



The Allfasteners NexSpan2™ F Series product line is a modular framing system that may be used to design support frames and platforms for use in a variety of industry settings. In these applications, the members may be analyzed as beams and columns. Beams support and transmit loads, and must be checked for bending, shear, torsion and deflection, combined with any axial loads that may be present. Columns are subject to axial compressive loads, and must be checked for buckling.

## BASIC DESIGN METHODOLOGY OF BEAMS

The equations used for analysis of beam loading depend on the support condition and loading condition of the beam. The tables of loading information found on pages 5 through 10 are based on simply-supported beams, with four different loading configurations. In addition to the support and loading, the capacity is based on the material and cross-sectional properties. The material and cross-sectional properties for the NexSpan2™ F Series members can be found on page 4.

Beams are often categorized by their support conditions. A simply-supported beam is a beam that is restrained in all three directions but not resistant to rotating at the support locations. An example of this is a beam that is supported by a pin at one end and a roller or smooth surface at the other end.

A cantilevered beam has one fixed end that is restrained in all three dimensions and also cannot rotate, while the other end is free.

A fixed beam has both ends fixed such that it is restrained in all three dimensions and neither end can rotate, so both ends resist bending.

These three types of beams can be seen in the following diagram. Other types of beams include beams with overhangs and continuous beams, which are not pictured.



Figure: from left to right: simply-supported beam, cantilevered beam, fixed beam

Since beams are subject to transverse loads, shear forces and bending moments are produced within the beam. Possible loading conditions for beams include a point load,  $P$  (lbs), and a distributed load,  $w$  (lbs/ft). A point load is concentrated in one location on the beam, and a distributed load is spread uniformly over a length of the beam, as shown in the figure:

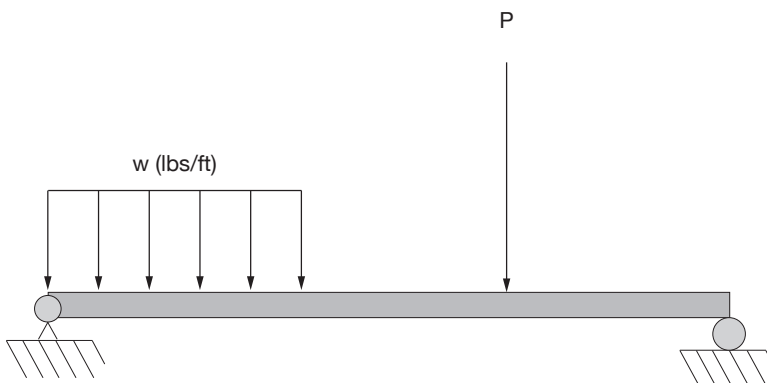


Figure: Point load,  $P$ , and distributed load,  $w$

Note that a free body diagram can be used to apply the equations of equilibrium to simply-supported and cantilevered beams to find the reactions. For this reason, they are called statically determinate. This method, however, cannot be used to find the reactions within fixed beams, which are statically indeterminate.

**BASIC DESIGN METHODOLOGY OF COLUMNS**

The allowable load capacity of a column is based on intrinsic properties, such as material and cross-sectional properties, as well as external influences, including its support conditions, unbraced length/height, and the location of the applied load. The material and cross-sectional properties for the NexSpan2™ F Series members can be found on page 4.

The length of the column that spans the distance between the end locations is the unbraced length or height, L. Possible support conditions for columns can be seen in the figure below. The column will have a combination of fixed, pinned, and free end conditions; the impact of this combination can be thought of as effectively increasing or decreasing the column's unbraced height. This influences the column's capacity by means of the effective length factor, K. The default end condition is pinned-pinned, and for this scenario K=1.0. One or more fixed ends decreases the value of K, and a free end increases it. Values of K can be seen for each example below.

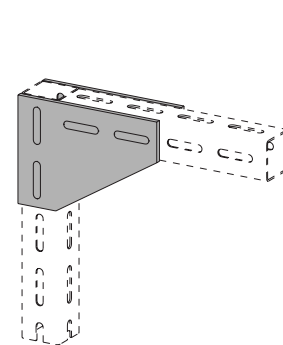
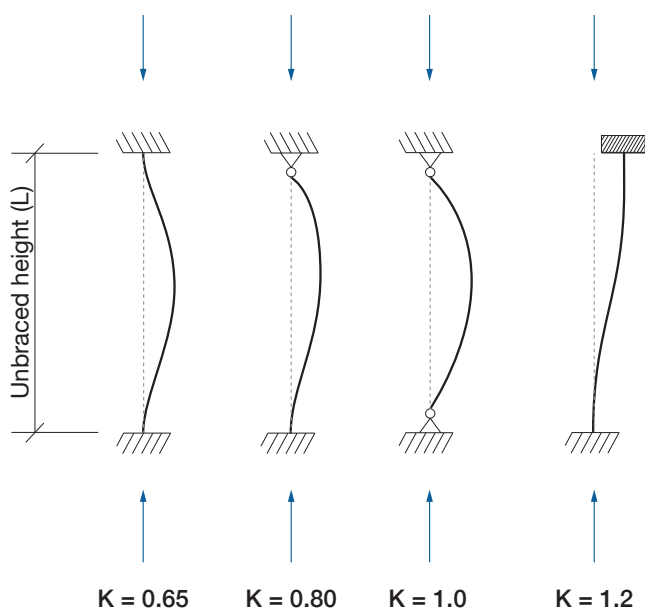


