GF Piping Systems

+GF+

COOL-FIT 2.0/4.0

Installation Instructions

Chilled Water Applications
Flow ≥ +6°C

Chilled Water Applications (Flow ≥ +6°C)

Supplement to Planning Fundamentals

1 General Guidelines and Boundary Conditions

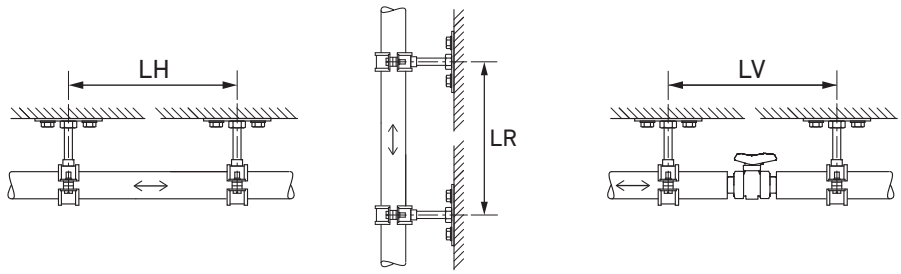
The installation guidelines are recommendations on the basis of the outlined assumptions and boundaries. For deviating situations like more complex routings, less available space for an L-Bend, different load cases, static evidences, please contact GF Advanced Engineering. At any time, the planning fundamentals have to be taken into account and the instructions have to be followed for a correct and long lasting function of the system.

Boundary conditions	
System and pipe class	COOL-FIT 2.0 (d32-d140), COOL-FIT 4.0 (d160-d450)
Flow temperature	+6 to +47°C
Ambient temperature	-5 to +45°C
Installation temperature	-5 to +40°C
Medium type	Water
Operation time	25 years for flow temp. ≤47°C; reduced for flow temp. >47°C

2 Maximal Permissible Operating Pressure

	[°C]	0	10	20	30	40	50	60
COOL-FIT 2.0/4.0 pipe and fitting, SDR11, PE100, C=1.6	[bar]	15.07	15.07	12.69	10.81	9.30	8.08	7.08
COOL-FIT 2.0/4.0 pipe and fitting, SDR17, PE100, C=1.6	[bar]	9.42	9.42	7.93	6.76	5.82	5.05	4.43
Ball valve, PVC-U, PN16	[bar]	16.0	16.0	16.0	12.8	9.6	5.6	2.4
Butterfly valve, ABS, PN10	[bar]	10.0	10.0	10.0	8.5	6.0	4.0	2.0

3 Maximum Support Distances



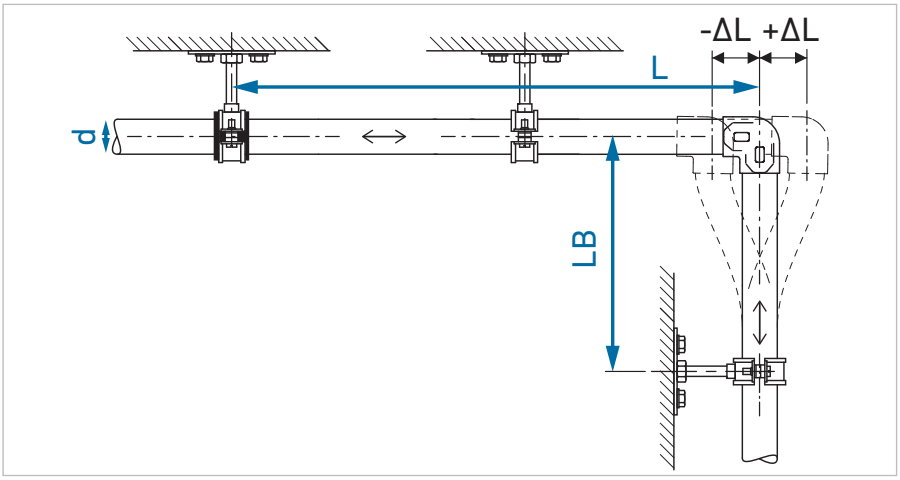
	Horizontal LH max. [m]	Riser LR max. (1.3 x LA) [m]	Valve LV max. (0.5 x LA) [m]	Pipe weight with water ρ=1000 kg/m3 [kg/m]
d32/75	1.6	2.1	0.8	1.7
d40/90	1.7	2.2	0.9	2.3
d50/90	1.7	2.2	0.9	3.0
d63/110	1.9	2.5	1.0	4.5
d75/125	2.0	2.6	1.0	6.2
d90/140	2.0	2.6	1.0	8.4
d110/160	2.1	2.7	1.1	11.9
d140/200	2.4	3.1	1.2	19.0
d160/250	2.6	3.4	1.3	25.3
d225/315	2.9	3.8	1.5	47.1
d250/355	3.3	4.3	1.7 (metal valve*)	57
d280/400	3.5	4.6	1.8 (metal valve*)	72.2
d315/450	3.7	4.8	1.9 (metal valve*)	90.5
d355/500	3.9	5.1	2.0 (metal valve*)	114.7
d400/560	4.1	5.3	2.1 (metal valve*)	145.4
d450/630	4.3	5.6	2.2 (metal valve*)	180.9

