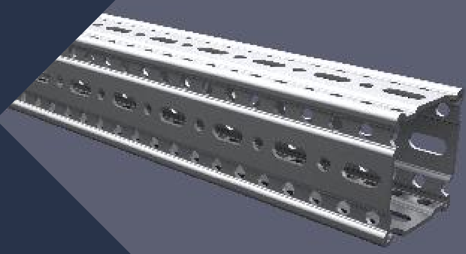

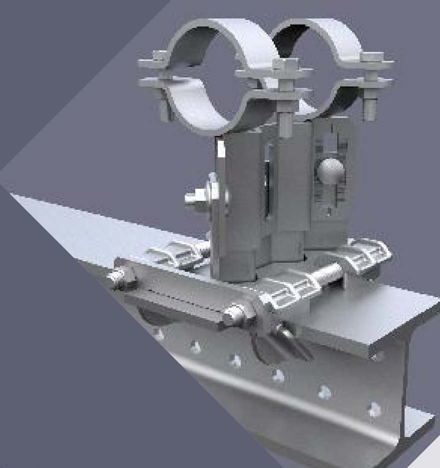

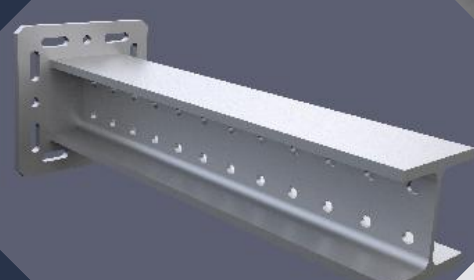

Sikla USA

Installation Guidelines 2016

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01/2016

Application

Sikla „Installation Guidelines“ is supposed to provide recommendations for supporting constructions within industrial pipework and plant engineering consisting of the Sikla Systems Framo 80, Framo 100, Beam System 100 and Beam System 120.
All Sikla Systems mentioned above are certified according to EN 1090 and may therefore be used to EXC 2 for load- bearing structures.

Basis of calculation

Eurocode 3 (DIN EN 1993) „Design of steel structures“ provides the basis for determining the load capacity. Regarding serviceability the specified restrictions are allocated separately according to the design of the individual constructions. These limits may also be specified differently by the client. All deformations are determined on the basis of characteristic loads (γ_F = 1.0). The values of the permissible loads comply simultaneously the ultimate limit state and the serviceability limit state design. The respective governing load is listed as $F_{z.\,perm}$ in the Installation Guideline.

Load effects

Specified are permissible vertical loads $F_{z.\,perm}$ in kN (e.g. pipeline weights), which have to be understood as maximum values of characteristic load effects and consider a safety factor γ_F = 1.35.
Some Sikla constructions take into account additional friction forces $F_x = F_z * \mu_0$ for Sikla Pipe Shoes supported on hot-dipped galvanized surface of Sikla beams which are calculated from pipe weight F_z and a friction coefficient μ_0 = 0.2. These variable forces from pipe expansion are taken into account with a safety factor γ_F = 1.5. Sliding or guided Pipe Shoes (Sikla slide elements) with a higher coefficient $\mu_0 > 0.2$ (e.g. steel on steel) require an individual calculation.

Conditions

All loads are static loads at room temperature unless stated otherwise. Technical notes of the respective product data sheets for use and application range must be observed.

Load transmission into building structure

When fixing by anchors, or connection to existing anchor struts, the structural safety analysis for the components used for this purpose must be done separately. When connecting to existing steel structures on site, its resilience and its support and torsional rigidity must be tested separately. In addition, when connecting with clamping sets, the static friction between clamping set and the on-site steel structure must fulfill the condition $\mu_0 \geq 0.2$ (Sliding Surfaces Class D). On-site steel structure sizes (flange widths) of ≥ 100 mm are considered by using clamps for connection points. Unless shown otherwise: force direction F_x = steel structure longitudinal axis.

Technical Information

Installation conditions are summarized at the end of this brochure - in particular specifications regarding tightening torques, bolt spacing, general installation instructions etc.

Reusability of Products

Products must only be re-used if the recommended working loads have not been previously exceeded and if the coating has not been discernibly damaged.

General Remarks/ Disclaimer

This document is solely for being used by the receiver but remains property of Sikla. The technical drawings and all other content are to the best of our knowledge. Pictures and illustrations are non-committing. We can not be held responsible for printing errors and their implications. We reserve the right of making alterations and improvements in the interest of technical progress.

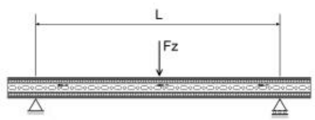
The present Guideline allows the user to select and to design supporting structures (constructions) easily. This document has been prepared in close cooperation with the following external specialists.

MPA STUTTGART Otto-Graf-Institut, Materialprüfungsanstalt Universität Stuttgart · IPU Ingenieurgesellschaft Pell, Ummenhofer mbH · Breinlinger Ingenieure · KIT Karlsruher Institut für Technologie

Test Report numbers: 52140-901 0946 000; 52140-901 2896 000; 155204-2-a; 142 508 T1-3; K14-6005; H14-176;

Working loads

Beam Section TP F 80

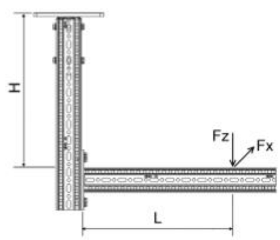


L_{max}	$F_{z.\ perm}$
[in]	[kip]
40	3.09
60	2.04
80	1.54
100	1.01
120	0.69

F_z as a dead load at L/2.
Max. bending L/200.

Part List
1 x Beam Section TP F 80

L- Construction F 80

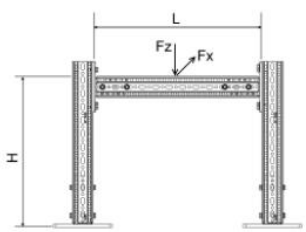


H_{max}	L_{max}	$F_{z.\ perm}$ for $F_x = 0$	$F_{z.\ perm}$ for $F_x = \mu_0 * F_z$
[in]	[in]	[kip]	[kip]
20	10	0.61	0.61
	20	0.33	0.33
	30	0.19	0.19
40	10	0.44	0.44
	20	0.24	0.24
	30	0.16	0.16
60	10	0.34	0.34
	20	0.20	0.20
	30	0.11	0.11

F_z as dead load at distance L; F_x as a variable load at distance L from pipe expansion/friction.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation H/100; L/100.