Figure: Example for concentric connection

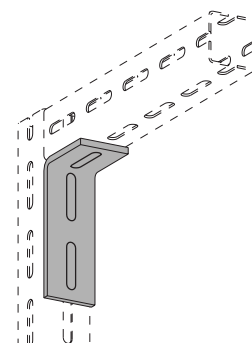


Figure: Example for eccentric connection

Figure: Possible support conditions for columns include (from left to right): fixed-fixed, fixed-pinned, pinned-pinned, fixed-fixed/free.

A column is subject to axially compressive loads, which can be either concentric or eccentric. Concentric loads pass through the centroid of the column, while eccentric loads are offset from it. The greater the offset of an eccentric load, the more significantly it will affect the load capacity of the column, due to the bending moment that is introduced. Connections that attach an axial load to the face of a NexSpan2™ tube member are eccentric, as can be seen in the example of the angle connector, above. Connections that apply the axial load through a pair of plate connectors are concentric, as can be seen in the example of the plates, above. Note, the plate connectors above may also apply a separate bending moment. See pages 12 to 15 for maximum allowable loads in connections, with diagrams.

Since a column is subject to axially compressive loads, its typical geometry dictates that buckling is its primary method of failure. The longer and more slender, the more prone to buckling a column becomes. This relationship is represented by the slenderness ratio,

$$K L / r,$$

where K and L are described above, and r is the radius of gyration, which can be found with the other cross-sectional properties mentioned above. For Nexspan2™ members, the effective area and radius of gyration are used to calculate the column capacities. For the NexSpan2™ members that are square, the radius of gyration is the same in both axes of the cross section.

Note: The 14NSF6x3 is a slender column member and is primarily intended for beam use applications. A qualified engineer may design the member as a column using the allowable column capacity of the 14NSF3 member and reducing the capacity for the bi-axial eccentricity in both directions in addition to accounting for the other combined forces.



