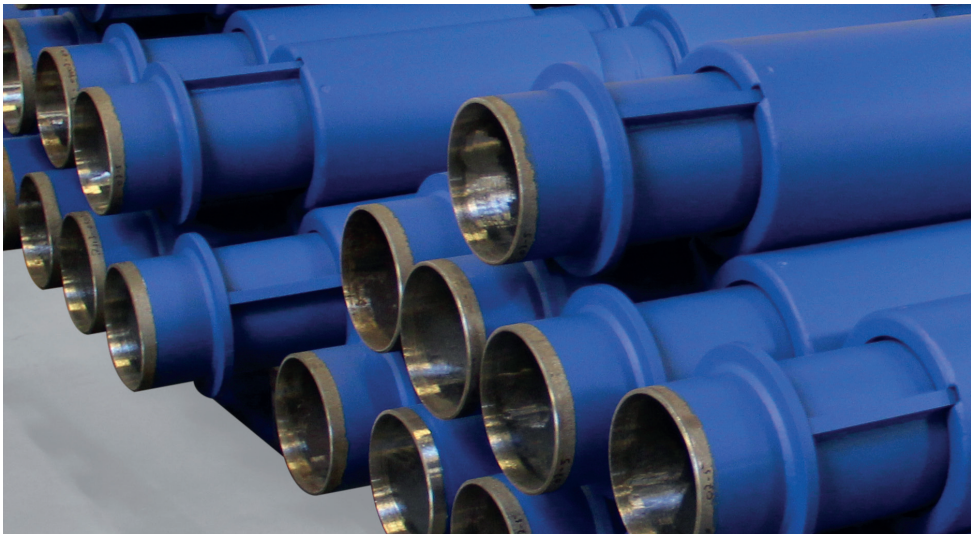
Belman

District heating expansion joints

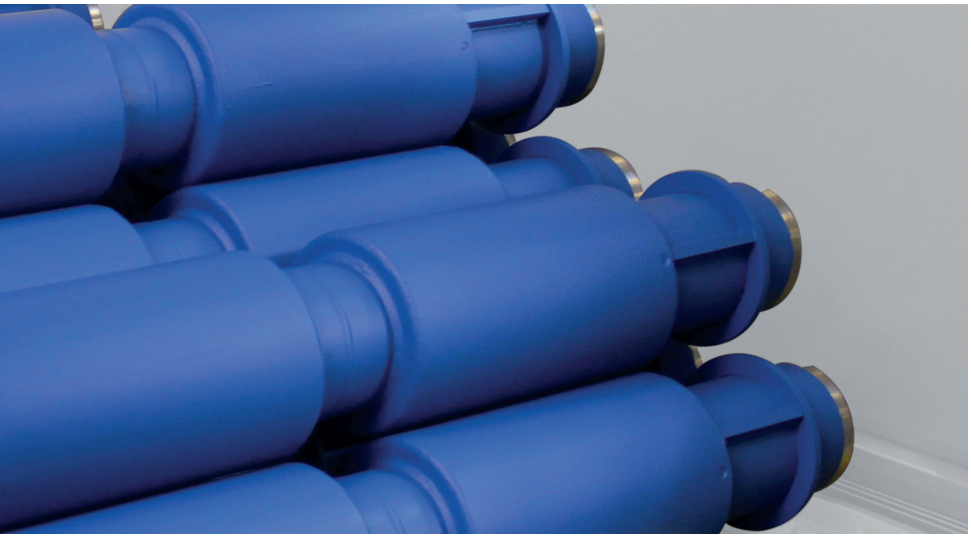
PRODUCT CATALOGUE



CONTENT

The complete range of our standard products for district heating pipelines and their specifications can be seen in this catalogue. This catalogue also includes customised solutions for district heating pipelines and power plants.

BG05/2014 – Subject to changes and misprints



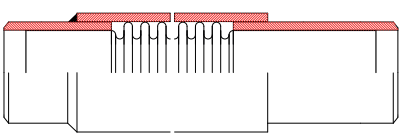
INTRODUCTION

District heating pipelines are exposed to temperature expansions caused by temperature fluctuations as a result of a system start-up or the prevailing operating conditions.
Depending on the purpose district heating expansion joints can be divided into two main categories:

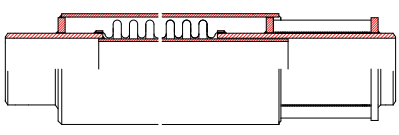
- District heating expansion joints
- One-step expansion joints

Both types are specifically developed for district heating applications and are suitable for ground-surface and underground pipeline systems. Belman offers both standard and customised solutions.

ONE-STEP EXPANSION JOINTS



DISTRICT HEATING EXPANSION JOINTS



DISTRICT HEATING EXPANSION JOINTS

TECHNICAL DATA

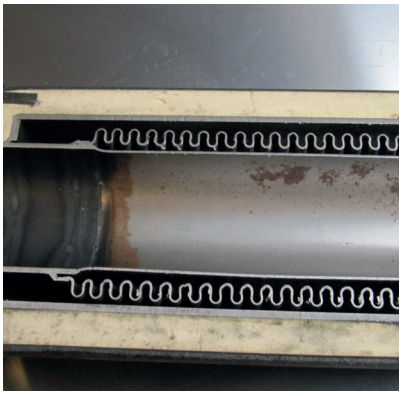
District heating expansion joints are designed to absorb mainly axial movements caused by temperature expansions of the pipeline.
The expansion joints are suitable for both trenched/trenchless pipelines. They are reliable in operation and do not require any maintenance.

Highly flexible bellows is a main component of the expansion joint, ensuring absorption of large axial movements. The solid cover and guides mounted on the expansion joints perform multiple functions e.g. the protection of the bellows from mechanical damage, providing higher bellow stability and helping to absorb eventual misalignments in the pipeline. An inner sleeve protects the bellows against internal abrasives as sand and dirt particles often carried by district heating water. These particles settle between the convolutions preventing the bellows from functioning as intended. Furthermore, the expansion joints have a safeguard preventing torsion of the bellows and other unintended loads, thus ensuring a longer service life.