Part List
1 x Beam Section TP F 80
1 x End Support WBD F 80
1 x Cantilever Bracket AK F 80
8 x Self-Forming-Screw FLS F

Frame F 80

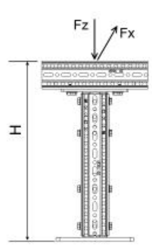


H_{max}	L_{max}	$F_{z.\ perm}$ for $F_x = 0$	$F_{z.\ perm}$ for $F_x = \mu_0 * F_z$
[in]	[in]	[kip]	[kip]
40	40	4.46	3.77
	60	3.22	2.56
	80	2.42	1.91
60	40	4.46	1.98
	60	3.22	1.97
	80	2.42	1.93

F_z as dead load at distance L/2; F_x as a variable load at distance L/2 from pipe expansion/friction.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation H/100; max. bending L/200.

Part List
3 x Beam Section TP F 80
2 x End Support WBD F 80
2 x End Support STA F 80
24 x Self-Forming-Screw FLS F

T- Support F 80



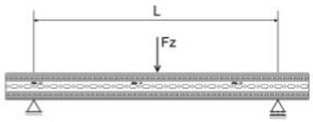
H_{max}	$F_{z.\ perm}$ for $F_x = 0$	$F_{z.\ perm}$ for $F_x = \mu_0 * F_z$
[in]	[kip]	[kip]
20	2.25	2.23
40	2.25	0.89
60	2.25	0.50

F_z as dead load; F_x as a variable load from pipe expansion/friction.
Central load introduction for planned eccentricity ± 2".
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation H/100.
When load off-centre, design must be checked for buckling.

Part List
2 x Beam Section TP F 80
1 x End Support WBD F 80
1 x End Support STA F 80
12 x Self-Forming-Screw FLS F

Working loads

Beam Section TP F 100

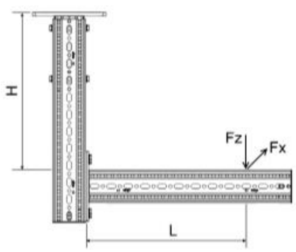


L_{max}	$F_{z.\,perm}$
[in]	[kip]
40	7.87
80	3.88
120	2.22
160	1.25
200	0.79
240	0.54

F_z as a dead load at L/2.
Max. bending L/200.

Part List
1 x Beam Section TP F 100

L- Construction F 100

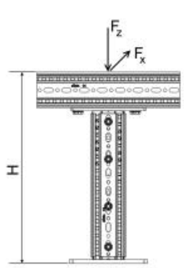


H_{max}	L_{max}	$F_{z.\,perm}$ for $F_x = 0$	$F_{z.\,perm}$ for $F_x = \mu_0 * F_z$
[in]	[in]	[kip]	[kip]
40	10	0.78	0.78
	20	0.45	0.45
	30	0.31	0.31
	40	0.23	0.23
	50	0.16	0.16
60	10	0.66	0.66
	20	0.39	0.39
	30	0.26	0.26
	40	0.19	0.19
	50	0.14	0.14
80	10	0.57	0.57
	20	0.34	0.34
	30	0.23	0.23
	40	0.17	0.17
	50	0.12	0.12
100	10	0.51	0.51
	20	0.30	0.30
	30	0.20	0.20
	40	0.15	0.15
	50	0.10	0.10

F_z as dead load at distance L; F_x as a variable load at distance L from pipe expansion/friction.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation H/100; L/100.

Part List
1 x Beam Section TP F 100
1 x End Support WBD F 100
1 x Cantilever Bracket AK F 100
8 x Self-Forming-Screw FLS F

T- Support F 100



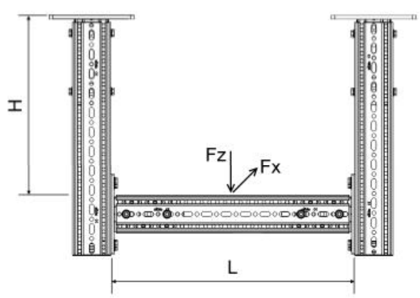
H_{max}	$F_{z.\,perm}$ $F_x = 0$	$F_{z.\,perm}$ $F_x = \mu_0 * F_z$
[in]	[kip]	[kip]
60	2.88	1.00
80	2.86	0.68
100	2.85	0.49
120	2.83	0.37

F_z as dead load; F_x as a variable load from pipe expansion/friction.
Central load introduction for planned eccentricity ± 2“.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation H/150.
When load off-centre, design must be checked for buckling.

Part List
1 x End Support WBD F 100
2 x Beam Section TP F 100
1 x End Support STA F 100
12 x Self-Forming-Screw FLS F

Working loads

Frame F 100



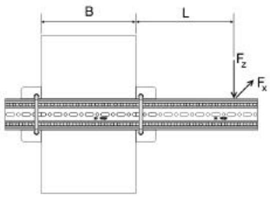
H_{max}	L_{max}	$F_{z. perm}$ for $F_x = 0$	$F_x = \mu_0 * F_z$
[in]	[in]	[kip]	[kip]
60	40	6.08	2.79
	60	5.62	2.71
	80	4.33	2.62
	100	3.49	2.45
	120	2.64	2.24
	140	2.03	1.90
	160	1.60	1.51
80	40	6.08	2.25
	60	5.63	2.19
	80	4.32	2.06
	100	3.49	1.95
	120	2.61	1.81
	140	2.01	1.67
	160	1.59	1.53
100	40	6.08	1.45
	60	5.61	1.44
	80	4.27	1.42
	100	3.49	1.39
	120	2.60	1.35
	140	1.99	1.29
	160	1.57	1.23
120	40	6.07	1.13
	60	5.51	1.12
	80	4.26	1.11
	100	3.45	1.09
	120	2.61	1.07
	140	1.98	1.04
	160	1.56	1.01
140	40	6.07	0.90
	60	5.51	0.90
	80	4.27	0.89
	100	3.45	0.89
	120	2.57	0.87
	140	1.99	0.86
	160	1.55	0.83
160	40	6.07	0.74
	60	5.51	0.73
	80	4.26	0.73
	100	3.45	0.73
	120	2.62	0.72
	140	1.95	0.71
	160	1.57	0.70

F_z as dead load at distance L/2; F_x as a variable load at distance L/2 from pipe expansion/ friction.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation H/100; max. bending L/200.

Part List
2 x End Support WBD F 100
3 x Beam Section TP F 100
2 x End Support STA F 100
24 x Self-Forming-Screw FLS F

Working loads

Joining Beam Bracket F 100 vertical



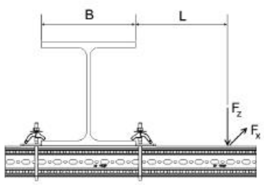
L_{max}	B	$F_{z, perm}$ for $F_x = 0$	$F_{z, perm}$ for $F_x = \mu_0 * F_z$
[in]	[in]	[kip]	[kip]
10	4	0.12	0.11
	6	0.21	0.20
	8	0.27	0.26
	10	0.31	0.30
	12	0.35	0.33
20	4	0.09	0.08
	6	0.14	0.13
	8	0.18	0.17
	10	0.22	0.21
	12	0.25	0.24
30	4	0.06	0.06
	6	0.11	0.11
	8	0.15	0.14
	10	0.18	0.17
	12	0.21	0.20
40	4	0.05	0.04
	6	0.09	0.09
	8	0.12	0.12
	10	0.15	0.15
	12	0.18	0.17
50	4	0.03	0.03
	6	0.08	0.08
	8	0.11	0.11
	10	0.14	0.13
	12	0.16	0.15

Part List
1 x Beam Section TP F 100
2 x U-Holder SB F 100-40

F_z as dead load at distance L; F_x as a variable load at distance L.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation L/100.