# DESIGN OF NEXSPAN2™ F SERIES FRAMING SYSTEMS

MODULAR DESIGN

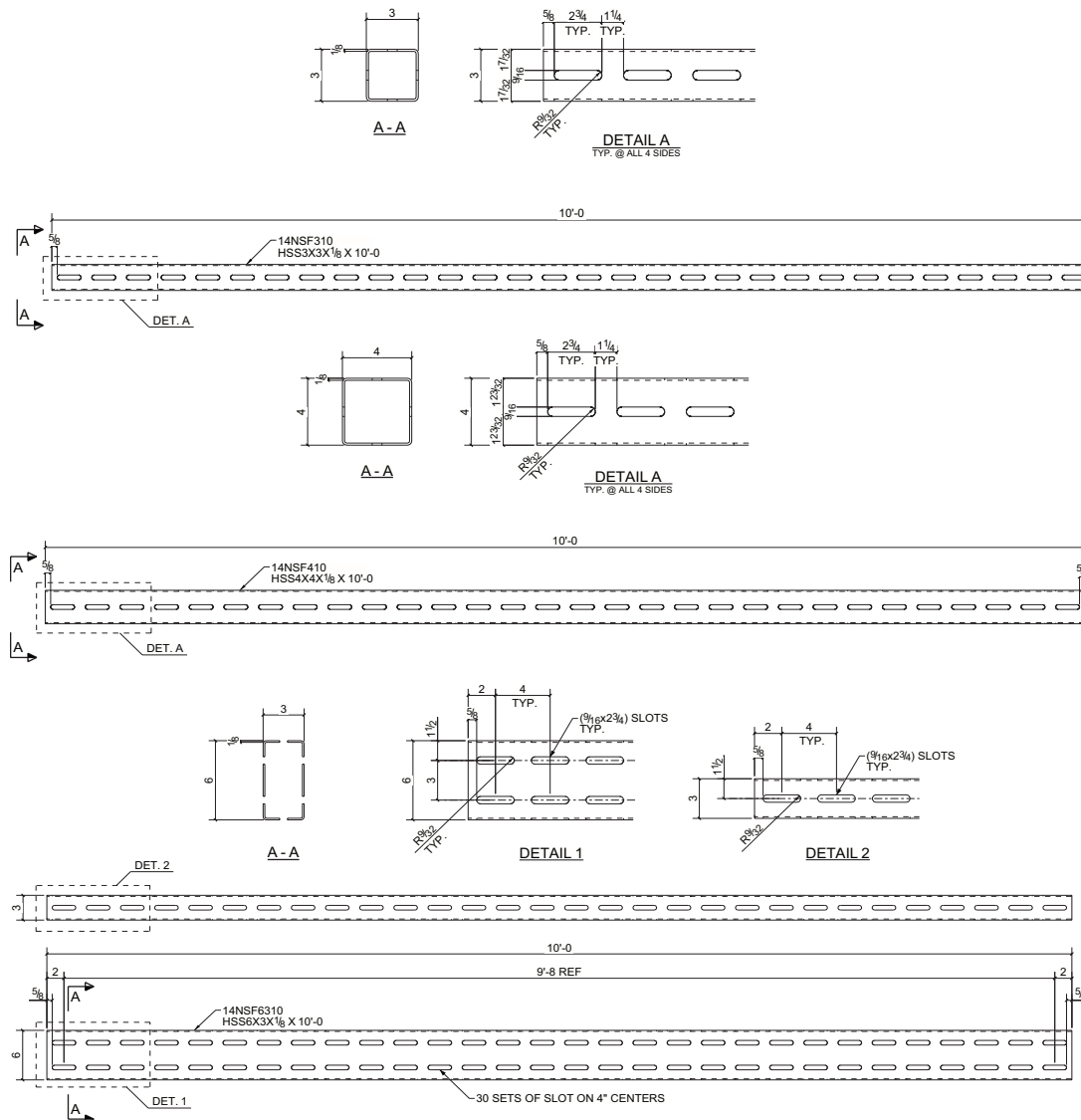
## DESIGN CONSIDERATIONS OF NEXSPAN2™ TUBES

Selection of NexSpan2™ F Series tubes for a user application may be completed using the load tables in this document. Combined loading must be accounted for. For more complicated designs, it should be designed by a qualified engineer. Contact Allfasteners for information on obtaining engineering services through one of our engineering partners.

The load tables are based on elastic design, and allowable loads for the beams have been determined based on typical allowable deflections for a given span, specifically, 1/180, 1/240, or 1/360 times the span. The maximum deflection requirement may be set by building codes, specifications like contract documents, or user preference.

The NexSpan2™ tube end connections are designed such that the T-bolt slots will align with tubes cut at 4" increments. Other tube lengths can be used, but fit-up considerations must be accounted for, so that the T-bolts are able to be inserted and installed in all locations required.

## NEXSPAN2™ F SERIES TUBE DIMENSIONS



**NEXSPAN2™ F SERIES TECHNICAL PRODUCT INFORMATION****MEMBER PROPERTIES**

	UNITS	14NSF3	14NSF4	14NSF6X3
Depth	in	3.000	4.000	6.000
Width	in	3.000	4.000	3.000
Thickness	in	0.125	0.125	0.125
Wt/ft.	lb/ft	4.4	6.0	6.4

**MATERIAL INFORMATION**

	UNITS	14NSF3	14NSF4	14NSF6X3
Minimum Specified Yield Strength	ksi	50	50	50
Minimum Specified Tensile Strength	ksi	62	62	62
Modulus of Elasticity	ksi	29000	29000	29000

**SLOT DIMENSIONS**

	UNITS	14NSF3	14NSF4	14NSF6X3
Height x Width	in.	9/16" x 2-3/4"	9/16" x 2-3/4"	9/16" x 2-3/4"

**GROSS SECTION PROPERTIES**

	UNITS	14NSF3	14NSF4	14NSF6X3
Design Thickness	in	0.116	0.116	0.116
Area	in <sup>2</sup>	1.300	1.770	2.000
Moment of Inertia I <sub>x</sub>	in <sup>4</sup>	1.780	4.400	9.430
Moment of Inertia I <sub>y</sub>	in <sup>4</sup>	1.780	4.400	3.230
Radius of Gyration r <sub>x</sub>	in	1.170	1.580	2.170
Radius of Gyration r <sub>y</sub>	in	1.170	1.580	1.270

**EFFECTIVE SECTION PROPERTIES**

	UNITS	14NSF3	14NSF4	14NSF6X3
Effective Area	in <sup>2</sup>	1.039	1.509	1.609
Effective Web Area A <sub>wx</sub>	in <sup>2</sup>	0.485	0.717	1.050
Effective Web Area A <sub>wy</sub>	in <sup>2</sup>	0.485	0.717	0.485
Effective Moment of Inertia I <sub>x</sub>	in <sup>4</sup>	1.505	3.904	7.713
Effective Moment of Inertia I <sub>y</sub>	in <sup>4</sup>	1.505	3.904	2.684
Effective Section Modulus S <sub>x</sub>	in <sup>3</sup>	1.003	1.952	2.571
Effective Section Modulus S <sub>y</sub>	in <sup>3</sup>	1.003	1.952	1.789
Effective Radius of Gyration r <sub>x</sub>	in	1.204	1.608	–
Effective Radius of Gyration r <sub>y</sub>	in	1.204	1.608	–

**TORSIONAL PROPERTIES**

	UNITS	14NSF3	14NSF4	14NSF6X3
Torsional Constant J	in <sup>4</sup>	2.840	6.910	7.730
HSS Torsional Constant C	in <sup>3</sup>	1.920	3.490	3.900