The basis design (AXDH) is represented by two types: short or long (for bigger axial movements). Additionally, we offer a reinforced design (type AXTDH) with built-in guide support, which doesn't require utilization of the first guides, normally installed at 2÷4 DN distance.

Pre-stressing

The district heating expansion joints are usually available as pre-stressed.
Pre-stressing is often required in order to utilize the complete range of compensating ability of the expansion joint.
The optimum value of pre-stressing is 50% of the total movement. It comes ready to install with a pre-tensioning device that unfastens itself automatically when the system is started-up.



Insulation
District heating expansion joints are suitable for pre-insulated pipes - meaning that insulation foam is applied directly on the expansion joint's cover and covered by an additional layer of plastic. Insulated expansion joints are available on request.

Remote leakage monitoring
Pre-insulated expansion joints are normally provided with leak indicator for the timely detection of any leakages, allowing remedial action to be quickly taken.

ADVANTAGES

- Prevention of torsion
- Pre-stressed
- Suitable for insulation
- Safety and reliability of operation
- Maintenance free

APPLICATION

The district heating expansion joints are specially developed for district heating systems and power plants. These expansion joints are suitable for ground-surface and underground pipeline systems.

DISTRICT HEATING EXPANSION JOINTS

SHORT

AXDHS

PN 16

DN mm	Type	Wall thickness mm	Effective areal mm^2	Axial movement, cycles 100 mm	1000 mm	5000 mm	Installation length mm	Spring rate N/mm	Weight kg
80	AXDHS-16-0080-080-6	Ø 89 x 3,2	8107	+10/-80	+10/-50	+10/-39	690	152	13
100	AXDHS-16-0100-090-6	Ø 108 x 3,6	12291	+10/-90	+10/-51	+10/-35	690	155	19
125	AXDHS-16-0125-090-6	Ø 133 x 4,0	18578	+10/-90	+10/-55	+10/-37	690	234	23
150	AXDHS-16-0150-100-6	Ø 159 x 4,5	26101	+10/-100	+10/-56	+10/-47	700	237	26
200	AXDHS-16-0200-140-6	Ø 219 x 4,5	42310	+10/-140	+10/-82	+10/-56	880	268	53
250	AXDHS-16-0250-160-6	Ø 273 x 6,0	64242	+10/-160	+10/-92	+10/-63	990	277	75
300	AXDHS-16-0300-180-6	Ø 325 x 6,0	93157	+10/-180	+10/-104	+10/-70	1040	346	91
350	AXDHS-16-0350-180-6	Ø 377 x 6,0	111687	+10/-180	+10/-102	+10/-69	1050	352	106
400	AXDHS-16-0400-190-6	Ø 426 x 6,0	160034	+10/-190	+10/-106	+10/-71	1130	375	143

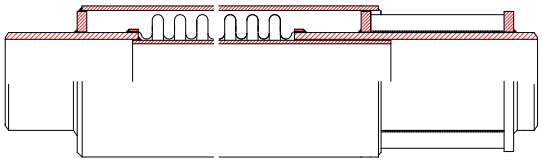
Temperature:

+150°C

Materials:

Bellow: 1.4541 (AISI 321)

or 1.4571 (AISI 316Ti)



DN mm	Type	Wall thickness mm	Effective areal mm²	Axial movement, cycles 100 mm	 1000 mm	 5000 mm	Installation length mm	Spring rate N/mm	Weight kg
450	AXDHS-16-0450-190-6	Ø465 x 6,0	183149	+10/-190	+10/-110	+10/-75	1150	417	167
500	AXDHS-16-0500-200-6	Ø 530 x 8,0	243669	+10/-200	+10/-110	+10/-74	1230	601	210
600	AXDHS-16-0600-200-6	Ø 630 x 8,0	345758	+10/-200	+10/-127	+10/-85	1250	714	260
700	AXDHS-16-0700-210-6	Ø 720 x 8,0	448290	+10/-210	+10/-138	+10/-93	1250	660	295
800	AXDHS-16-0800-210-6	Ø 820 x 8,0	575758	+10/-210	+10/-140	+10/-95	1270	879	353
900	AXDHS-16-0900-210-6	Ø 920 x 8,0	718104	+10/-210	+10/-138	+10/-93	1270	965	432
1000	AXDHS-16-1000-220-6	Ø 1020 x 10,0	877319	+10/-220	+10/-141	+10/-95	1300	1222	498
1200	AXDHS-16-1200-220-6	Ø 1220 x 12,0	1189388	+10/-220	+10/-138	+10/-93	1300	1521	790

IMPORTANT INFORMATION:

Suitable for insulation.
The district heating expansion joints are available pre-stressed.

DISTRICT HEATING EXPANSION JOINTS

SHORT

AXDHS

PN 25

DN mm	Type	Wall thickness mm	Effective areal mm^2	Axial movement, cycles 100 mm	1000 mm	5000 mm	Installation length mm	Spring rate N/mm	Weight kg
80	AXDHS-25-0080-080-6	Ø 89 x 3,2	8123	+10/-80	+10/-46	+10/-31	600	282	13
100	AXDHS-25-0100-085-6	Ø 108 x 3,6	12193	+10/-85	+10/-47	+10/-31	690	253	19
125	AXDHS-25-0125-090-6	Ø 133 x 4,0	18578	+10/-90	+10/-52	+10/-35	690	239	23
150	AXDHS-25-0150-100-6	Ø 159 x 4,5	26245	+10/-100	+10/-56	+10/-37	700	331	27
200	AXDHS-25-0200-140-6	Ø 219 x 4,5	42492	+10/-140	+10/-85	+10/-57	880	340	55
250	AXDHS-25-0250-160-6	Ø 273 x 6,0	64467	+10/-160	+10/-92	+10/-62	1010	354	79
300	AXDHS-25-0300-180-6	Ø 325 x 6,0	93428	+10/-180	+10/-104	+10/-71	1040	415	95
350	AXDHS-25-0350-180-6	Ø 377 x 6,0	111983	+10/-180	+10/-102	+10/-69	1070	422	112
400	AXDHS-25-0400-190-6	Ø 426 x 6,0	160460	+10/-190	+10/-106	+10/-71	1150	469	149