Working loads

Joining Beam Bracket F 100 horizontal



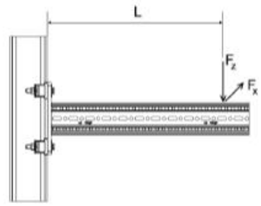
L_{max}	B	$F_{z. perm}$ for $F_x = 0$	$F_{z. perm}$ for $F_x = \mu_0 * F_z$
[in]	[in]	[kip]	[kip]
10	4	0.48	0.23
	6	0.86	0.41
	8	1.07	0.51
	10	1.25	0.59
	12	1.39	0.66
20	4	0.34	0.16
	6	0.55	0.26
	8	0.72	0.34
	10	0.86	0.41
	12	0.99	0.47
30	4	0.24	0.11
	6	0.44	0.21
	8	0.59	0.28
	10	0.71	0.34
	12	0.82	0.39
40	4	0.18	0.09
	6	0.37	0.17
	8	0.49	0.23
	10	0.60	0.29
	12	0.71	0.34
50	4	0.14	0.06
	6	0.33	0.16
	8	0.44	0.21
	10	0.54	0.26
	12	0.64	0.30

F_z as dead load at distance L; F_x as a variable load at distance L.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation L/100.

Part List
1 x Beam Section TP F 100
2 x U-Holder SB F 100-40

Working loads

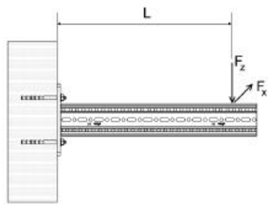
Beam Bracket F 100



Variant a) clamped

L_{max}	$F_{z.\ perm}$ for	
	$F_x = 0$	$F_x = \mu_0 * F_z$
[in]	[kip]	[kip]
10	2.67	1.65
20	1.45	0.90
30	0.98	0.61
40	0.73	0.45
50	0.54	0.34

F_z as dead load at distance L; F_x as a variable load at distance L.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation L/100.



Variant b) dowelled

L_{max}	$F_{z.\ perm}$ for	
	$F_x = 0$	$F_x = \mu_0 * F_z$
[in]	[kip]	[kip]
10	1.46	1.46
20	1.06	1.06
30	0.81	0.81
40	0.62	0.62
50	0.46	0.46

F_z as dead load at distance L; F_x as a variable load at distance L.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation L/100.

Variant c) infinitely rigid

L_{max}	$F_{z.\ perm}$ for	
	$F_x = 0$	$F_x = \mu_0 * F_z$
[in]	[kip]	[kip]
10	6.68	5.90
20	3.77	3.65
30	2.15	2.15
40	1.38	1.38
50	0.83	0.83

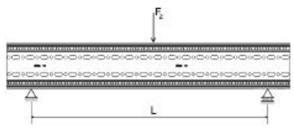
F_z as dead load at distance L; F_x as a variable load at distance L.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation L/100.

Part List
1 x Beam Bracket TKO F 100

and variable
a) 1 x Assembly Set P2 S
b) 4 x Injection system VMZ-A (M12/100)
c) infinitely rigid

Working loads

Beam Section TP F 100/160

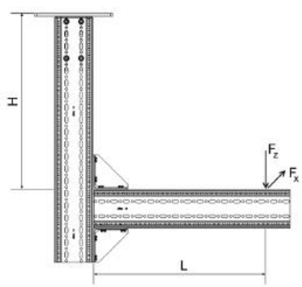


L_{max}	$F_{z.\ perm}$
[in]	[kip]
40	16.08
80	7.98
120	5.28
160	3.87
200	2.48
240	1.68

Part List
1 x Beam Section TP F 100/160

F_z as dead load at distance L/2.
Max. deflection L/200.

L- Construction F 100/160



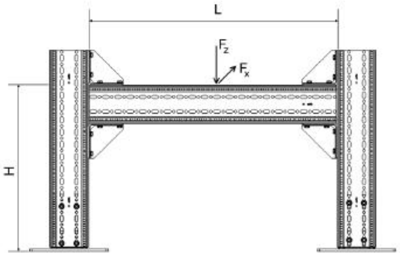
H_{max}	L_{max}	$F_{z.\ perm}$ for $F_x = 0$	$F_{z.\ perm}$ for $F_x = \mu_0 * F_z$
[in]	[in]	[kip]	[kip]
40	10	1.17	1.17
	20	0.71	0.71
	30	0.50	0.50
	40	0.37	0.37
	50	0.28	0.28
60	10	1.06	1.06
	20	0.65	0.65
	30	0.46	0.46
	40	0.34	0.34
	50	0.25	0.25
80	10	0.97	0.97
	20	0.60	0.60
	30	0.42	0.42
	40	0.32	0.32
	50	0.23	0.23
100	10	0.89	0.89
	20	0.56	0.56
	30	0.39	0.39
	40	0.29	0.29
	50	0.22	0.22
120	10	0.83	0.83
	20	0.52	0.52
	30	0.36	0.36
	40	0.25	0.25
	50	0.18	0.18
140	10	0.77	0.77
	20	0.48	0.48
	30	0.34	0.34
	40	0.22	0.22
	50	0.16	0.16
160	10	0.72	0.72
	20	0.45	0.45
	30	0.32	0.32
	40	0.18	0.18
	50	0.14	0.14

Part List
1 x End Support WBD F 100/160
2 x Beam Section TP F 100/160
2 x Corner Bracket WD F 100
24 x Self-Forming-Screw FLS F

F_z as dead load at distance L; F_x as a variable load at distance L.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation H/100; L/100.