## BEAM & COLUMN LOAD TABLES FOR NEXSPAN2™ 14NSF3

### BEAMS

#### CASE 1 - UNIFORMLY DISTRIBUTED LOAD

SPAN (in.)	MAX ALLOWABLE LOAD P (lbs)	Δ AT MAX ALLOWABLE LOAD (in.)	SPAN/180	SPAN/240	SPAN/360
24	10005	0.04	NA	NA	NA
36	6663	0.09	NA	NA	NA
48	4989	0.17	NA	NA	4024
60	3983	0.26	NA	3858	2565
72	3311	0.37	NA	2668	1770
84	2830	0.51	2609	1949	1289
96	2468	0.66	1986	1480	975
108	2185	0.84	1557	1158	759
120	1958	1.03	1249	926	603
144	*	*	845	621	396
168	*	*	598	433	268
192	*	*	435	309	182
216	*	*	320	220	120
240	*	*	235	155	74

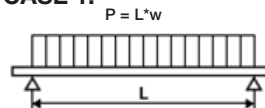
#### CASE 2 - CONCENTRATED LOAD AT CENTER

SPAN (in.)	MAX ALLOWABLE LOAD P (lbs)	Δ AT MAX ALLOWABLE LOAD (in.)	SPAN/180	SPAN/240	SPAN/360
24	5002	0.03	NA	NA	NA
36	3331	0.07	NA	NA	NA
48	2494	0.13	NA	NA	NA
60	1991	0.21	NA	NA	1603
72	1655	0.30	NA	NA	1106
84	1415	0.41	NA	1218	806
96	1234	0.53	NA	925	610
108	1092	0.67	973	724	474
120	979	0.83	781	579	377
144	*	*	528	388	248
168	*	*	374	271	168
192	*	*	272	193	114
216	*	*	200	138	75
240	*	*	147	97	46

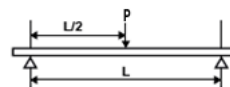
#### NOTES:

1. These load tables are based on the allowable stress method, using an elastic capacity with a factor of safety  $\Omega$  of 1.67, and AISC 360 *Specification for Structural Steel Buildings*.
2. The load values in these tables are based on simply supported beams.
3. Beam weight has already been deducted from the tables.
4. Load values indicated as "NA" were found to be higher than the maximum allowable load, and therefore not applicable.
5. For lengths indicated with an asterisk (\*), engineering analysis is required to use loads greater than those listed, which are based on deflection.
6. Concentrated loads greater than 4000 lbs require a bearing plate with a length equal to or greater than the width of the tube.

#### CASE 1:



#### CASE 2:



### COLUMNS

UNBRACED HEIGHT (in.)	ALLOWABLE LOAD ON FACE (lbs.) K=1.0	ALLOWABLE CONCENTRIC LOAD (lbs.)			
		K=0.65	K=0.80	K=1.0	K=1.2
24	12045	30846	30651	30332	29946
36	11870	30375	29946	29248	28418
48	11623	29729	28986	27796	26408
60	11303	28918	27796	26034	24032
72	10908	27956	26408	24032	21416
84	10437	26861	24857	21863	18689
96	9892	25651	23180	19603	15972
108	9275	24345	21416	17322	13366
120	8592	22964	19603	15086	10941



**BEAM & COLUMN LOAD TABLES FOR NEXSPAN2™ 14NSF3 CONTINUED**

**BEAMS**

**CASE 3 - TWO EQUAL CONCENTRATED LOADS EQUALLY PLACED**

SPAN (in.)	MAX ALLOWABLE LOAD P (lbs)	Δ AT MAX ALLOWABLE LOAD (in.)	SPAN/180	SPAN/240	SPAN/360
24	3752	0.04	NA	NA	NA
36	2498	0.09	NA	NA	NA
48	1871	0.17	NA	NA	1476
60	1493	0.26	NA	1415	941
72	1241	0.38	NA	979	649
84	1061	0.52	957	715	473
96	925	0.68	728	543	358
108	819	0.85	571	425	278
120	734	1.05	458	340	221
144	*	*	310	228	145
168	*	*	219	159	98
192	*	*	160	113	67
216	*	*	117	81	44
240	*	*	86	57	27

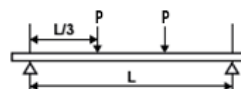
**CASE 4 - THREE EQUAL CONCENTRATED LOADS EQUALLY PLACED**

SPAN (in.)	MAX ALLOWABLE LOAD P (lbs)	Δ AT MAX ALLOWABLE LOAD (in.)	SPAN/180	SPAN/240	SPAN/360
24	2501	0.04	NA	NA	NA
36	1665	0.09	NA	NA	NA
48	1247	0.16	NA	NA	1053
60	995	0.25	NA	NA	671
72	827	0.36	NA	698	463
84	707	0.48	683	510	337
96	617	0.63	520	387	255
108	546	0.80	408	303	199
120	489	0.99	327	242	158
144	*	*	221	162	104
168	*	*	157	113	70
192	*	*	114	81	48
216	*	*	84	58	32
240	*	*	62	40	19

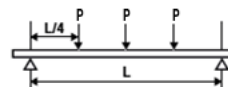
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3. Beam weight has already been deducted from the tables.
4. Load values indicated as "NA" were found to be higher than the maximum allowable load, and therefore not applicable.
5. For lengths indicated with an asterisk (\*), engineering analysis is required to use loads greater than those listed, which are based on deflection.
6. Concentrated loads greater than 4000 lbs require a bearing plate with a length equal to or greater than the width of the tube.