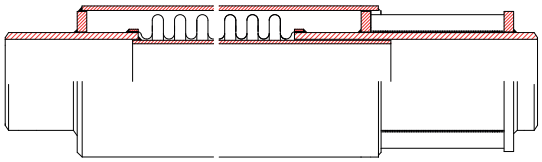
Temperature:

+150°C

Materials:

Bellow: 1.4541 (AISI 321)

or 1.4571 (AISI 316Ti)



DN mm	Type	Wall thickness mm	Effective areal mm²	Axial movement, cycles 100 mm	1000 mm	5000 mm	Installation length mm	Spring rate N/mm	Weight kg
450	AXDHS-25-0450-190-6	Ø 465 x 6,0	183171	+10/-190	+10/-114	+10/-77	1200	497	183
500	AXDHS-25-0500-200-6	Ø 530 x 8,0	245949	+10/-200	+10/-125	+10/-83	1250	584	220
600	AXDHS-25-0600-200-6	Ø 630 x 8,0	347532	+10/-200	+10/-132	+10/-89	1280	791	273
700	AXDHS-25-0700-210-6	Ø 720 x 8,0	449953	+10/-210	+10/-144	+10/-96	1290	931	323
800	AXDHS-25-0800-210-6	Ø 820 x 8,0	577643	+10/-210	+10/-144	+10/-98	1300	1173	385
900	AXDHS-25-0900-210-6	Ø 920 x 8,0	727749	+10/-210	+10/-180	+10/-119	1300	861	482
1000	AXDHS-25-1000-220-6	Ø 1020 x 10,0	888144	+10/-220	+10/-159	+10/-106	1320	1358	558
1200	AXDHS-25-1200-220-6	Ø 1220 x 12,0	1188229	+10/-220	+10/-155	+10/-104	1360	2521	902

IMPORTANT INFORMATION:

Suitable for insulation.
The district heating expansion joints are available pre-stressed.

DISTRICT HEATING EXPANSION JOINTS

LONG

AXDHL

PN 16

DN mm	Type	Wall thickness mm	Effective areal mm^2	Axial movement, cycles 100 mm	1000 mm	5000 mm	Installation length mm	Spring rate N/mm	Weight kg
125	AXDHL-16-0125-180-5	Ø 139 x 4	18578	+10/-180	+10/-109	+10/-74	970	117	32
150	AXDHL-16-0150-200-5	Ø 168 x 4	26101	+10/-200	+10/-112	+10/-75	970	119	35
200	AXDHL-16-0200-280-5	Ø 219 x 4	42310	+10/-280	+10/-166	+10/-112	1290	134	73
250	AXDHL-16-0250-320-5	Ø 273 x 6	64242	+10/-320	+10/-186	+10/-126	1450	139	104
300	AXDHL-16-0300-360-5	Ø 324 x 7	93157	+10/-360	+10/-206	+10/-141	1540	173	129
350	AXDHL-16-0350-360-5	Ø 377 x 6	111687	+10/-360	+10/-206	+10/-141	1550	176	147
400	AXDHL-16-0400-380-5	Ø 426 x 6	160034	+10/-380	+10/-212	+10/-142	1640	188	193

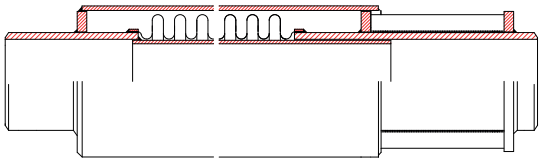
Temperature:

+150°C

Materials:

Bellow: 1.4541 (AISI 321)

or 1.4571 (AISI 316Ti)



DN mm	Type	Wall thickness mm	Effective areal mm²	Axial movement, cycles 100 mm	 1000 mm	 5000 mm	Installation length mm	Spring rate N/mm	Weight kg
500	AXDHL-16-0500-400-5	Ø 530 x 8	243669	+10/-400	+10/-220	+10/-149	1780	301	278
600	AXDHL-16-0600-400-5	Ø 630 x 8	344716	+10/-400	+10/-238	+10/-162	1840	392	350
700	AXDHL-16-0700-420-5	Ø 720 x 8	444737	+10/-420	+10/-238	+10/-162	1860	434	402
800	AXDHL-16-0800-420-5	Ø 820 x 8	575758	+10/-420	+10/-248	+10/-168	1810	495	475
900	AXDHL-16-0900-420-5	Ø 920 x 8	719156	+10/-420	+10/-252	+10/-172	1840	633	602
1000	AXDHL-16-1000-440-5	Ø 1020 x 8	877319	+10/-440	+10/-252	+10/-172	1850	688	667

IMPORTANT INFORMATION:

Suitable for insulation.
The district heating expansion joints are available pre-stressed.