* Support metal valves direct

4 Flexible Sections

4.1 Flexible Sections (L-Bend or LB)

Temperature Range	
Flow temperature	+6 to +47°C
Ambient temperature	-5 to +45°C
Installation temperature	-5 to +40°C



① Pipe length L	② d (mm)	
	③ LB [m]	
	-ΔL [mm] ④	④ +ΔL [mm]

① choose pipe length L
② choose dimension d
③ determine minimal clamping distance of the flexible section LB.
④ consider space for pipe movement due to contraction –ΔL and expansion +ΔL

Table for L-Bend, pipe contraction and expansion - COOL-FIT 2.0 (d32-d140) and COOL-FIT 4.0 (d160-d450) pipe

Pipe length L	d32	d40	d50	d63	d75	d90	d110	d140	d160	d225	d250	d280	d315	d355	d400	d450
0.5 m	0.4 -3 1	0.4 -3 1	0.4 -3 1	0.5 -3 1	0.5 -3 1	0.5 -3 1	0.5 -3 1	0.6 -3 1	0.7 -3 1	0.8 -3 1	0.8 -3 1	0.8 -3 1	0.9 -3 1	0.9 -3 1	1.0 -3 1	1.0 -3 1
1.0 m	0.5 -6 1	0.6 -5 1	0.6 -6 1	0.6 -5 1	0.7 -5 1	0.7 -5 1	0.8 -5 1	0.9 -5 1	0.9 -5 1	1.1 -5 1	1.1 -5 1	1.2 -5 1	1.3 -5 1	1.3 -5 1	1.4 -5 1	1.5 -5 1
1.5 m	0.7 -8 2	0.7 -8 2	0.7 -8 2	0.8 -8 2	0.8 -8 2	0.9 -8 2	0.9 -8 2	1.1 -8 2	1.2 -8 2	1.3 -8 2	1.4 -8 2	1.5 -8 2	1.5 -8 2	1.6 -8 2	1.7 -8 2	1.8 -8 2
2.0 m	0.8 -11 2	0.8 -11 3	0.8 -11 2	0.9 -11 2	1.0 -11 2	1.0 -11 2	1.1 -11 2	1.2 -11 2	1.3 -11 3	1.5 -11 2	1.6 -10 3	1.7 -10 3	1.8 -10 3	1.9 -10 3	2.0 -10 3	2.1 -10 3
2.5 m	0.8 -14 3	0.9 -14 3	0.9 -14 3	1.0 -14 3	1.1 -14 3	1.1 -14 3	1.2 -14 3	1.4 -14 3	1.5 -13 3	1.7 -13 3	1.8 -13 3	1.9 -13 3	2.0 -13 3	2.1 -13 3	2.2 -13 3	2.3 -13 3
3.0 m	0.9 -17 4	1.0 -16 4	1.0 -17 4	1.1 -16 4	1.2 -16 4	1.2 -16 4	1.3 -16 4	1.5 -16 4	1.6 -16 4	1.8 -16 4	1.9 -16 4	2.1 -16 4	2.2 -16 4	2.3 -16 4	2.4 -16 4	2.6 -15 4
3.5 m	1.0 -20 4	1.1 -19 4	1.1 -19 4	1.2 -19 4	1.3 -19 4	1.3 -19 4	1.4 -19 4	1.6 -19 4	1.8 -18 5	2.0 -19 4	2.1 -18 5	2.2 -18 4	2.3 -18 5	2.5 -18 4	2.6 -18 4	2.8 -18 5
4.0 m	1.1 -22 5	1.2 -22 5	1.2 -22 5	1.3 -22 5	1.4 -22 5	1.4 -22 5	1.5 -22 5	1.7 -22 5	1.9 -21 5	2.1 -21 5	2.2 -21 5	2.4 -21 5	2.5 -21 5	2.7 -21 5	2.8 -21 5	3.0 -21 5
4.5 m	1.1 -25 6	1.2 -24 6	1.2 -25 6	1.4 -25 6	1.4 -25 6	1.5 -25 6	1.6 -25 6	1.8 -25 5	2.0 -24 6	2.3 -24 6	2.4 -23 6	2.5 -24 6	2.7 -23 6	2.8 -23 6	3.0 -24 6	3.1 -23 6