Working loads

Frame F 100/160



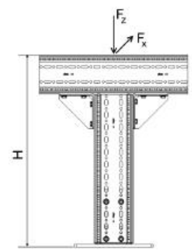
H_{max}	L_{max}	$F_{z,\ perm}$ for $F_x = 0$	$F_{z,\ perm}$ for $F_x = \mu_0 * F_z$
[in]	[in]	[kip]	[kip]
60	40	7.52	2.10
	60	7.47	2.10
	80	7.43	2.08
	100	7.27	2.08
	120	6.18	2.08
	140	5.37	2.07
	160	4.77	2.04
80	40	7.55	1.65
	60	7.45	1.63
	80	7.44	1.63
	100	7.18	1.63
	120	6.12	1.62
	140	5.37	1.61
	160	4.74	1.61
100	40	7.54	1.32
	60	7.45	1.31
	80	7.44	1.31
	100	7.19	1.31
	120	6.12	1.30
	140	5.34	1.30
	160	4.75	1.29
120	40	7.46	1.12
	60	7.45	1.12
	80	7.44	1.11
	100	7.18	1.11
	120	6.07	1.11
	140	5.33	1.10
	160	4.71	1.10
140	40	7.45	0.96
	60	7.45	0.96
	80	7.44	0.96
	100	7.10	0.95
	120	6.06	0.95
	140	5.29	0.94
	160	4.71	0.94
160	40	7.45	0.85
	60	7.45	0.85
	80	7.44	0.85
	100	7.11	0.84
	120	6.06	0.84
	140	5.29	0.84
	160	4.66	0.83

F_z as dead load at distance L/2; F_x as a variable load at distance L/2.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation H/100; max. deflection L/200.

Part List
2 x End Support WBD F 100/160
3 x Beam Section TP F 100/160
4 x Corner Bracket WD F 100
48 x Self-Forming-Screw FLS F

Working loads

T- Support F 100/160

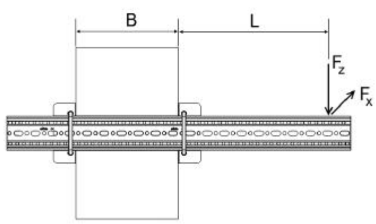


H_{max}	$F_{z.\,perm}$	
	$F_x = 0$	$F_x = \mu_0 * F_z$
[in]	[kip]	[kip]
60	3.44	1.06
80	3.44	0.75
100	3.42	0.55
120	3.39	0.44
140	3.37	0.35
160	3.37	0.28

F_z as dead load; F_x as a variable load from pipe expansion/friction.
Central load introduction for planned eccentricity ± 50 mm.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation H/150.

Part List
1 x End Support WBD F 100/160
2 x Beam Section TP F 100/160
2 x Corner Bracket WD F 100
24 x Self-Forming-Screw FLS F

Joining Beam Bracket F 100/160 vertical



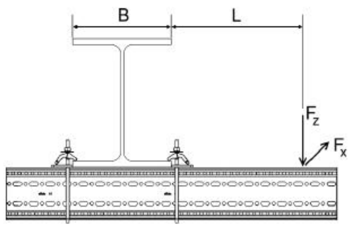
L_{max}	B	$F_{z.\,perm}$ for	
		$F_x = 0$	$F_x = \mu_0 * F_z$
[in]	[in]	[kip]	[kip]
10	4	0.12	0.11
	6	0.21	0.20
	8	0.27	0.26
	10	0.31	0.30
	12	0.35	0.33
20	4	0.09	0.08
	6	0.14	0.13
	8	0.18	0.17
	10	0.22	0.21
	12	0.25	0.24
30	4	0.06	0.06
	6	0.11	0.11
	8	0.15	0.14
	10	0.18	0.17
	12	0.21	0.20
40	4	0.05	0.04
	6	0.09	0.09
	8	0.12	0.12
	10	0.15	0.15
	12	0.18	0.17
50	4	0.03	0.03
	6	0.08	0.08
	8	0.11	0.11
	10	0.14	0.13
	12	0.16	0.15

F_z as dead load at distance L; F_x as a variable load at distance L.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation L/100.

Part List
1 x Beam Section TP F 100/160
2 x U-Holder SB F 100/160-40

Working loads

Joining Beam Bracket F 100/160 horizontal



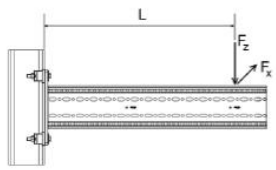
L_{max}	B	$F_{z.\,perm}$ for $F_x = 0$	$F_{z.\,perm}$ for $F_x = \mu_0 * F_z$
[in]	[in]	[kip]	[kip]
10	4	0.48	0.23
	6	0.86	0.41
	8	1.07	0.51
	10	1.25	0.59
	12	1.39	0.66
20	4	0.34	0.16
	6	0.55	0.26
	8	0.72	0.34
	10	0.86	0.41
	12	0.99	0.47
30	4	0.24	0.11
	6	0.44	0.21
	8	0.59	0.28
	10	0.71	0.34
	12	0.82	0.39
40	4	0.18	0.09
	6	0.37	0.17
	8	0.49	0.23
	10	0.60	0.29
	12	0.71	0.34
50	4	0.14	0.06
	6	0.33	0.16
	8	0.44	0.21
	10	0.54	0.26
	12	0.64	0.30

Part List
1 x Beam Section TP F 100/160
2 x U-Holder SB F 100/160-40

F_z as dead load at distance L; F_x as a variable load at distance L.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation L/100.

Working loads

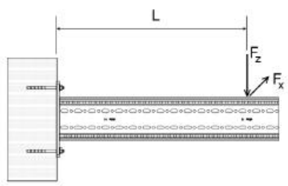
Beam Bracket F 100/160



Variant a) clamped

L_{max}	$F_{z. perm}$ for	
	$F_x = 0$	$F_x = \mu_0 * F_z$
[in]	[kip]	[kip]
10	3.40	2.09
20	1.84	1.14
30	1.24	0.76
40	0.93	0.57
50	0.69	0.42

F_z as dead load at distance L; F_x as a variable load at distance L.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation L/100.



Variant b) dowelled

L_{max}	$F_{z. perm}$ for	
	$F_x = 0$	$F_x = \mu_0 * F_z$
[in]	[kip]	[kip]
10	1.61	1.61
20	1.23	1.23
30	0.97	0.97
40	0.75	0.75
50	0.55	0.55

F_z as dead load at distance L; F_x as a variable load at distance L.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation L/100.

Variant c) infinitely rigid

L_{max}	$F_{z. perm}$ for	
	$F_x = 0$	$F_x = \mu_0 * F_z$
[in]	[kip]	[kip]
10	7.51	6.20
20	4.66	3.76
30	3.32	2.57
40	2.50	1.92
50	1.85	1.43

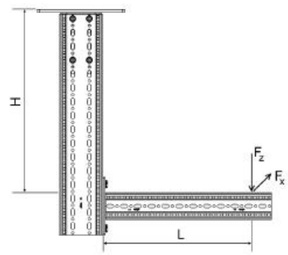
F_z as dead load at distance L; F_x as a variable load at distance L.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation L/100.