DISTRICT HEATING EXPANSION JOINTS

LONG

AXDHL

PN 25

DN mm	Type	Wall thickness mm	Effective areal mm²	Axial movement, cycles 100 mm	 1000 mm	 5000 mm	Installation length mm	Spring rate N/mm	Weight kg
125	AXDHL-25-0125-180-5	Ø 139 x 4	18578	+10/-180	+10/-104	+10/-70	960	120	32
150	AXDHL-25-0150-200-5	Ø 168 x 4	26245	+10/-200	+10/-112	+10/-75	980	166	37
200	AXDHL-25-0200-280-5	Ø 219 x 4	42492	+10/-280	+10/-157	+10/-105	1280	185	76
250	AXDHL-25-0250-320-5	Ø 273 x 6	63794	+10/-320	+10/-182	+10/-123	1470	228	114
300	AXDHL-25-0300-360-5	Ø 324 x 7	93699	+10/-360	+10/-206	+10/-139	1520	206	134
350	AXDHL-25-0350-360-5	Ø 377 x 6	111983	+10/-360	+10/-208	+10/-139	1570	211	157
400	AXDHL-25-0400-380-5	Ø 426 x 6	159751	+10/-380	+10/-210	+10/-140	1610	227	201

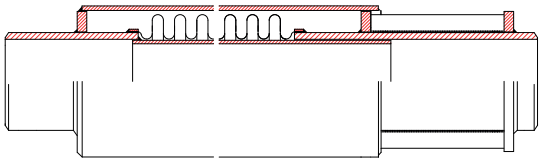
Temperature:

+150°C

Materials:

Bellow: 1.4541 (AISI 321)

or 1.4571 (AISI 316Ti)



DN mm	Type	Wall thickness mm	Effective areal mm²	Axial movement, cycles 100 mm	 1000 mm	 5000 mm	Installation length mm	Spring rate N/mm	Weight kg
500	AXDHL-25-0500-400-5	Ø 530 x 8	246477	+10/-400	+10/-234	+10/-157	1780	383	307
600	AXDHL-25-0600-400-5	Ø 630 x 8	348263	+10/-400	+10/-248	+10/-166	1820	526	388
700	AXDHL-25-0700-420-5	Ø 720 x 8	449596	+10/-420	+10/-252	+10/-169	1860	661	469
800	AXDHL-25-0800-420-5	Ø 820 x 8	586568	+10/-420	+10/-276	+10/-188	1900	1130	567
900	AXDHL-25-0900-420-5	Ø 920 x 8	734721	+10/-420	+10/-306	+10/-208	1890	951	715
1000	AXDHL-25-1000-440-5	Ø 1020 x 8	895844	+10/-440	+10/-312	+10/-211	1930	1128	809

IMPORTANT INFORMATION:

Suitable for insulation.
The district heating expansion joints are available pre-stressed.

EXPANSION JOINTS, TYPE AXTDH

Expansion joints, type AXTDH are designed for compensation of thermal expansions of the pipeline, but possess some extra qualities compared to standard types. The expansion joint has a reinforced inner sleeve and built-in guides for the additional stability of the bellows.

AXTDH expansion joints do not require installation of two guide supports, otherwise normally installed on both sides of the compensator on the distance of 2÷4 DN.

ADVANTAGES

- Provided with built-in guides, so there is no need for installation of the first two guides
- Reinforced inner sleeve for higher wear resistance
- Prevention of torsion
- Pre-stressed
- Suitable for insulation
- Safety and reliability of operation
- Maintenance free

APPLICATION

The district heating expansion joints are specially developed for district heating systems and power plants. These expansion joints are suitable for ground-surface and underground pipeline systems.

DISTRICT HEATING EXPANSION JOINTS

SHORT

AXTDHS

PN 16

DN mm	Type	Wall thickness mm	Effective areal mm²	Axial movement, cycles 100 mm	 1000 mm	 5000 mm	Installation length mm	Spring rate N/mm	Weight kg
80	AXTDHS-16-0080-080-6	Ø 89 x 3,2	8107	+10/-80	+10/-50	+10/-39	690	152	13
100	AXTDHS-16-0100-090-6	Ø 108 x 3,6	12291	+10/-90	+10/-51	+10/-35	690	155	19
125	AXTDHS-16-0125-090-6	Ø 133 x 4,0	18578	+10/-90	+10/-55	+10/-37	690	234	23
150	AXTDHS-16-0150-100-6	Ø 159 x 4,5	26101	+10/-100	+10/-56	+10/-47	700	237	26
200	AXTDHS-16-0200-140-6	Ø 219 x 4,5	42310	+10/-140	+10/-82	+10/-56	880	268	53
250	AXTDHS-16-0250-160-6	Ø 273 x 6,0	64242	+10/-160	+10/-92	+10/-63	990	277	75
300	AXTDHS-16-0300-180-6	Ø 325 x 6,0	93157	+10/-180	+10/-104	+10/-70	1040	346	91
350	AXTDHS-16-0350-180-6	Ø 377 x 6,0	111687	+10/-180	+10/-102	+10/-69	1050	352	106
400	AXTDHS-16-0400-190-6	Ø 426 x 6,0	160034	+10/-190	+10/-106	+10/-71	1130	375	143

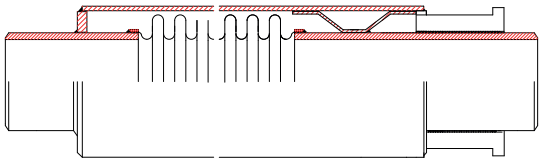
Temperature:

+150°C

Materials:

Bellow: 1.4541 (AISI 321)

or 1.4571 (AISI 316Ti)



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450	AXTDHS-16-0450-190-6	Ø465 x 6,0	183149	+10/-190	+10/-110	+10/-75	1150	417	167
500	AXTDHS-16-0500-200-6	Ø 530 x 8,0	243669	+10/-200	+10/-110	+10/-74	1230	601	210
600	AXTDHS-16-0600-200-6	Ø 630 x 8,0	345758	+10/-200	+10/-127	+10/-85	1250	714	260
700	AXTDHS-16-0700-210-6	Ø 720 x 8,0	448290	+10/-210	+10/-138	+10/-93	1250	660	295
800	AXTDHS-16-0800-210-6	Ø 820 x 8,0	575758	+10/-210	+10/-140	+10/-95	1270	879	353
900	AXTDHS-16-0900-210-6	Ø 920 x 8,0	718104	+10/-210	+10/-138	+10/-93	1270	965	432
1000	AXTDHS-16-1000-220-6	Ø 1020 x 10,0	877319	+10/-220	+10/-141	+10/-95	1300	1222	498
1200	AXTDHS-16-1200-220-6	Ø 1220 x 12,0	1189388	+10/-220	+10/-138	+10/-93	1300	1521	790

IMPORTANT INFORMATION:

Suitable for insulation.
The district heating expansion joints
are available pre-stressed.

