0	2.4	3.0	-	-
40	3.0	3.6	2.4	3.0	-	-
50	3.0	3.6	2.7	3.0	1.8	1.8
65	3.7	4.6	3.0	3.6	-	-
80	3.7	4.6	3.0	3.6	2.7	2.7
100	3.7	4.6	3.0	3.6	2.7	2.7
125	3.7	5.4	3.0	3.6	-	-
150	4.5	5.4	3.6	4.2	3.7	3.7
200	5.0	6.0	-	-	3.7	3.7
250	5.0	6.0	-	-	4.5	5.4
300	6.1	10.0	-	-	8.0	10.0
350	10.0	12.0	-	-	-	-
400	10.5	12.6	-	-	-	-
450	11.0	13.2	-	-	-	-
500	12.0	14.4	-	-	-	-
600	14.0	16.8	-	-	-	-

Pipe Bore (mm) Nominal	Maximum Support Spacing (m)					
	UPVC Pipe		PE Pipe		Glass Pipe	
	Class O,B,C Horizontal	Class D,E,6,7 Vertical	Type 32 Horizontal	Type 50 Vertical	Horizontal	Vertical
Up to 10	-	0.6	0.3	0.45	-	-
15	-	0.6	0.4	0.6	-	-
20	-	0.65	0.4	0.6	-	-
25	-	0.75	0.4	0.6	-	-
32	-	0.8	0.45	0.7	-	-
40	-	0.9	0.45	0.7	0.9	1.7
50	1.1	1.2	0.55	0.85	1.2	1.7
65	1.2	1.4	0.55	0.85	-	-
80	1.4	1.5	0.6	0.9	1.2	1.7
100	1.5	1.7	0.7	1.1	1.2	1.7
125	1.7	1.9	-	-	-	-
150	1.8	2.1	-	1.3	1.2	1.7
175	2.0	2.3	-	-	-	-
200	2.1	2.5	-	-	-	-
225	2.3	2.7	-	-	-	-
250	2.4	2.9	-	-	-	-
300	2.6	3.1	-	-	-	-
350	2.9	3.4	-	-	-	-
400	3.1	3.7	-	-	-	-
450	3.4	3.7	-	-	-	-







Multiply by conversion factor in direction of arrow.  
Divide by conversion factor for opposite requirement, eg.  $\text{PSI} \div 1.42 = \text{M}$

[illegible]



# DST Group Limited June 2016 STANDARD CONDITIONS OF SALE

## 1) Interpretation

In these conditions the following terms have the following meaning:-

**Seller** - DST Group Limited

**Buyer** - The person, firm or company purchasing the products subject of the contract between the Seller and the Buyer

**Products** - The goods or materials which shall be the subject of the contract between the Seller and the Buyer

**Price** - The price specified in the Seller's quotation, acknowledgement, order or otherwise communicated to the Buyer and agreed

## 2) General

2.1. These conditions prevail over any conditions stipulated by the Buyer, whether express or by implication or incorporation. If the Buyer's documentation shall contain any conditions as to sale and purchase they shall be of no contractual effect between the Seller and the Buyer.

2.2. Save as is otherwise expressly agreed in writing by the Seller or as is expressly provided in these conditions all guarantees, warranties, conditions, representations or stipulations whether expressed or implied and whether arising hereunder or under any prior agreement or statement, or by statute, common law or otherwise are hereby excluded and negated, provided that nothing in this clause or elsewhere in these conditions shall operate to exclude the provisions of Section 12 of the Sales of Goods Act 1979 and the Consumer Rights Act 2015 or to exclude or restrict liability for death or personal injury resulting from the Seller's negligence.

2.3. In the event that the Buyer produces to the Seller at any stage conditions upon which the Buyer will enter any agreement to acquire the Products the terms of these Standard Conditions of Sale shall prevail over the Buyer's conditions in the event of conflict.

## 3) Orders

3.1. Orders for products shall be in writing and are accepted by the Seller subject to these conditions unless otherwise varied in writing.

3.2. Once an order has been placed by the Buyer it may not be suspended, cancelled or amended without the Seller's prior written agreement. The Buyer shall be responsible for the cost of all purchases, stocks, work-in-progress, labour costs, unrecovered overheads, and other expenses suffered by the Seller as a result of such suspension, cancellation or amendment.

3.3. Products are supplied specifically for the purposes mentioned in the Order/Order Acknowledgement and for no other purposes.

## 4) The Price

4.1. All prices given, published or put forward are quotations unless otherwise expressly stated therein. Prices quoted are prices prevailing at the date of quotation and are subject to increase. The Seller may at any time before delivery increase the price of the undelivered products or balance of the products by notice in writing to the Buyer. Prices invoiced are prices prevailing at the date of despatch.