Part List
1 x Beam Bracket TKO F 100/160

and variable
a) 1 x Assembly Set P2 S
b) 4 x Injection system VMZ-A (M12/100)
c) infinitely rigid

Working loads

L- Construction F 100/160 - 100



H_{max}	L_{max}	$F_{z. perm}$ for $F_x = 0$	$F_{z. perm}$ for $F_x = \mu_0 * F_z$
[in]	[in]	[kip]	[kip]
40	10	1.16	1.05
	20	0.69	0.69
	30	0.47	0.47
	40	0.34	0.34
	50	0.24	0.24
60	10	1.05	0.80
	20	0.63	0.63
	30	0.43	0.43
	40	0.32	0.32
	50	0.23	0.23
80	10	0.96	0.65
	20	0.58	0.56
	30	0.40	0.40
	40	0.29	0.29
	50	0.21	0.21
100	10	0.89	0.55
	20	0.54	0.48
	30	0.37	0.37
	40	0.27	0.27
	50	0.20	0.20
120	10	0.82	0.47
	20	0.50	0.42
	30	0.35	0.35
	40	0.24	0.24
	50	0.17	0.17
140	10	0.77	0.42
	20	0.47	0.38
	30	0.33	0.33
	40	0.21	0.21
	50	0.15	0.15
160	10	0.72	0.37
	20	0.44	0.34
	30	0.31	0.30
	40	0.18	0.18
	50	0.12	0.12

F_z as dead load at distance L; F_x as a variable load at distance L.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation H/100; L/100.

Part List
1 x End Support WBD F 100/160
1 x Beam Section TP F 100/160
1 x Cantilever Bracket AK F 100
12 x Self-Forming-Screw FLS F

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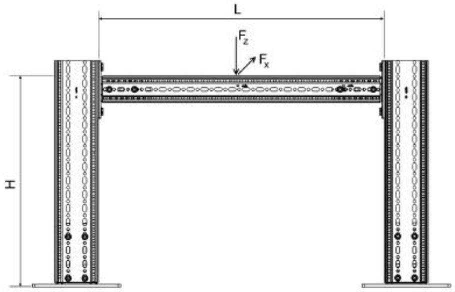
Working loads

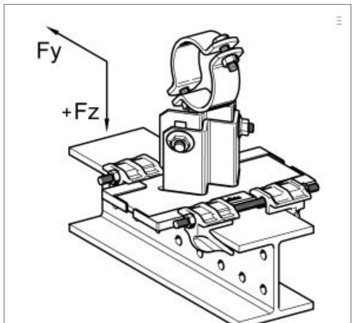
Frame F 100/160 - 100



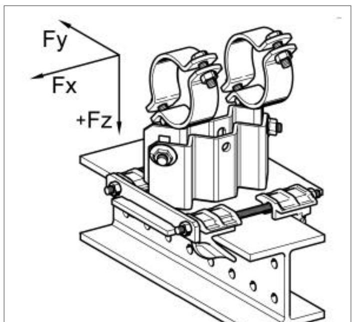
H_{max}	L_{max}	$F_{z.\,perm}$ for $F_x = 0$	$F_{z.\,perm}$ for $F_x = \mu_0 * F_z$
[in]	[in]	[kip]	[kip]
60	40	6.77	2.10
	60	5.61	2.10
	80	4.25	2.08
	100	3.47	2.08
	120	2.96	2.08
	140	2.58	2.05
	160	2.28	1.83
80	40	6.82	1.63
	60	5.61	1.63
	80	4.26	1.63
	100	3.47	1.63
	120	2.96	1.62
	140	2.56	1.61
	160	2.29	1.61
100	40	6.87	1.32
	60	5.51	1.31
	80	4.26	1.31
	100	3.47	1.31
	120	2.93	1.30
	140	2.56	1.30
	160	2.27	1.29
120	40	6.92	1.12
	60	5.51	1.12
	80	4.26	1.11
	100	3.47	1.11
	120	2.94	1.11
	140	2.56	1.10
	160	2.27	1.10
140	40	6.92	0.96
	60	5.52	0.96
	80	4.27	0.96
	100	3.48	0.95
	120	2.94	0.95
	140	2.56	0.94
	160	2.27	0.94
160	40	2.10	0.85
	60	2.10	0.85
	80	2.08	0.84
	100	2.08	0.84
	120	2.08	0.84
	140	2.05	0.84
	160	1.83	0.83

F_z as dead load at distance L/2; F_x as a variable load at distance L/2 from pipe expansion/ friction.
Friction coefficient μ_0 = 0.2 for friction in longitudinal direction.
Max. deviation H/100; max. bending L/200.

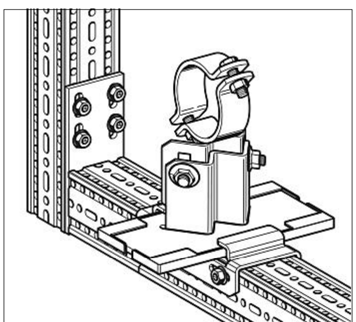
Part List
2 x End Support WBD F 100/160
2 x Beam Section TP F 100/160
1 x Beam Section TP F 100
2 x End Support STA F 100
32 x Self-Forming-Screw FLS F



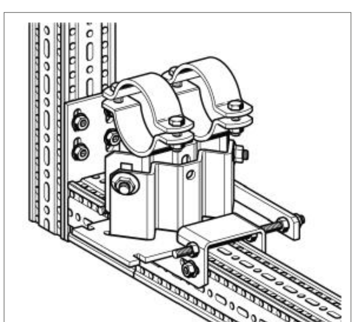
LA + FS



LC + XS



LA + FW F 80



LC + XW F 80

Working loads for Supports LA. LC and LD - HV

Sliding Support LA - HV + Guiding Set FS resp. Fixed Point Set XS
Sliding Support LA - HV + Guiding Bracket FW F resp. Fixed Point Bracket XW F

Height Type HV	NPS	F_x [kip] X-Supports only	F_y [kip]	+ F_z [kip]	- F_z FS 80/120 [kip]	- F_z FW F [kip]	- F_z XS 80/120 [kip]	- F_z XW F [kip]
90	≤ 1“	2.05	1.17	3.46	3.15	1.37	3.46	3.46
90	1 1/4“	1.98	1.10	3.46	3.15	1.37	3.46	3.46
90	1 1/2“	1.93	1.08	3.46	3.15	1.37	3.46	3.46
90	2“	1.84	0.99	3.46	3.15	1.37	3.46	3.46
90	2 1/2“	1.73	0.88	3.46	3.15	1.37	3.46	3.46
90	3“	1.64	0.81	3.46	3.15	1.37	3.46	3.46
90	4“	1.46	0.63	3.46	3.15	1.37	3.46	3.46
90	5“	1.28	0.47	3.46	3.15	1.37	3.46	3.46
90	6“	1.06	0.29	3.46	3.15	1.37	3.46	3.46
150	≤ 1“	1.80	0.94	3.46	3.15	1.37	3.46	3.46
150	1 1/4“	1.78	0.88	3.46	3.15	1.37	3.46	3.46
150	1 1/2“	1.75	0.88	3.46	3.15	1.37	3.46	3.46
150	2“	1.71	0.81	3.46	3.15	1.37	3.46	3.46
150	2 1/2“	1.66	0.72	3.46	3.15	1.37	3.46	3.46
150	3“	1.62	0.67	3.46	3.15	1.37	3.46	3.46
150	4“	1.55	0.56	3.46	3.15	1.37	3.46	3.46
150	5“	1.46	0.45	3.46	3.15	1.37	3.46	3.46
150	6“	1.37	0.32	3.46	3.15	1.37	3.46	3.46
200	≤ 1“	1.42	0.81	3.46	3.15	1.37	3.46	3.46
200	1 1/4“	1.39	0.79	3.46	3.15	1.37	3.46	3.46
200	1 1/2“	1.39	0.76	3.46	3.15	1.37	3.46	3.46
200	2“	1.35	0.72	3.46	3.15	1.37	3.46	3.46
200	2 1/2“	1.33	0.67	3.46	3.15	1.37	3.46	3.46
200	3“	1.28	0.63	3.46	3.15	1.37	3.46	3.46
200	4“	1.23	0.54	3.46	3.15	1.37	3.46	3.46
200	5“	1.17	0.45	3.46	3.15	1.37	3.46	3.46
200	6“	1.10	0.36	3.46	3.15	1.37	3.46	3.46