DISTRICT HEATING EXPANSION JOINTS

SHORT

AXTDHS

PN 25

DN mm	Type	Wall thickness mm	Effective areal mm²	Axial movement, cycles 100 mm	1000 mm	5000 mm	Installation length mm	Spring rate N/mm	Weight kg
80	AXTDHS-25-0080-080-6	Ø 89 x 3,2	8123	+10/-80	+10/-46	+10/-31	600	282	13
100	AXTDHS-25-0100-085-6	Ø 108 x 3,6	12193	+10/-85	+10/-47	+10/-31	690	253	19
125	AXTDHS-25-0125-090-6	Ø 133 x 4,0	18578	+10/-90	+10/-52	+10/-35	690	239	23
150	AXTDHS-25-0150-100-6	Ø 159 x 4,5	26245	+10/-100	+10/-56	+10/-37	700	331	27
200	AXTDHS-25-0200-140-6	Ø 219 x 4,5	42492	+10/-140	+10/-85	+10/-57	880	340	55
250	AXTDHS-25-0250-160-6	Ø 273 x 6,0	64467	+10/-160	+10/-92	+10/-62	1010	354	79
300	AXTDHS-25-0300-180-6	Ø 325 x 6,0	93428	+10/-180	+10/-104	+10/-71	1040	415	95
350	AXTDHS-25-0350-180-6	Ø 377 x 6,0	111983	+10/-180	+10/-102	+10/-69	1070	422	112
400	AXTDHS-25-0400-190-6	Ø 426 x 6,0	160460	+10/-190	+10/-106	+10/-71	1150	469	149

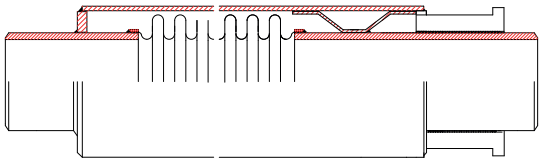
Temperature:

+150°C

Materials:

Bellow: 1.4541 (AISI 321)

or 1.4571 (AISI 316Ti)



DN mm	Type	Wall thickness mm	Effective areal mm²	Axial movement, cycles 100 mm	 1000 mm	 5000 mm	Installation length mm	Spring rate N/mm	Weight kg
450	AXTDHS-25-0450-190-6	Ø 465 x 6,0	183171	+10/-190	+10/-114	+10/-77	1200	497	183
500	AXTDHS-25-0500-200-6	Ø 530 x 8,0	245949	+10/-200	+10/-125	+10/-83	1250	584	220
600	AXTDHS-25-0600-200-6	Ø 630 x 8,0	347532	+10/-200	+10/-132	+10/-89	1280	791	273
700	AXTDHS-25-0700-210-6	Ø 720 x 8,0	449953	+10/-210	+10/-144	+10/-96	1290	931	323
800	AXTDHS-25-0800-210-6	Ø 820 x 8,0	577643	+10/-210	+10/-144	+10/-98	1300	1173	385
900	AXTDHS-25-0900-210-6	Ø 920 x 8,0	727749	+10/-210	+10/-180	+10/-119	1300	861	482
1000	AXTDHS-25-1000-220-6	Ø 1020 x 10,0	888144	+10/-220	+10/-159	+10/-106	1320	1358	558
1200	AXTDHS-25-1200-220-6	Ø 1220 x 12,0	1188229	+10/-220	+10/-155	+10/-104	1360	2521	902

IMPORTANT INFORMATION:

Suitable for insulation.
The district heating expansion joints are available pre-stressed.

DISTRICT HEATING EXPANSION JOINTS

LONG

AXTDHL

PN 16

DN mm	Type	Wall thickness mm	Effective areal mm^2	Axial movement, cycles 100 mm	1000 mm	5000 mm	Installation length mm	Spring rate N/mm	Weight kg
125	AXTDHL-16-0125-180-5	Ø 89 x 3,2	18578	+10/-180	+10/-109	+10/-74	970	117	31,8
150	AXTDHL-16-0150-200-5	Ø 108 x 3,6	26101	+10/-200	+10/-112	+10/-75	970	119	34,5
200	AXTDHL-16-0200-280-5	Ø 133 x 4,0	42310	+10/-280	+10/-166	+10/-112	1290	134	73,2
250	AXTDHL-16-0250-320-5	Ø 159 x 4,5	64242	+10/-320	+10/-186	+10/-126	1450	139	103,8
300	AXTDHL-16-0300-360-5	Ø 219 x 4,5	93157	+10/-360	+10/-206	+10/-141	1540	173	128,5
350	AXTDHL-16-0350-360-5	Ø 273 x 6,0	111687	+10/-360	+10/-206	+10/-141	1550	176	147,1
400	AXTDHL-16-0400-380-5	Ø 325 x 6,0	160034	+10/-380	+10/-212	+10/-142	1640	188	193,3

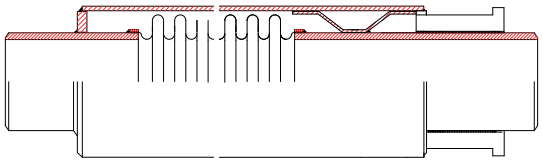
Temperature:

+150°C

Materials:

Bellow: 1.4541 (AISI 321)

or 1.4571 (AISI 316Ti)