4.2. Unless otherwise stated on acceptance, the price of the products shall include the Seller's costs of standard packing, normal insurance and delivery of the products to any one address in the United Kingdom maintained specified in writing by the Buyer and agreed by the Seller prior to delivery.

## 5) Payment

5.1. Unless otherwise stated on the Seller's invoice or otherwise agreed in writing, payment for the products shall be made not later than thirty days after the end of the month of invoicing but so that the Seller may at any time on or after acceptance by notice in writing to the Buyer vary the terms of payment by demanding immediate payment or (at the Seller's option) adequate security for sums which will be due hereunder.

5.2. Time of payment shall be of the essence and failure by the Buyer to pay the price or any installment thereof in due time shall entitle the Seller to treat such failure as a repudiation of the whole contract by the Buyer and to require the Buyer to make immediate payment of all monies due or become due and to recover from the Buyer damages for such breach of contract and/or (at the Seller's option) to charge interest at four per cent per annum above the base rate of Barclays Bank PLC from due date until payment.

## 6) Delivery

Unless otherwise agreed in writing between the Seller and the Buyer the following provisions shall apply:-

6.1. Delivery of the products shall have taken place when the products have been delivered to the address specified on the Seller's quotation, acknowledgement or other document or if the Buyer refuses to accept delivery, at the time when the products are due and ready for delivery in such latter instance the Seller shall be entitled to arrange storage for the products and to charge such storage and other costs to the Buyer and

the Buyer shall also be responsible for the payment of interest on any unpaid sum in accordance with clause 5.2.

6.2. The delivery date or dates specified on the Seller's acceptance of order are estimates only. The Seller shall not be liable for failure to deliver by such date or dates or for any damage or loss arising directly or indirectly out of delay in delivery; nor shall the Buyer be entitled to refuse to accept the Products because of late delivery.

6.3. Where delivery is to be made by installments, each delivery shall be deemed for such purpose to be the subject of a separate contract and any failure whatsoever by the Seller in respect of any one delivery shall not entitle the Buyer to repudiate the contract or any installments remaining to be delivered thereunder.

6.4. The risk of any loss or damage to or deterioration of the products shall be borne by the Buyer from the time delivery has taken place in accordance with clause 6.1.

6.5. In respect of sea transit the Seller shall not be required to give the Buyer the notice relating to insurance of the products referred to in Section 32(3) of the Sales of Goods Act 1979 and the Consumer Rights Act 2015.

6.6. The Buyer is deemed to have accepted the Products after a period of 3 days after the date of delivery.

6.7. The Buyer shall make all necessary arrangements to take delivery of the Product on the date when the Products are tendered for delivery.

## 7) Property

Notwithstanding delivery and the passing of risk:-

7.1. The property in the products shall remain the Sellers until payment in full has been made to the Seller by the Buyer for the products and all other sums due to the Seller at the date of delivery of the products.

7.2. Where full payment has not been made to the Seller and the Buyer uses the products in his manufacturing process or incorporates the products with other products the property in the products shall be retained by the Seller insofar as such products are identifiable and insofar as they are incorporated with other products the Seller's title in the products shall transfer into the product of which the products form a part. The Seller also reserves the right to trace into the proceeds of sale of the products or of the products of which the products form a part to the extent that the Seller remains unpaid.

7.3. Until such payment is made the Buyer shall hold all products and materials the property in which is vested in the Seller on a fiduciary basis only and in any of the events specified above the Buyer shall store such products and materials so as to be marked and clearly identifiable as the property of the Seller in any dispute relating thereto.

7.4. The Buyer grants the Seller the right of entry (by force, if necessary) upon the Buyer's premises to recover the products if the Buyer is in breach.

## 8) Lien

The Seller shall in respect of all unpaid debts due from the Buyer under the same or any other contract have a general lien on all products and property of the Buyer in its possession (although the products or some of them may have been paid for) and shall after the expiration of fourteen days written notice to the Buyer be entitled to dispose of such products and property as it deems fit, and apply the proceeds towards such debts.

## 9) Loss/Damage/Storage

9.1. Unless otherwise agreed in writing between the Buyer and Seller the Seller may deliver against any order an excess and/or deficiency up to ten per cent of weight or volume ordered without any liability whatsoever to the Buyer save that the price shall be adjusted accordingly.

9.2. The Buyer shall inspect the products immediately upon delivery and shall within 3 days of such delivery (time being of the essence) give notice in writing to the Seller and the carrier of all claims on account of damage to or total or partial loss of Products in transit. Claims for non-delivery must be submitted in writing to the Seller within fourteen days after notification of despatch. Quality claims must be made in writing immediately after the Buyer learns of the defect and in any event not later than thirty days after the Buyer's receipt of the products. Any claim not made in writing and received by the Seller within the aforesaid time limits shall be deemed waived.