5.0 m	1.2 -28 6	1.3 -27 6	1.3 -28 6	1.4 -27 6	1.5 -27 6	1.6 -27 6	1.7 -27 6	1.9 -27 6	2.1 -26 6	2.4 -27 6	2.5 -26 6	2.7 -26 6	2.8 -26 6	3.0 -26 6	3.1 -26 6	3.3 -26 7
6.0 m	1.3 -33 7	1.4 -33 8	1.4 -33 7	1.6 -33 7	1.7 -33 7	1.8 -33 7	1.9 -33 7	2.1 -33 7	2.3 -32 8	2.6 -32 7	2.7 -31 8	2.9 -31 8	3.1 -31 8	3.3 -31 8	3.4 -31 8	3.6 -31 8
7.0 m	1.4 -39 9	1.5 -38 9	1.5 -39 9	1.7 -38 9	1.8 -38 9	1.9 -38 9	2.0 -38 9	2.3 -38 9	2.5 -37 9	2.8 -37 9	3.0 -36 9	3.1 -37 9	3.3 -36 9	3.5 -36 9	3.7 -37 9	3.9 -36 9
8.0 m	1.5 -45 10	1.6 -43 10	1.6 -44 10	1.8 -44 10	1.9 -44 10	2.0 -44 10	2.2 -44 10	2.4 -44 10	2.7 -42 10	3.0 -43 10	3.2 -42 10	3.4 -42 10	3.5 -41 10	3.8 -42 10	4.0 -42 10	4.2 -41 10
9.0 m	1.6 -50 11	1.7 -49 12	1.7 -50 11	1.9 -49 11	2.0 -49 11	2.2 -49 11	2.3 -49 11	2.6 -49 11	2.8 -47 12	3.2 -48 11	3.3 -47 12	3.6 -47 12	3.8 -47 12	4.0 -47 12	4.2 -47 12	4.4 -46 12
10 m	1.7 -56 12	1.8 -54 13	1.8 -55 12	2.0 -55 12	2.2 -55 12	2.3 -55 12	2.4 -54 12	2.7 -55 12	3.0 -53 13	3.4 -53 12	3.5 -52 13	3.8 -52 13	4.0 -52 13	4.2 -52 13	4.4 -52 13	4.7 -51 13
15 m	2.1 -84 19	2.2 -82 19	2.2 -83 18	2.5 -82 19	2.6 -82 18	2.8 -82 18	3.0 -82 18	3.3 -82 18	3.7 -79 19	4.1 -80 19	4.3 -78 19	4.6 -78 19	4.9 -78 19	5.1 -78 19	5.4 -78 19	5.7 -77 20
20 m	2.4 -112 25	2.6 -109 26	2.6 -110 25	2.9 -110 25	3.0 -110 25	3.2 -110 24	3.4 -109 24	3.8 -109 24	4.2 -105 26	4.8 -107 25	5.0 -104 26	5.3 -104 26	5.6 -104 26	5.9 -104 26	6.3 -104 26	6.6 -103 26
25 m	2.7 -140 31	2.9 -136 32	2.9 -138 31	3.2 -137 31	3.4 -137 31	3.6 -137 31	3.8 -136 31	4.3 -136 30	4.7 -132 32	5.3 -133 31	5.6 -130 32	5.9 -131 32	6.3 -129 32	6.6 -130 32	7.0 -131 32	7.4 -128 33
30 m	2.9 -167 37	3.2 -163 39	3.2 -166 37	3.5 -164 37	3.7 -165 37	3.9 -165 37	4.2 -163 37	4.7 -164 36	5.2 -158 39	5.8 -160 37	6.1 -156 39	6.5 -157 38	6.9 -155 39	7.3 -156 38	7.7 -157 38	8.1 -154 39
40 m	3.4 -223 50	3.6 -217 51	3.7 -221 49	4.0 -219 50	4.3 -220 49	4.6 -219 49	4.9 -218 49	5.4 -218 49	6.0 -211 51	6.7 -213 50	7.1 -208 52	7.5 -209 51	7.9 -207 52	8.4 -208 51	8.9 -209 51	9.4 -205 52
50 m	3.8 -279 62	4.1 -272 64	4.1 -276 62	4.5 -274 62	4.8 -274 62	5.1 -274 61	5.4 -272 61	6.1 -273 61	6.7 -263 64	7.5 -267 62	7.9 -259 65	8.4 -261 64	8.9 -259 65	9.4 -261 64	9.9 -261 64	10.5 -257 65