**CASE 3:**



**CASE 4:**





# DESIGN OF NEXSPAN2™ F SERIES FRAMING SYSTEMS

MODULAR DESIGN

## BEAM & COLUMN LOAD TABLES FOR NEXSPAN2™ 14NSF4

### BEAMS

#### CASE 1 - UNIFORMLY DISTRIBUTED LOAD

SPAN (in.)	MAX ALLOWABLE LOAD P (lbs)	Δ AT MAX ALLOWABLE LOAD (in.)	SPAN/180	SPAN/240	SPAN/360
24	19471	0.03	NA	NA	NA
36	12970	0.07	NA	NA	NA
48	9717	0.12	NA	NA	NA
60	7763	0.19	NA	NA	6680
72	6458	0.28	NA	NA	4624
84	5524	0.38	NA	5093	3381
96	4822	0.50	NA	3884	2573
108	4275	0.63	4088	3052	2017
120	3836	0.77	3295	2456	1617
144	*	*	2258	1675	1093
168	*	*	1628	1200	772
192	*	*	1215	887	559
216	*	*	927	669	410
240	*	*	719	509	299

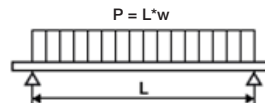
#### CASE 2 - CONCENTRATED LOAD AT CENTER

SPAN (in.)	MAX ALLOWABLE LOAD P (lbs)	Δ AT MAX ALLOWABLE LOAD (in.)	SPAN/180	SPAN/240	SPAN/360
24	9735	0.02	NA	NA	NA
36	6485	0.06	NA	NA	NA
48	4858	0.10	NA	NA	NA
60	3881	0.16	NA	NA	NA
72	3229	0.22	NA	NA	2890
84	2762	0.30	NA	NA	2113
96	2411	0.40	NA	NA	1608
108	2137	0.50	NA	1908	1261
120	1918	0.62	NA	1535	1011
144	*	*	1411	1047	683
168	*	*	1017	750	482
192	*	*	759	554	350
216	*	*	580	418	256
240	*	*	449	318	187

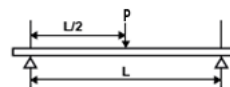
#### NOTES:

1. These load tables are based on the allowable stress method, using an elastic capacity with a factor of safety  $\Omega$  of 1.67, and AISC 360 *Specification for Structural Steel Buildings*.
2. The load values in these tables are based on simply supported beams.
3. Beam weight has already been deducted from the tables.
4. Load values indicated as "NA" were found to be higher than the maximum allowable load, and therefore not applicable.
5. For lengths indicated with an asterisk (\*), engineering analysis is required to use loads greater than those listed, which are based on deflection.
6. Concentrated loads greater than 4000 lbs require a bearing plate with a length equal to or greater than the width of the tube.

#### CASE 1:



#### CASE 2:



### COLUMNS

UNBRACED HEIGHT (in.)	ALLOWABLE LOAD ON FACE (lbs.) K=1.0	ALLOWABLE CONCENTRIC LOAD (lbs.)			
		K=0.65	K=0.80	K=1.0	K=1.2
24	17632	44781	44623	44363	44047
36	17489	44399	44047	43471	42778
48	17289	43869	43253	42253	41061
60	17029	43196	42253	40736	38956
72	16709	42388	41061	38956	36528
84	16329	41453	39697	36952	33854
96	15888	40400	38179	34768	31010
108	15385	39238	36528	32448	28075
120	14820	37979	34768	30038	25122



**BEAM & COLUMN LOAD TABLES FOR NEXSPAN2™ 14NSF4 CONTINUED**

**BEAMS**

**CASE 3 - TWO EQUAL CONCENTRATED LOADS EQUALLY PLACED**

SPAN (in.)	MAX ALLOWABLE LOAD P (lbs)	Δ AT MAX ALLOWABLE LOAD (in.)	SPAN/180	SPAN/240	SPAN/360
24	7301	0.03	NA	NA	NA
36	4864	0.07	NA	NA	NA
48	3644	0.13	NA	NA	NA
60	2911	0.20	NA	NA	2450
72	2421	0.28	NA	NA	1696
84	2071	0.39	NA	1868	1240
96	1808	0.51	NA	1425	944
108	1603	0.64	1500	1120	740
120	1438	0.79	1209	901	593
144	*	*	828	615	401
168	*	*	597	440	283
192	*	*	446	325	205
216	*	*	340	245	150
240	*	*	264	187	110

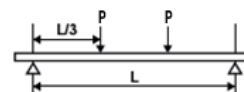
**CASE 4 - THREE EQUAL CONCENTRATED LOADS EQUALLY PLACED**

SPAN (in.)	MAX ALLOWABLE LOAD P (lbs)	Δ AT MAX ALLOWABLE LOAD (in.)	SPAN/180	SPAN/240	SPAN/360
24	4867	0.03	NA	NA	NA
36	3242	0.07	NA	NA	NA
48	2429	0.12	NA	NA	NA
60	1940	0.18	NA	NA	1748
72	1614	0.27	NA	NA	1210
84	1381	0.36	NA	1333	885
96	1205	0.47	NA	1016	673
108	1068	0.60	NA	799	528
120	959	0.74	862	643	423
144	*	*	591	438	286
168	*	*	426	314	202
192	*	*	318	232	146
216	*	*	243	175	107
240	*	*	188	133	78

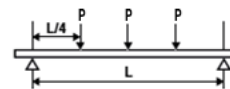
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5. For lengths indicated with an asterisk (\*), engineering analysis is required to use loads greater than those listed, which are based on deflection.
6. Concentrated loads greater than 4000 lbs require a bearing plate with a length equal to or greater than the width of the tube.