Sikla Pipe Shoe types:

HV 90 = Height 3 1/2“
HV 150 = Height 5 7/8“
HV 200 = Height 7 7/8“

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Sliding Support LC - HV + Guiding Set FS resp. Fixed Point Set XS
Sliding Support LC - HV + Guiding Bracket FW F resp. Fixed Point Bracket XW F

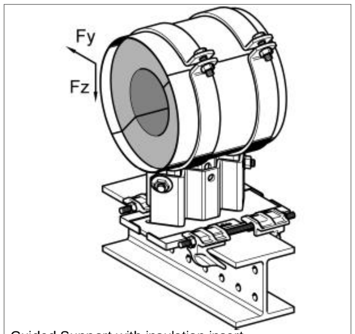
Height Type HV	NPS	F_x [kip] X-Supports only	F_y [kip]	+ F_z [kip]	- F_z FS 80/120 [kip]	- F_z FW F [kip]	- F_z XS 80/120 [kip]	- F_z XW F [kip]
90	≤ 1"	3.22	1.42	3.82	3.15	1.37	3.82	3.82
90	1 1/4"	3.17	1.39	3.82	3.15	1.37	3.82	3.82
90	1 1/2"	3.15	1.37	3.82	3.15	1.37	3.82	3.82
90	2"	3.13	1.33	3.82	3.15	1.37	3.82	3.82
90	2 1/2"	3.06	1.26	3.82	3.15	1.37	3.82	3.82
90	3"	3.04	1.21	3.82	3.15	1.37	3.82	3.82
90	4"	2.95	1.12	3.82	3.15	1.37	3.82	3.82
90	5"	2.86	1.01	3.82	3.15	1.37	3.82	3.82
90	6"	2.77	0.90	3.82	3.15	1.37	3.82	3.82
90	8"	2.61	0.72	3.82	3.15	1.37	3.82	3.82
90	10"	2.43	0.52	3.82	3.15	1.37	3.82	3.82
90	12"	2.27	0.34	3.82	3.15	1.37	3.82	3.82
150	≤ 1"	1.91	1.10	3.82	3.15	1.37	3.82	3.82
150	1 1/4"	1.91	1.08	3.82	3.15	1.37	3.82	3.82
150	1 1/2"	1.91	1.06	3.82	3.15	1.37	3.82	3.82
150	2"	1.89	1.03	3.82	3.15	1.37	3.82	3.82
150	2 1/2"	1.89	0.99	3.82	3.15	1.37	3.82	3.82
150	3"	1.89	0.97	3.82	3.15	1.37	3.82	3.82
150	4"	1.87	0.90	3.82	3.15	1.37	3.82	3.82
150	5"	1.87	0.83	3.82	3.15	1.37	3.82	3.82
150	6"	1.84	0.74	3.82	3.15	1.37	3.82	3.82
150	8"	1.82	0.61	3.82	3.15	1.37	3.82	3.82
150	10"	1.80	0.47	3.82	3.15	1.37	3.82	3.82
150	12"	1.78	0.34	3.82	3.15	1.37	3.82	3.82
200	≤ 1"	1.64	1.19	3.82	3.15	1.37	3.82	3.82
200	1 1/4"	1.62	1.17	3.82	3.15	1.37	3.82	3.82
200	1 1/2"	1.62	1.15	3.82	3.15	1.37	3.82	3.82
200	2"	1.60	1.10	3.82	3.15	1.37	3.82	3.82
200	2 1/2"	1.57	1.06	3.82	3.15	1.37	3.82	3.82
200	3"	1.55	1.03	3.82	3.15	1.37	3.82	3.82
200	4"	1.51	0.97	3.82	3.15	1.37	3.82	3.82
200	5"	1.46	0.90	3.82	3.15	1.37	3.82	3.82
200	6"	1.42	0.81	3.82	3.15	1.37	3.82	3.82
200	8"	1.33	0.67	3.82	3.15	1.37	3.82	3.82
200	10"	1.24	0.52	3.82	3.15	1.37	3.82	3.82
200	12"	1.15	0.38	3.82	3.15	1.37	3.82	3.82

Sliding Support LD - HV + 2 x Guiding Set FS resp. 2 x Fixed Point Set XS
Sliding Support LD - HV + 2 x Guiding Bracket FW F resp. 2 x Fixed Point Bracket XW F

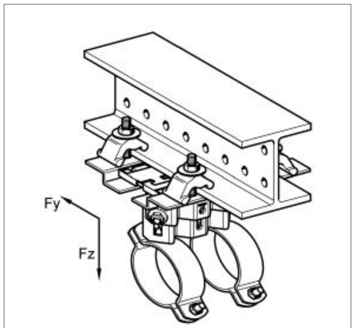
Height Type HV	NPS	F_x [kip] X-Supports only	F_y [kip]	+ F_z [kip]	- F_z FS 80/120 [kip]	- F_z FW F [kip]	- F_z XS 80/120 [kip]	- F_z XW F [kip]
90	≤ 14"	5.62	2.95	7.37	6.30	2.74	7.37	7.37
90	16"	5.06	2.68	7.37	6.30	2.74	7.37	7.37
90	20"	4.68	2.11	7.37	6.30	2.74	7.37	7.37
90	24"	2.32	1.62	7.37	6.30	2.74	7.37	7.37
150	≤ 14"	5.62	2.90	7.37	6.30	2.74	7.37	7.37
150	16"	5.06	2.59	7.37	6.30	2.74	7.37	7.37
150	20"	3.89	1.98	7.37	6.30	2.74	7.37	7.37
150	24"	1.96	1.42	7.37	6.30	2.74	7.37	7.37
200	≤ 14"	5.62	2.54	7.37	6.30	2.74	7.37	7.37
200	16"	4.61	2.29	7.37	6.30	2.74	7.37	7.37
200	20"	3.53	1.82	7.37	6.30	2.74	7.37	7.37
200	24"	1.69	1.37	7.37	6.30	2.74	7.37	7.37