9.3. If the Buyer establishes to the satisfaction of the Seller that products have been damaged in transit or that the consignment is incomplete, the Seller will, at the Seller's option, repair or replace such products or credit the Buyer with the value thereof as appropriate, provided that the Buyer shall have given to the Seller written notification (otherwise than upon the carrier's delivery document) of such damage or shortage as provided in clause 9.2. The Seller shall be permitted a reasonable opportunity to inspect any damaged consignment and to investigate any shortage.

9.4. Save as provided in clause 9.3 above, the Seller shall not be liable to the Buyer for any loss or damage arising out of or in connection with products damaged or shortages.

9.5. If the Seller fails to make delivery or makes defective delivery of any one installment such failure or defective delivery shall not vitiate the contract as regards other installments.

9.6. The right of the Buyer to set off the value of any shortage, defective products or products not otherwise conforming to contract shall be restricted to the specific invoice for the products in question and shall not apply to previous or future accounts.

## 10) Liability/Limitation and Warranty

10.1. All conditions, guarantees, or warranties express or implied by statute, common law or otherwise including (but without prejudice to the generality of the foregoing) conditions, guarantees or warranties as to quality, fitness for purpose or description of the products or their life or wear or use under any conditions whether known or made known to the Seller or not are hereby excluded.

10.2. The Seller's liability for any and all direct loss or damage resulting to the Buyer from defects in the products or any other cause shall be limited to the purchase price of the quantity of the products in respect of or in relation to which such loss or damage is claimed. The Seller shall not be liable for any loss, damage or expense caused to the Buyer by reason of any labour costs or other expenditure incurred by the Buyer or for any indirect or consequential loss or damage howsoever arising. Subject as aforesaid the Seller shall be under no liability in contract or in tort for any loss or damage or personal injury arising directly or indirectly out of the supply or use of the products or containers other than death or personal injury resulting from the negligence of the Seller within the meaning of Section 1 of the Unfair Contract Terms Act 1977 and the Consumer Rights Act 2015.

## 11) Force Majeure

11.1. Deliveries may be partially or totally suspended by either party during any period in which it is prevented from manufacturing, delivering or taking delivery of the products through any circumstances outside its control. If because of such circumstances, the Seller is unable to supply the total requirement of the products the Seller may allocate its available supply (after satisfaction of its own requirements) amongst all of its customers, including those not under contract, as the Seller thinks fit. Deliveries so suspended shall be cancelled without liability, but the contract between the parties shall otherwise remain unaffected.

11.2. For the purpose of these conditions, circumstances outside the Seller's control include acts of God, strikes, lock-outs, other industrial action, fire, accident, lightning, earthquakes, storms, floods, explosion, war, governmental restriction and any other circumstances, whether similar or dissimilar, beyond the reasonable control of the Seller.

## 12) Indemnity

The Buyer shall indemnify the Seller in respect of all damage or injury occurring to any person, firm, company or property and against all actions, suits, claims and demands, charges or expenses in connection therewith for which the Seller may become liable in respect of the products sold under the contract in the event that the damage or injury shall have been occasioned otherwise than by the negligence of the Seller.

## 13) Default

The Seller reserves the right (without prejudice to its other rights and remedies) either to terminate the contract between the parties or to suspend further deliveries under it or require payment in advance in the event that the Buyer fails to pay for any one delivery when the same becomes due or the Buyer's financial responsibility becomes unsatisfactory to the Seller or if the Buyer, being a company, goes into liquidation or has a receiver appointed or not being a company has a receiving order made against him or enters into any arrangement or composition with creditors.

## 14) V.A.T.

All prices quoted are exclusive of all import duties, V.A.T. and other imposts which will be for the Buyer's account and should be added to the price as appropriate.

## 15) Intellectual Property

No representation, warranty or indemnity is given by the Seller that the products do not infringe any letters patent, trademarks, registered designs or other industrial rights.

## 16) Product Liability

16.1. The Buyer shall ensure that the products are transported, stored, fitted and used in accordance with any specifications or instructions which the Seller may provide.

16.2. The Buyer shall ensure that customers of the products incorporating the products shall be warned of the nature of the products and shall be given any information in respect of any claims made against the Seller where the Buyer has failed to comply with clause 16.1 above.

## 17) Assignability

The contract of which these conditions form part is personal to the Buyer and the benefit thereof shall not be assigned without the Seller's written consent.

## 18) Proper Law

These conditions and the contract between the parties shall be construed and applied in accordance with the Law of England and the English Courts shall have sole jurisdiction in any dispute relating thereto.



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