**CASE 3:**



**CASE 4:**





**BEAM & COLUMN LOAD TABLES FOR NEXSPAN2™ 14NSF63**

**BEAMS**

**CASE 1 - UNIFORMLY DISTRIBUTED LOAD**

SPAN (in.)	MAX ALLOWABLE LOAD P (lbs)	Δ AT MAX ALLOWABLE LOAD (in.)	SPAN/180	SPAN/240	SPAN/360
24	25646	0.02	NA	NA	NA
36	17087	0.05	NA	NA	NA
48	12804	0.08	NA	NA	NA
60	10231	0.13	NA	NA	NA
72	8514	0.19	NA	NA	NA
84	7286	0.25	NA	NA	6718
96	6363	0.33	NA	NA	5127
108	5644	0.42	NA	NA	4034
120	5067	0.52	NA	4907	3250
144	4199	0.74	NA	3375	2224
168	3576	1.01	3292	2446	1601
192	*	*	2487	1839	1192
216	*	*	1930	1419	908
240	*	*	1529	1115	700

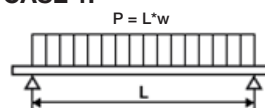
**CASE 2 - CONCENTRATED LOAD AT CENTER**

SPAN (in.)	MAX ALLOWABLE LOAD P (lbs)	Δ AT MAX ALLOWABLE LOAD (in.)	SPAN/180	SPAN/240	SPAN/360
24	12823	0.02	NA	NA	NA
36	8543	0.04	NA	NA	NA
48	6402	0.07	NA	NA	NA
60	5115	0.10	NA	NA	NA
72	4257	0.15	NA	NA	NA
84	3643	0.20	NA	NA	NA
96	3181	0.26	NA	NA	NA
108	2822	0.34	NA	NA	2521
120	2533	0.41	NA	NA	2031
144	2099	0.60	NA	NA	1390
168	1788	0.81	NA	1529	1001
192	1552	1.07	NA	1150	745
216	*	*	1206	887	567
240	*	*	956	697	438

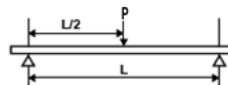
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2. The load values in these tables are based on simply supported beams.
3. Beam weight has already been deducted from the tables.
4. Load values indicated as "NA" were found to be higher than the maximum allowable load, and therefore not applicable.
5. For lengths indicated with an asterisk (\*), engineering analysis is required to use loads greater than those listed, which are based on deflection.
6. Values are based on the 6" tube dimension being in the vertical direction, with the 3" tube dimension in the horizontal direction.
7. The 6x3 NexSpan2™ F Series tube is intended to be used as a beam member; see Design Guide for additional information.
8. Concentrated loads greater than 4000 lbs require a bearing plate with a length equal to or greater than the width of the tube.

**CASE 1:**



**CASE 2:**





**BEAM & COLUMN LOAD TABLES FOR NEXSPAN2™ 14NSF63 CONTINUED**

**BEAMS**

**CASE 3 - TWO EQUAL CONCENTRATED LOADS EQUALLY PLACED**

SPAN (in.)	MAX ALLOWABLE LOAD P (lbs)	Δ AT MAX ALLOWABLE LOAD (in.)	SPAN/180	SPAN/240	SPAN/360
24	9617	0.02	NA	NA	NA
36	6407	0.05	NA	NA	NA
48	4801	0.08	NA	NA	NA
60	3836	0.13	NA	NA	NA
72	3193	0.19	NA	NA	NA
84	2732	0.26	NA	NA	2465
96	2386	0.34	NA	NA	1881
108	2116	0.43	NA	NA	1480
120	1900	0.53	NA	1800	1192
144	1574	0.76	NA	1238	816
168	1341	1.03	1208	897	587
192	*	*	912	675	437
216	*	*	708	521	333
240	*	*	561	409	257

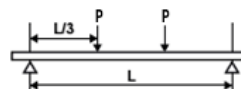
**CASE 4 - THREE EQUAL CONCENTRATED LOADS EQUALLY PLACED**

SPAN (in.)	MAX ALLOWABLE LOAD P (lbs)	Δ AT MAX ALLOWABLE LOAD (in.)	SPAN/180	SPAN/240	SPAN/360
24	6411	0.02	NA	NA	NA
36	4271	0.04	NA	NA	NA
48	3201	0.08	NA	NA	NA
60	2557	0.12	NA	NA	NA
72	2128	0.18	NA	NA	NA
84	1821	0.24	NA	NA	1758
96	1590	0.32	NA	NA	1342
108	1411	0.40	NA	NA	1056
120	1266	0.49	NA	NA	851
144	1049	0.71	NA	883	582
168	894	0.97	862	640	419
192	*	*	651	481	312
216	*	*	505	371	238
240	*	*	400	292	183