Sikla Pipe Shoe types:

HV 90 = Height 3 1/2"
HV 150 = Height 5 7/8"
HV 200 = Height 7 7/8"



Guided Support with insulation insert



Guided Support. suspended

Working loads for Supports with insulation insert and suspended

Sliding Support LK - HV + Guiding Set FS

Height Type HV	NPS	F_y FS 80/120 [kip]	+/- F_z FS 80/120 [kip]
150	1“	0.70	0.70
150	1 1/4“	0.85	0.85
150	1 1/2“	0.97	0.97
150	2“	0.90	0.88
150	2 1/2“	0.63	0.63
150	3“	0.56	0.54
150	4“	1.01	3.82
150	5“	0.92	3.82
150	6“	0.81	3.82
150	8“	0.63	3.82
150	10“	0.43	3.82
150	12“	0.09	3.82

Sliding Support LC - HV + Guiding Set FS Z

Height Type HV	NPS	F_y FS Z [kip]	+/- F_z FS Z [kip]
90	1“	1.12	2.25
90	1 1/4“	1.08	2.25
90	1 1/2“	1.06	2.25
90	2“	1.01	2.25
90	2 1/2“	0.94	2.25
90	3“	0.90	2.25
90	4“	0.81	2.25
90	5“	0.74	2.25
90	6“	0.70	2.25
90	8“	0.61	2.25
90	10“	0.52	2.25
90	12“	0.34	2.25
150	1“	0.72	2.25
150	1 1/4“	0.70	2.25
150	1 1/2“	0.70	2.25
150	2“	0.67	2.25
150	2 1/2“	0.63	2.25
150	3“	0.63	2.25
150	4“	0.59	2.25
150	5“	0.54	2.25
150	6“	0.52	2.25
150	8“	0.45	2.25
150	10“	0.38	2.25
150	12“	0.29	2.25
200	1“	0.56	2.25
200	1 1/4“	0.54	2.25
200	1 1/2“	.054	2.25
200	2“	0.52	2.25
200	2 1/2“	0.50	2.25
200	3“	0.50	2.25
200	4“	0.47	2.25
200	5“	0.45	2.25
200	6“	0.43	2.25
200	8“	0.38	2.25
200	10“	0.34	2.25
200	12“	0.25	2.25

Sikla Pipe Shoe types:

HV 90 = Height 3 1/2“
HV 150 = Height 5 7/8“
HV 200 = Height 7 7/8“

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Supports (Pipe Shoes)

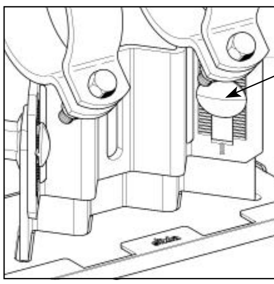
Application

The Sikla height- adjustable Supports (Pipe Shoes; HV 90, HV 150, HV 200) can be used as a Sliding Support, a Guided Support or as a Fixed Point. The testing process of the individual Support types and the determination of the direction dependent permissible loads was carried out by the German testing house TÜV Rheinland (Report No. 69617494/01).

Conformity

The Sikla Simotec Supports (Pipe Shoes) therefore complies with DIN EN 13480-3 : 2012-11, particularly in section 13.3.6.1 where it is pointed that the design of Pipe Support components should be in accordance with DIN EN 1993. For every Pipe Support type (incl. required connection kit) a declaration of conformity is available upon request in accordance with ISO / IEC 17050.

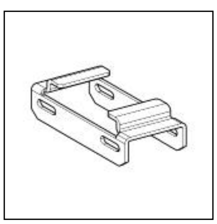
Installation

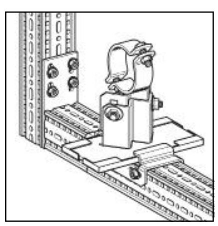


Special bolts for height- adjustable connection of lower and upper Pipe Shoe components.
Tightening torque: 59.0 [lbf/ft] (80 Nm)

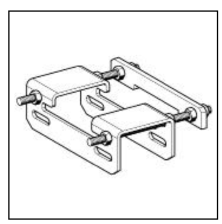
By combining *Sliding Support LA or LC* with connection kits for each specific steel beam type results:

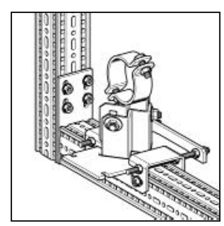
Guiding Support on Framo
+ *Guiding Bracket FW F ...*



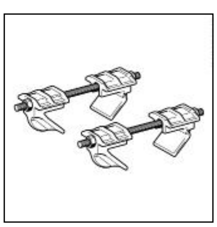


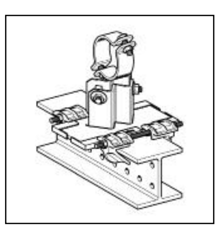
Fixed Point Support on Framo
+ *Fixed Point Bracket XW F ...*



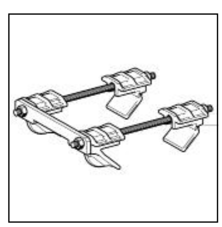


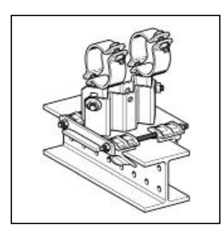
Guiding Support on structural steel beam
+ *Guiding Set FS ...*





Fixed Point Support on structural steel beam
+ *Fixed Point Set XS ...*





The dimension of the existing steel beam determines the required type of connection kit.
Connection kits can be installed on steel beams with flange width ≤ 11 13/16“ and flange thickness ≤ 1 3/16“.

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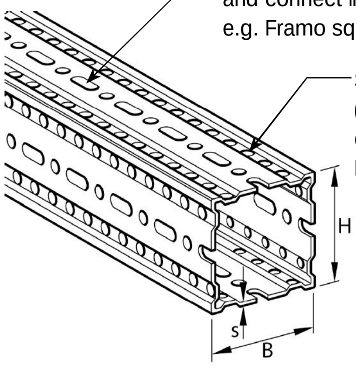
Beam Section TP F 80 and TP F 100

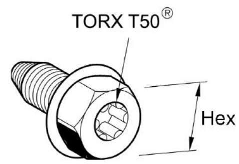


Self-Forming-Screws FLS F pass- through the slotted holes Ø 7/16“ x 1 3/16“ (Ø 11x30mm) and connect into the Framo components within the box section:
e.g. Framo square End Support WBD F and Framo octagonal STA F.