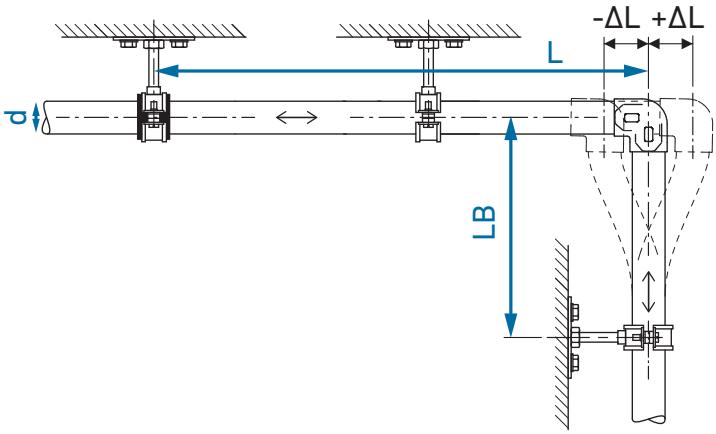
Request GF support for values in dark grey fields and complex routings.

L-bends not required for pipe length smaller 0.5m.

4.2 Flexible Sections (L-Bend or LB) – Reduced Temperature Range (Lowered Requirements)

Choose the pipe length L and dimension d and determine the minimal clamping distance of the flexible section LB. Consider space for pipe movement due to contraction –ΔL and expansion +ΔL.

Reduced Temperature Range	
Flow temperature	+6 to +47°C
Ambient temperature	+5 to +45°C
Installation temperature	-5 to +35°C



① Pipe length L	② d (mm)	
	③ LB [m]	
	-ΔL [mm] ④	④ +ΔL [mm]

① choose pipe length L
② choose dimension d
③ determine minimal clamping distance of the flexible section LB.
④ consider space for pipe movement due to contraction –ΔL and expansion +ΔL

Table for L-Bend, pipe contraction and expansion - COOL-FIT 2.0 (d32-d140) and COOL-FIT 4.0 (d160-d450) pipe