DN mm	Type	Wall thickness mm	Effective areal mm²	Axial movement, cycles 100 mm	 1000 mm	 5000 mm	Installation length mm	Spring rate N/mm	Weight kg
500	AXTDHL-16-0500-400-5	Ø 377 x 6,0	243669	+10/-400	+10/-220	+10/-149	1780	301	278,4
600	AXTDHL-16-0600-400-5	Ø 426 x 6,0	344716	+10/-400	+10/-238	+10/-162	1840	392	349,8
700	AXTDHL-16-0700-420-5	Ø 465 x 6,0	444737	+10/-420	+10/-238	+10/-162	1860	434	402,3
800	AXTDHL-16-0800-420-5	Ø 530 x 8,0	575758	+10/-420	+10/-248	+10/-168	1810	495	475,2
900	AXTDHL-16-0900-420-5	Ø 630 x 8,0	719156	+10/-420	+10/-252	+10/-172	1840	633	601,7
1000	AXTDHL-16-1000-440-5	Ø 720 x 8,0	877319	+10/-440	+10/-252	+10/-172	1850	688	667,2

IMPORTANT INFORMATION:

Suitable for insulation.
The district heating expansion joints are available pre-stressed.

DISTRICT HEATING EXPANSION JOINTS

LONG

AXTDHL

PN 25

DN mm	Type	Wall thickness mm	Effective areal mm²	Axial movement, cycles 100 mm	1000 mm	5000 mm	Installation length mm	Spring rate N/mm	Weight kg
125	AXTDHL-25-0125-180-5	Ø 89 x 3,2	18578	+10/-180	+10/-104	+10/-70	960	120	31,6
150	AXTDHL-25-0150-200-5	Ø 108 x 3,6	26245	+10/-200	+10/-112	+10/-75	980	166	36,8
200	AXTDHL-25-0200-280-5	Ø 133 x 4,0	42492	+10/-280	+10/-157	+10/-105	1280	185	76,2
250	AXTDHL-25-0250-320-5	Ø 159 x 4,5	63794	+10/-320	+10/-182	+10/-123	1470	228	113,8
300	AXTDHL-25-0300-360-5	Ø 219 x 4,5	93699	+10/-360	+10/-206	+10/-139	1520	206	134,3
350	AXTDHL-25-0350-360-5	Ø 273 x 6,0	111983	+10/-360	+10/-208	+10/-139	1570	211	157
400	AXTDHL-25-0400-380-5	Ø 325 x 6,0	159751	+10/-380	+10/-210	+10/-140	1610	227	201,3

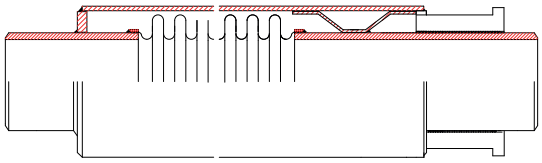
Temperature:

+150°C

Materials:

Bellow: 1.4541 (AISI 321)

or 1.4571 (AISI 316Ti)



DN mm	Type	Wall thickness mm	Effective areal mm²	Axial movement, cycles 100 mm	 1000 mm	 5000 mm	Installation length mm	Spring rate N/mm	Weight kg
500	AXTDHL-25-0500-400-5	Ø 377 x 6,0	246477	+10/-400	+10/-234	+10/-157	1780	383	306,5
600	AXTDHL-25-0600-400-5	Ø 426 x 6,0	348263	+10/-400	+10/-248	+10/-166	1820	526	387,9
700	AXTDHL-25-0700-420-5	Ø 465 x 6,0	449596	+10/-420	+10/-252	+10/-169	1860	661	468,5
800	AXTDHL-25-0800-420-5	Ø 530 x 8,0	586568	+10/-420	+10/-276	+10/-188	1900	1130	566,5
900	AXTDHL-25-0900-420-5	Ø 630 x 8,0	734721	+10/-420	+10/-306	+10/-208	1890	951	715,2
1000	AXTDHL-25-1000-440-5	Ø 720 x 8,0	895844	+10/-440	+10/-312	+10/-211	1930	1128	808,8

IMPORTANT INFORMATION:

Suitable for insulation.
The district heating expansion joints are available pre-stressed.

ONE-STEP EXPANSION JOINTS

TECHNICAL INFORMATION

One-step expansion joints are used during the start-up of the district heating pipelines to relieve the system from expansions, caused by temperature fluctuations. Once the expansion joint absorbs the movement, it functions as a regular part of the pipeline. One-step expansion joints are normally utilised in a pipeline system with an average operating temperature below 90°C and are installed while it is cold. Prior to pipeline's commissioning, it is heated up to a mean temperature by pumping the system up with hot district heating water. Once the system reaches the mean temperature, one-step expansion joints should be "locked" by welding the cover to the pipe end. The entire system can be insulated and ready for operation. One-step expansion joints are maintenance free.

ADVANTAGES

- Available pre-stressed
- Suitable for pre-insulated pipelines
- Functions as an ordinary part of a pipeline

APPLICATION

The district heating expansion joints are specially developed for district heating systems and power plants. These expansion joints are suitable for ground-surface and underground pipeline systems.

ONE-STEP EXPANSION JOINTS

AXOS

PN 16

DN mm	Type	Wall thickness	Effective areal mm^2	Axial movement, cycles 10 mm	Installation length mm	Spring rate N/mm	Weight kg
50	AXOS-16-0050-080-6	Ø 60,3 x 2,9	2048	-80	450	290,3	3,2
65	AXOS-16-0065-080-6	Ø 76,1 x 2,9	3459	-80	480	345,8	5
80	AXOS-16-0080-080-6	Ø 88,9 x 3,2	5035	-80	500	229,6	5,8
100	AXOS-16-0100-080-6	Ø 114,3 x 3,6	8587	-80	550	280,5	7,9
125	AXOS-16-0125-110-6	Ø 139,7 x 4,0	13038	-110	550	422,5	11,1
150	AXOS-16-0150-110-6	Ø 168,3 x 4,5	19223	-110	630	328,3	15,8
200	AXOS-16-0200-140-6	Ø 219,1 x 6,3	32278	-140	700	366,3	30
250	AXOS-16-0250-140-6	Ø 273 x 6,3	51724	-140	700	410	37,9