Self-Forming-Screws FLS screws directly into the Ø 3/8“ (9.1 mm) round-holes (perforations) running along the outer edges of each face of the Framo beam. All connecting Framo components are fixed in this way: e.g. Cantilever Brackets AK F, End Supports STA F, Channel Adapters SA F and Slide Sets GS F.

Self-Forming-Screw FLS F

Thread- forming bolt with locking- serration for all connections.

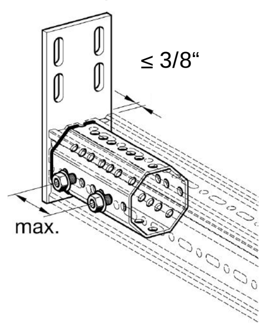


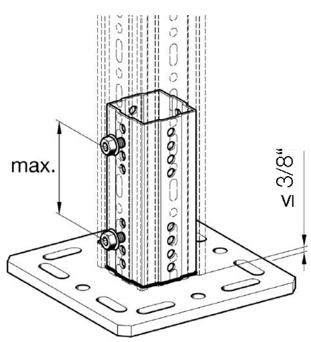
Attention!

▶ *Max. applied torque no more than 44.25 lbf/ft (60 Nm)!*

Assembly of Beam Section TP F with WBD-End Support and End Support STA F

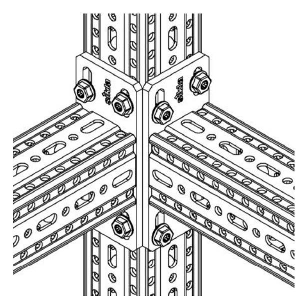
For best performance the Self-Forming-Screw FLS F must be applied to both sides in greatest possible distance apart 2 x 2 screws opposite one another.
Distance between end of section and end-plate: ≤ 3/8“





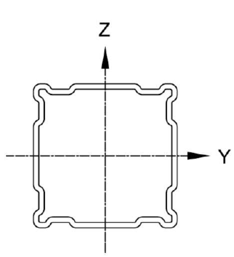
Assembly to Beam Section TP F. e.g. Cantilever Bracket AK F

Offset hole-lines allow for connection at one level without collision of bolts inside the box section for all components with end-plate (e.g. STA F, SA F).
4 Self-Forming-Screws are required to fix each end-plate!



Each connection to the section requires 4 screws! Plugged through the slotted hole, these will screw into the round- hole of the section underneath.

Technical Data



Description Beam Section [mm]	Axis	Material Thickness s [in] (mm)	Moment of Inertia I_y [in⁴]	Moment of Inertia I_z [in⁴]	Section Modulus W_y [in³]	Section Modulus W_z [in³]	Radius of Inertia i_y [in]	Radius of Inertia i_z [in]	Torsional Moment It [in⁴]	Cross Section A [in²]	Weight G [lb/ft]
TP F 80/30		1/8“ (3.0)	0.85*)	0.16*)	0.63*)	0.29*)	1.43	0.62	0.27	0.42*)	2.89
TP F 80/80		1/8“ (3.0)	1.52*)		0.96*)		1.16		2.36*)	1.13	4.30
TP F 100/100		1/6“ (4.0)	4.32*)		2.25*)		1.89		4.36	1.21*)	7.26
TP F 100/160		1/6“ (4.0)	13.44*)	6.74*)	4.61*)	2.82*)	2.43	1.72	9.25	2.28*)	9.61

Beam Section TP F, Steel, Hot-dipped-galvanized according to DIN EN ISO 1461 tZn o.
All structural data takes perforation into account.
*) determination of effective values by tests.

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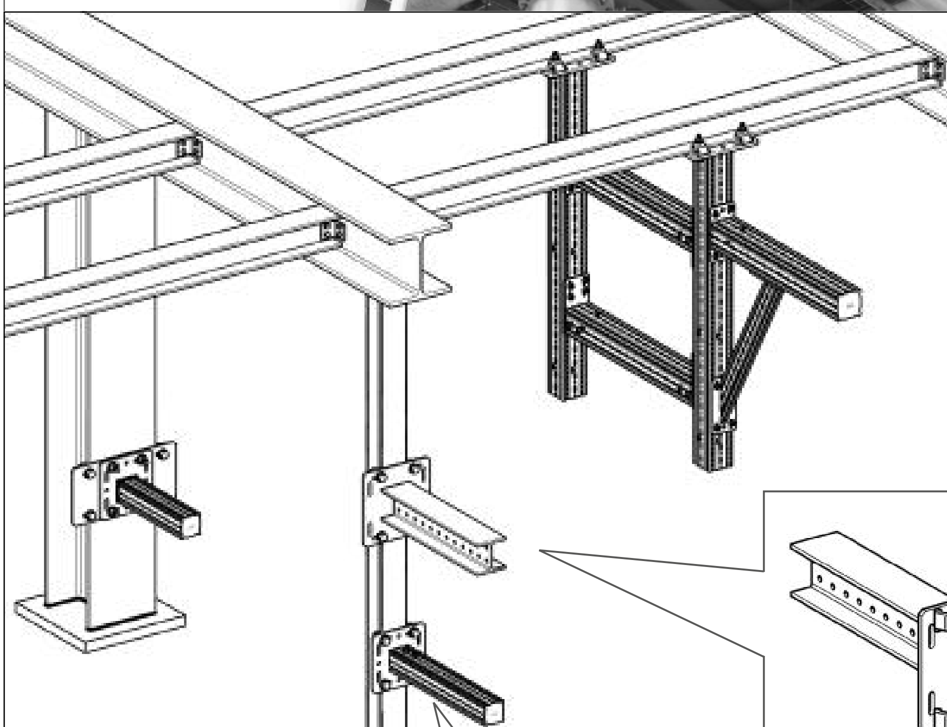
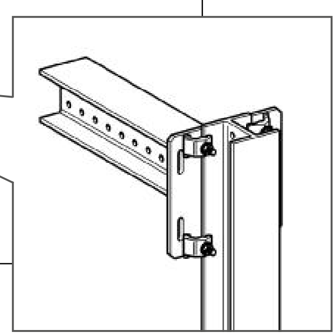
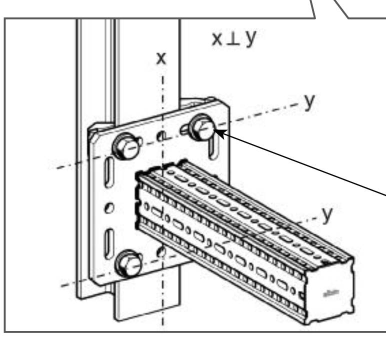
Connection to primary steel structure by Assembly Set P2 S and P3 S







Description	Thread	Tightening torque [lbf/ft] (Nm)
Assembly Set P2 S	M12	62.69 (85)
Assembly Set P3 S	M16	110.63 (150)

Use Assembly Set always into slotted hole rows (y) in 90° direction to the main axis of the structural beam (x).

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Article-No. 113302