Pipe length L	d32	d40	d50	d63	d75	d90	d110	d140	d160	d225	d250	d280	d315	d355	d400	d450
0.5 m	0.3 -2 1	0.3 -2 1	0.4 -2 1	0.4 -2 1	0.4 -2 1	0.4 -2 1	0.5 -2 1	0.5 -2 1	0.6 -2 1	0.7 -2 1	0.7 -2 1	0.7 -2 1	0.8 -2 1	0.8 -2 1	0.9 -2 1	0.9 -2 1
1.0 m	0.4 -4 2	0.5 -4 2	0.5 -4 2	0.5 -4 2	0.6 -4 2	0.6 -4 2	0.7 -4 2	0.8 -4 2	0.8 -4 2	0.9 -4 2	1.0 -4 2	1.1 -4 2	1.1 -4 2	1.2 -4 2	1.2 -4 2	1.3 -4 2
1.5 m	0.5 -6 3	0.6 -6 3	0.6 -6 3	0.7 -6 3	0.7 -6 3	0.8 -6 3	0.8 -6 3	0.9 -6 3	1.0 -6 3	1.1 -6 3	1.2 -6 3	1.3 -6 3	1.4 -6 3	1.4 -6 3	1.5 -6 3	1.6 -6 3
2.0 m	0.6 -8 4	0.7 -8 4	0.7 -8 4	0.8 -8 4	0.8 -8 4	0.9 -8 4	0.9 -8 4	1.1 -8 4	1.2 -8 4	1.3 -8 4	1.4 -8 4	1.5 -8 4	1.6 -8 4	1.7 -8 4	1.8 -8 4	1.9 -8 4
2.5 m	0.7 -10 5	0.8 -10 5	0.8 -10 5	0.9 -10 5	0.9 -10 5	1.0 -10 5	1.1 -10 5	1.2 -10 5	1.3 -10 5	1.5 -10 5	1.6 -10 5	1.7 -10 5	1.8 -10 5	1.9 -10 5	2.0 -10 5	2.1 -10 5
3.0 m	0.8 -12 6	0.8 -12 6	0.9 -12 6	1.0 -12 6	1.0 -12 6	1.1 -12 6	1.2 -12 6	1.3 -13 6	1.4 -12 6	1.6 -12 6	1.7 -12 6	1.8 -12 6	1.9 -12 6	2.0 -12 6	2.2 -12 6	2.3 -12 6
3.5 m	0.8 -14 7	0.9 -14 7	0.9 -14 7	1.0 -14 7	1.1 -14 7	1.2 -14 7	1.3 -15 7	1.4 -15 7	1.5 -14 7	1.8 -14 7	1.9 -14 7	2.0 -14 7	2.1 -14 7	2.2 -14 7	2.3 -14 7	2.5 -14 7
4.0 m	0.9 -16 8	1.0 -16 8	1.0 -16 8	1.1 -16 8	1.2 -16 8	1.2 -16 8	1.3 -17 8	1.5 -17 8	1.7 -16 8	1.9 -17 8	2.0 -16 8	2.1 -16 8	2.2 -16 8	2.4 -16 8	2.5 -16 8	2.6 -16 8
4.5 m	1.0 -18 9	1.0 -18 9	1.1 -18 9	1.2 -18 9	1.2 -18 9	1.3 -19 9	1.4 -19 9	1.6 -19 9	1.8 -18 9	2.0 -19 9	2.1 -18 9	2.2 -18 9	2.4 -18 9	2.5 -18 9	2.6 -18 9	2.8 -18 9
5.0 m	1.0 -20 10	1.1 -20 10	1.1 -20 10	1.2 -20 10	1.3 -20 10	1.4 -21 10	1.5 -21 10	1.7 -21 10	1.8 -20 10	2.1 -21 10	2.2 -20 10	2.3 -20 10	2.5 -20 10	2.6 -20 10	2.8 -21 10	2.9 -20 10
6.0 m	1.1 -24 11	1.2 -23 12	1.2 -24 12	1.3 -24 12	1.4 -24 12	1.5 -25 12	1.6 -25 12	1.8 -25 12	2.0 -24 12	2.3 -25 12	2.4 -24 12	2.6 -25 12	2.7 -24 12	2.9 -25 12	3.1 -25 12	3.2 -24 12
7.0 m	1.2 -28 13	1.3 -27 14	1.3 -28 14	1.5 -28 14	1.6 -29 14	1.7 -29 14	1.8 -29 14	2.0 -29 14	2.2 -28 14	2.5 -29 14	2.6 -29 14	2.8 -29 14	2.9 -28 14	3.1 -29 14	3.3 -29 14	3.5 -28 14
8.0 m	1.3 -32 15	1.4 -31 16	1.4 -32 15	1.6 -32 16	1.7 -33 16	1.8 -33 16	1.9 -33 16	2.1 -33 16	2.3 -32 16	2.7 -33 16	2.8 -33 16	3.0 -33 16	3.1 -33 16	3.3 -33 16	3.5 -33 16	3.7 -33 16
9.0 m	1.3 -36 17	1.5 -35 17	1.5 -36 17	1.6 -36 17	1.8 -37 17	1.9 -37 18	2.0 -37 18	2.3 -38 18	2.5 -36 18	2.8 -37 18	3.0 -37 18	3.2 -37 18	3.3 -37 18	3.5 -37 18	3.7 -37 18	3.9 -37 18
10 m	1.4 -40 19	1.5 -39 19	1.6 -41 19	1.7 -40 19	1.9 -41 19	2.0 -41 19	2.1 -42 20	2.4 -42 20	2.6 -40 20	3.0 -41 20	3.1 -41 20	3.3 -41 20	3.5 -41 20	3.7 -41 20	3.9 -41 20	4.2 -41 20
15 m	1.7 -59 29	1.9 -59 29	1.9 -61 29	2.1 -61 29	2.3 -61 29	2.4 -62 29	2.6 -62 29	2.9 -63 29	3.2 -60 30	3.6 -62 30	3.8 -61 30	4.1 -61 30	4.3 -61 30	4.6 -61 30	4.8 -62 30	5.1 -61 30
20 m	2.0 -79 38	2.2 -78 39	2.2 -81 39	2.5 -81 39	2.6 -82 39	2.8 -82 39	3.0 -83 39	3.4 -83 39	3.7 -81 40	4.2 -83 40	4.4 -82 40	4.7 -82 40	5.0 -81 40	5.3 -82 40	5.6 -82 40	5.9 -81 40
25 m	2.2 -99 48	2.4 -98 49	2.5 -101 48	2.7 -101 49	2.9 -102 49	3.1 -103 49	3.4 -104 49	3.8 -104 49	4.1 -101 50	4.7 -103 50	4.9 -102 50	5.3 -102 50	5.6 -102 50	5.9 -102 50	6.2 -103 50	6.6 -102 51
30 m	2.5 -119 57	2.7 -117 58	2.7 -122 58	3.0 -121 58	3.2 -122 58	3.4 -124 58	3.7 -125 59	4.1 -125 59	4.5 -121 60	5.1 -124 59	5.4 -122 60	5.8 -123 60	6.1 -122 60	6.4 -123 60	6.8 -123 60	7.2 -122 61
40 m	2.8 -159 77	3.1 -156 78	3.1 -162 77	3.5 -162 78	3.7 -163 78	3.9 -165 78	4.2 -166 78	4.7 -167 78	5.2 -161 80	5.9 -166 79	6.3 -163 80	6.6 -163 80	7.0 -163 80	7.4 -164 80	7.9 -164 80	8.3 -163 81
50 m	3.2 -198 96	3.4 -195 97	3.5 -203 97	3.9 -202 97	4.2 -204 97	4.4 -206 97	4.7 -208 98	5.3 -208 98	5.8 -202 99	6.6 -207 99	7.0 -204 100	7.4 -204 100	7.9 -203 101	8.3 -205 100	8.8 -205 100	9.3 -204 101