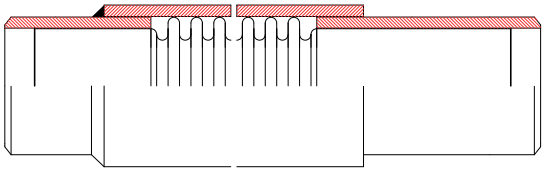
Temperature:

+150°C

Materials:

Bellow: 1.4541 (AISI 321)

or 1.4571 (AISI 316Ti)



DN mm	Type	Wall thickness	Effective areal mm^2	Axial movement, cycles 10 mm	Installation length mm	Spring rate N/mm	Weight kg
300	AXOS-16-0300-140-6	Ø 323,9 x 7,1	73686	-140	700	377,4	55
400	AXOS-16-0400-140-6	Ø 426 x 8,0	129839	-140	700	670,3	71
450	AXOS-16-0450-150-6	Ø 457 x 8,0	150530	-150	700	1.080,20	79,4
500	AXOS-16-0500-150-6	Ø 508 x8,0	187491	-150	750	663	105,7
600	AXOS-16-0600-150-6	Ø 630 x 8,0	289335	-150	750	852,1	149,2
700	AXOS-16-0700-150-6	Ø 710 x 8,0	370094	-150	750	1.125,60	165,9
800	AXOS-16-0800-150-6	Ø 820 x 8,0	486275	-150	700	2.108,40	187,4

ONE-STEP EXPANSION JOINTS

AXOS

PN 25

DN mm	Type	Wall thickness mm	Effective areal mm^2	Axial movement, cycles 10 mm	Installation length mm	Weight kg
50	AXOS-25-0050-050-6	Ø 60,3 X 2,9	2048	-50	175	3,2
65	AXOS-25-0065-065-6	Ø 76,1 X 2,9	3459	-65	180	5
80	AXOS-25-0080-070-6	Ø 88,9 X 3,2	5035	-70	185	5,8
100	AXOS-25-0100-080-6	Ø 114,3 X 3,6	8587	-80	210	7,9
125	AXOS-25-0125-095-6	Ø 139,7 X 4,0	13038	-95	230	11,1
150	AXOS-25-0150-105-6	Ø 168,3 X 4,5	19223	-105	230	15,8
200	AXOS-25-0200-120-6	Ø 219,1 X 6,3	32278	-120	255	30
250	AXOS-25-0250-125-6	Ø 273 X 6,3	51724	-125	260	37,9

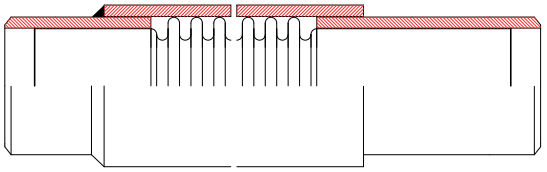
Temperature:

+150°C

Materials:

Bellow: 1.4541 (AISI 321)

or 1.4571 (AISI 316Ti)



DN mm	Type	Wall thickness mm	Effective area mm²	Axial movement, cycles 10 mm	Installation length mm	Weight kg
300	AXOS-25-0300-135-6	Ø 323,9 X 7,1	73686	-135	270	55
350	AXOS-25-0350-135-6	Ø 355,6 X 7,1	97639	-135	325	64
400	AXOS-25-0400-150-6	Ø 406,4 X 8,0	129839	-150	340	71
450	AXOS-25-0450-150-6	Ø 457 X 8,0	150530	-150	340	79,4
500	AXOS-25-0500-150-6	Ø 508 X8,0	187491	-150	340	105,7
600	AXOS-25-0600-150-6	Ø 630 X 8,0	289335	-150	340	149,2
700	AXOS-25-0700-150-6	Ø 720 X 8	372196	-150	650	156
800	AXOS-25-0800-150-6	Ø 820 X 8	486328	-150	850	227


HENRIK LARSEN

USEFUL INFORMATION

THERMAL EXPANSIONS OF DISTRICT HEATING PIPELINES

Thermal expansion

Temperature expansion of the pipe system depends on the initial and final temperature values and the material's thermal expansion factor. General formula for calculation of thermal expansions is:

$$dl = \propto L_o \, dt$$

where:

- dl Pipeline expansion
- L_o Length of the pipeline
- dt Temperature difference
- $\propto$ Thermal expansion factor

CALCULATION OF DEFORMATIONS

In general, the formula for calculation of deformations is:

ΔL=Δl_t- Δl_fr-Δl_(dm)+ Δl_p

where:

Δl_t – Thermal deformation

Δl_fr – Deformation due to the friction forces

Δl_p – Deformation due to the inner pressure

Δl_dm – Damper reaction (ground, foam pads, axial joint stiffness, spring rate of U-, L-, Z-shape and other compensating devices).

Installation of guides

Just one expansion joint is required between two anchors or physically fixed pipe section areas. Guides are required when expansion joints are utilized in trech/trechless systems and tunnels. The first guides are usually installed on both sides at the distance of 2÷4 DN. The second two are installed on both sides at the distance of 14÷16 DN from the expansion joint. The number and the necessity for the installation of the second and further pairs of supporting guides is determined by results of the strength analysis of the pipe system during the design phase.

There is no need for the first pair of guides on the distance of 2÷4 DN, when applying AXTDH expansion joints in trenches, tunnels/chambers as well as ground surfaces and inside buildings, as this type is designed to compensate for such stresses. Nevertheless, the installation of the guide supports on the distance of 14÷16 DN from the expansion joint is required.

If the expansion joints are installed near the anchor the distance to the anchors should be within 2÷4 DN. In such a case, the guides should be installed only from one side of the joint as the anchor functions as a guide from the other side. Typical support guides for district heating systems would be, saddle and frame types, preventing lateral and angular movements, but allowing it to slide in axial direction. The length of the first guide should not be less than two diameters. The gap between the pipe and the guide should be no more than 1,6 mm for pipes with DN≤100 and 2,0 mm for pipes with DN≥125 mm.