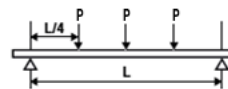
**NOTES:**

1. These load tables are based on the allowable stress method, using an elastic capacity with a factor of safety  $\Omega$  of 1.67, and AISC 360 *Specification for Structural Steel Buildings*.
2. The load values in these tables are based on simply supported beams.
3. Beam weight has already been deducted from the tables.
4. Load values indicated as "NA" were found to be higher than the maximum allowable load, and therefore not applicable.
5. For lengths indicated with an asterisk (\*), engineering analysis is required to use loads greater than those listed, which are based on deflection.
6. Values are based on the 6" tube dimension being in the vertical direction, with the 3" tube dimension in the horizontal direction.
7. The 6x3 NexSpan2™ F Series tube is intended to be used as a beam member; see Design Guide for additional information.
8. Concentrated loads greater than 4000 lbs require a bearing plate with a length equal to or greater than the width of the tube.

**CASE 3:**



**CASE 4:**





# DESIGN OF NEXSPAN2™ F SERIES FRAMING SYSTEMS

MODULAR DESIGN

## NEXSPAN2™ PRODUCT LINE DESIGN CONSIDERATIONS

All loads provided are allowable loads.

Provided connection capacities are based on the indicated loading direction. Consideration for multi direction loading interaction is required to determine final available capacity. When T-Bolts are loaded in combined tension and shear, the allowable bolt slip in shear for the connection must be reduced by the factor  $k_{sc}$ ,

$$k_{sc} = 1 - \frac{\text{Tension}}{\text{Allowable Bolt Slip in Shear}}$$

T-Bolt locations are assumed to be centered in the middle of the connection slot. For moment connections the bolt spacing is assumed to be 4". These bolt locations and spacing must be specified to the installer on drawings.

Moment capacities are for non cantilevered members. Additional review required for cantilevered member connection capacity.

Additional configurations and loading conditions can be reviewed by the Engineer for capacity determination.

Post base capacities provided are for the connection. Post base anchorage to the supporting structure must be designed separately by the Engineer.

## NEXSPAN2™ PRODUCT LINE PART-SPECIFIC CONNECTION CAPACITIES

### NEXSPAN2™ T-BOLTS

NexSpan2™ T-bolts are used to connect the NexSpan2™ F Series components.

**NOTE:** See T-Bolt information Sheet for additional bolt capacities and installation information.

#### PART NUMBER 2TBN12138-USA

Allowable Bolt Slip in Shear	2000 lbs
Allowable Bolt Pull Out	1000 lbs
Allowable Bolt Bearing Perpendicular to Slot	2610 lbs



**NOTE:** See T-Bolt Info Sheet for additional capacities.

## NEXSPAN2™ SPLICE CONNECTIONS

Nexspan2™ splice connectors are used when two tubes need to be connected. The splice connectors are placed internal to the tube.

Note, the splice connectors need to be placed on the top and bottom inside surfaces of the tubes, on faces without welded seams, such that the splice connectors are flush with the inside surface of the tube.

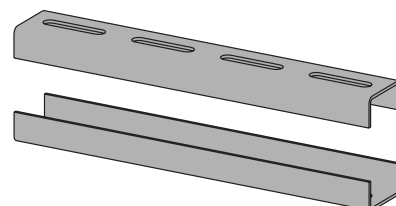
Splice connectors must be checked for capacity based on location and loading demand.

#### PART NUMBER 14NSF-S13

Mx	916 lbs-ft.
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#### PART NUMBER 14NSF-S14

Mx	1250 lbs-ft.
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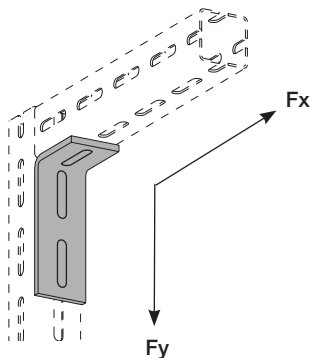


## NEXSPAN2™ ANGLE CONNECTIONS

NexSpan2™ angle connections are 90-degree bent plates, and can be categorized as either angle corners or cross connectors. Angle corners have slots all in the same plane, and are used to connect beams to columns, applying a face load on the column. Cross connectors are used to connect two beams in perpendicular planes.