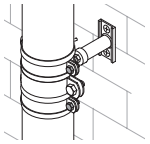
Request GF support for values in dark grey fields and complex routings.

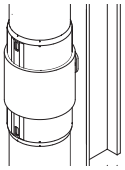
L-bends not required for pipe length smaller 0.5m.

5 Riser Installation Example

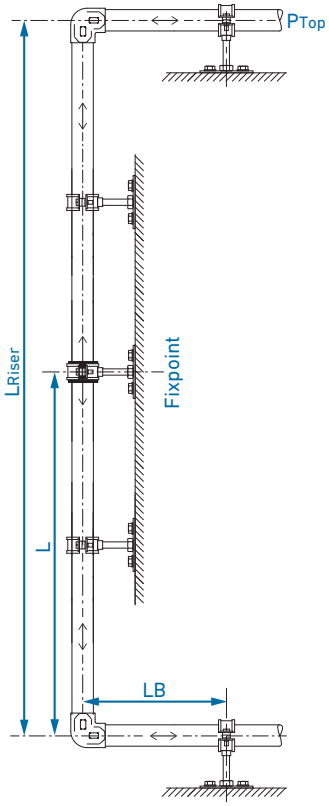
Following table shows an example of the achievable riser lengts under assumptions:

Boundary conditions	
System and pipe class	COOL-FIT 2.0 SDR11 (d32-d140), COOL-FIT 4.0 SDR11 (d160-d450)
Flow temperature	+6 to +47°C
Ambient temperature	-5 to +45°C
Installation temperature	-5 to +40°C
Fixed point position	Middle of the riser pipe
Pressure on top level	3 bar (PTop)
Support distance vertical	Equal to horizontal (stability increase for very long riser pipe length)