INSTALLATION INSTRUCTIONS

There are different categories of district heating expansion joints: District heating expansion joints and one-step expansion joints. They have different designs for different purposes. There are differences also in their installation. For this reason we have provided below instructions and some useful advice for the installation of expansion joints and design support. Please pay attention to the general instructions concerning storage, transportation and installation of Belman expansion joints.

District heating expansion joints

1. The pipeline should be examined to ensure that it is ready for the expansion joint installation, also the connection ends should be checked to ensure the pipeline is suited to the expansion joint installation length.
2. Check the expansion joint for possible damages.
3. Check that the direction of expansion joint installation is correct. The arrow direction on the expansion joint should coincide with the direction of the flow.
4. The expansion joint should be installed while the pipeline is cold. The expansion joint is supplied by default in a pre-stressed state unless specifically agreed in advance with the customer. If the expansion joint has to be installed on a heated pipeline it must be specified to us at time of order placement.
5. For the installation of expansion joints at ground level pipeline anchors should be fixed. Please, follow our general instructions concerning installation. No additional measures are required for the underground installation of pipeline systems. In both cases the connection ends of the expansion joints are welded to the respective ends of the pipeline.
6. In the case of pre-stressed installation of the expansion joint the pre-stressing device unfastens itself automatically when the system is in operation, then the expansion joint works in a stable condition.
7. Protect the expansion joint from welding splatter during installation.
8. Avoid applying torsion to the expansion joints, despite their torsion resistance.
9. If the expansion joint is installed on a pre-isolated pipeline it can be isolated with foam just after installation.
10. Avoid pressure testing at more than 1,5 times the design pressure.

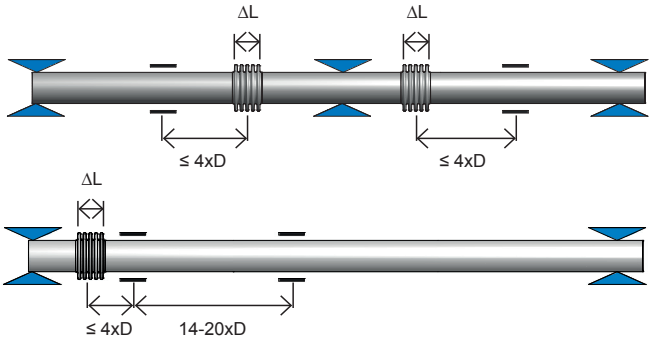
The installation could be performed with manual or automatic welding.

GLOSSARY

BL =	Free length
EBL =	Installation length
V=	Cold spring
	Anchor
	Guide
Δ L =	Expansion

One-step expansion joints

1. One-step expansion joints should be installed while the pipeline is cold. Built-in length cannot be changed.
2. The expansion joint should be installed on the prepared section of the pipeline, the connected ends of the expansion joint are welded to the respective ends of the pipeline.
3. After the completion of the installation of the functioning expansion joint, the cover of the expansion joint should be fixed by welding to avoid any further possible movements.
4. Once the expansion joint absorbs the designed movement, it functions as an ordinary part of a pipeline.
5. The expansion joint could be insulated with foam.

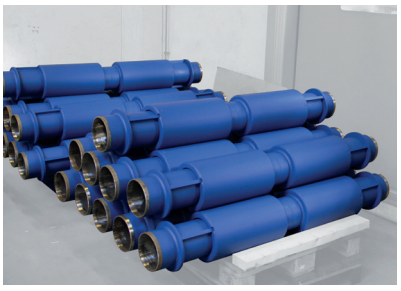
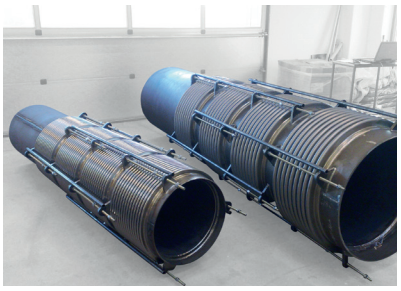


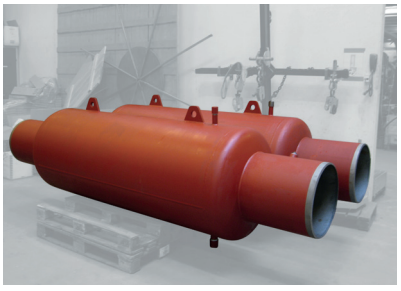
The distance between the expansion joint and the guides

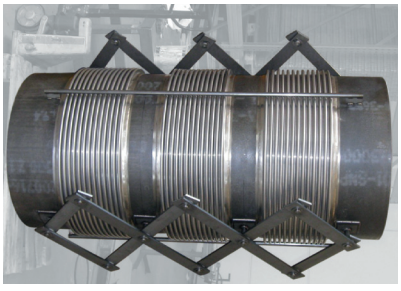
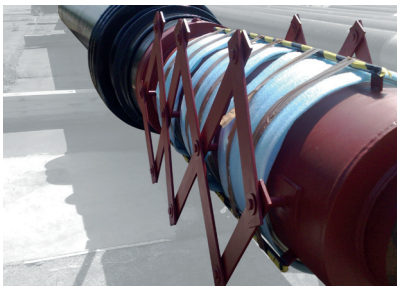
1. The anchor has to be installed as close as possible to the expansion joint
2. The first guide should be placed max. 4 x diameter
3. The further guides should be placed on 14-20 x diameter

CUSTOMISED SOLUTIONS

Should you require an expansion joint that is not mentioned in our standard range of our products, please provide us with your specifications and designs. Customised solutions are a core part of our business, we have successfully completed many district heating projects worldwide; some of them we present below:



Our experience, your benefit

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