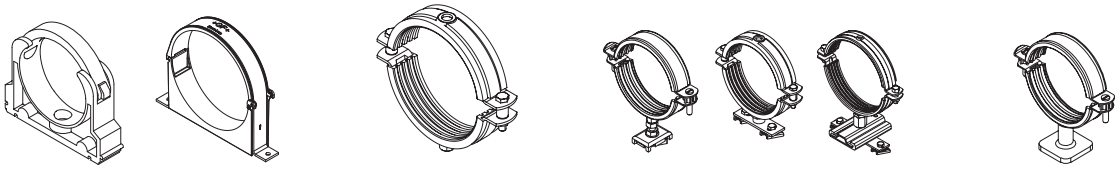
	Pipe support distance reduced for long riser		Fixed point		Fixed point for increased forces	
	Horizontal [m]	Vertical [m]	Max. riser length (LRiser) [m]	Fixed point force [kN]	Max. riser length (LRiser) [m]	Fixed point force [kN]
d32/75	1.6	1.6	32.5	0.6		
d40/90	1.7	1.7	40.5	1.0		
d50/90	1.7	1.7	32.5	1.0		
d63/110	1.9	1.9	39.5	1.9		
d75/125	2.0	2.0	43.5	2.9		
d90/140	2.0	2.0	48.0	4.4		
d110/160	2.1	2.1	52.0	6.6		
d140/200	2.4	2.4	48.5	10.0	54.5	11.2
d160/250	2.6	2.6	35.5	10.0	55.0	15.2
d225/315	2.9	2.9	18.5	10.0	54.5	28.3
d250/355	3.3	3.3	15.0	10.0	54.5	34.3
d280/400	3.5	3.5			43.0	35.0
d315/450	3.7	3.7			34.0	35.0
d355/500	3.9	3.9			26.0	35.0
d400/560	4.1	4.1			20.0	35.0
d450/630	4.3	4.3			15.5	35.0



⚠ Following sections are recommended to be proofed by GF Specialized Services before installation:

- Riser pipe dimension >d160
- Riser pipe with multiple dimensions
- Installation differ from normal installation with fixed point in the middle

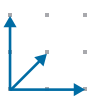
6 Sliding Clamps



	Klip-It	Stress Less	Sikla sliding clamp		Sikla sliding clamp with screws and threaded plates for connection to Sikla rail system		Sikla sliding clamp with welding plate	
	Code GF	Code GF	Typ	Code Sikla	Typ	Code Sikla	Typ	Code Sikla
d32/75	173061012	155484506	Ratio S-K 75	148850	GLH-CC 75	802865	GLH-ASP 75	802864
d40/90	173061013	155484507	Ratio S-K 90	155993	GLH-CC 90	802867	GLH-ASP 90	802866
d50/90	173061013	155484507	Ratio S-K 90	155993	GLH-CC 90	802867	GLH-ASP 90	802866
d63/110	173061014	155484508	Ratio S-K 110	156000	GLH-CC 110	802869	GLH-ASP 110	802868
d75/125	173061015	155484518	Stabil D-3G-K 125	802130	GLH-CC 125	802871	GLH-ASP 125	802870
d90/140	173061016	155484519	Stabil D-3G-K 140	802131	GLH-CC 140	802873	GLH-ASP 140	802872
d110/160	173061017	155484509	Stabil D-3G-K 160	802132	GLH-CC 160	802875	GLH-ASP 160	802874
d140/200			Stabil D-3G-K Top 200	169547	GLH-CC 200	802879	GLH-ASP 200	802878
d160/250		155484512	Stabil D-3G mE 244-250	107477	GLH-CC 250	802883	GLH-ASP 250	802882
d225/315		155484511	Stabil D-3G mE 307-318	189974	GLH-CC 315	802887	GLH-ASP 315	802886
d250/355			LC-HV 90Da 365 HCP m.E.	802905				
d280/400			LC-HV 90Da 407 HCP m.E.	802906				
d315/450			LC-HV 90Da 457 HCP m.E.	802907				
d355/500			LD-HV 90Da 508 HCP m.E.	802908				
d400/560			LD-HV 90Da 574 HCP m.E.	802909				
d450/630			LD-HV 90Da 641 HCP m.E.	802910				
Comment	Klip-It ≥D110 must be mounted upright		≥D225 sliding function via sliding plate					

Clamps are just recommendations and individual clarification is recommended

7 Notes/Isometric Grid



Local support around the world

Visit our webpage to get in touch with your local specialist:
www.gfps.com/our-locations

MA_00136 2024577
COOL-FIT simplified +6 (10.22)

8201 Schaffhausen/Switzerland