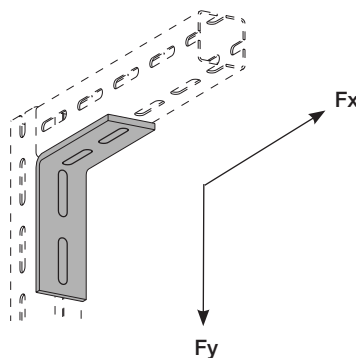
### PART NUMBERS 14NSF-A63, A64

Fy	4000 lbs
Fx	1000 lbs



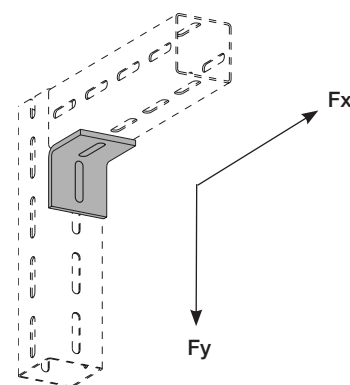
### PART NUMBERS 14NSF-A83, A84

Fy	4000 lbs
Fx	1000 lbs



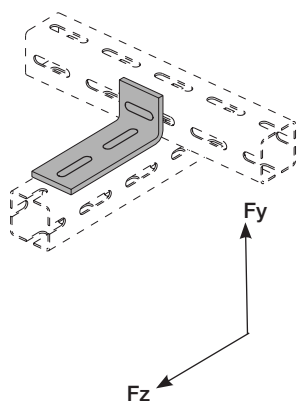
### PART NUMBERS 14NSF-A93, A94

Fy	2000 lbs
Fx	1000 lbs



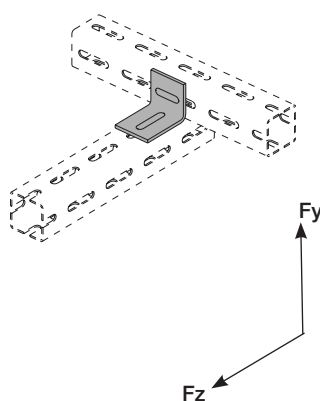
### PART NUMBERS 14NSF-A73, A74

Fz	4000 lbs
Fy	1000 lbs
Loads for top supported member	



### PART NUMBERS 14NSF-A03, A04

Fz	2000 lbs
Fy	1000 lbs
Loads for top supported member	





# DESIGN OF NEXSPAN2™ F SERIES FRAMING SYSTEMS

MODULAR DESIGN

## NEXSPAN2™ PLATE CONNECTIONS

NexSpan2™ plate parts are used to connect beams to columns, placing a concentric load on the column. The number of T-bolts required to be used with the plate parts may vary depending on whether it is meant to create a fixed versus pinned connection. A joint that uses a single T-bolt to connect one tube to another creates a pinned connection for that tube, whereas a joint that uses two T-bolts to connect the tube to another tube creates a fixed connection.

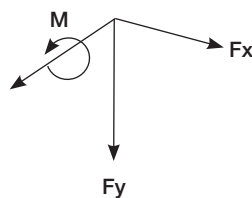
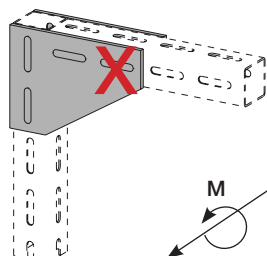
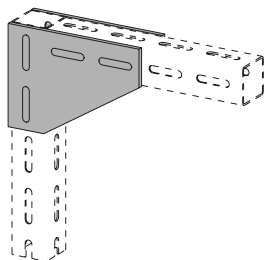
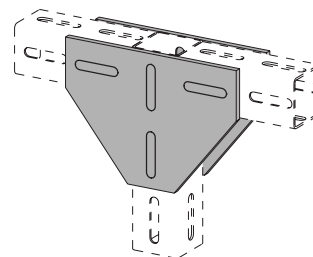
### PART NUMBERS 14NSF-P63, P64

8 Bolts Used	
Fy	8000 lbs
Fx	8000 lbs
Mz	1740 lbs-ft
Using a 4" moment arm	
6 Bolts Used	
Fy	5220 lbs
Fx	4000 lbs
Mz	0 lbs-ft

**NOTE: Red "X" indicates location of omitted T-bolt, when only using 6 T-bolts.**

### PART NUMBERS 14NSF-P73, P74

Fy	4000 lbs
Fx	4000 lbs
Mz	0 lbs-ft
Fy/Fx per horizontal member	



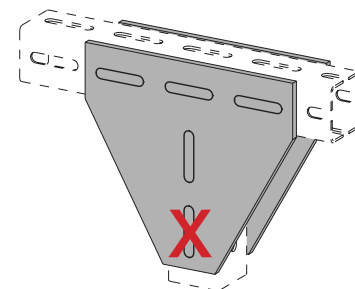
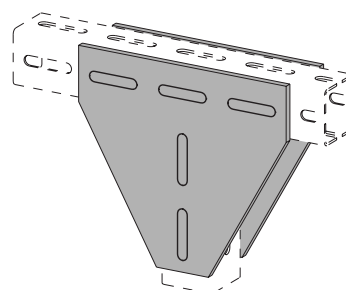
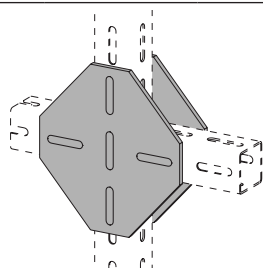
### PART NUMBERS 14NSF-P93, P94

10 Bolts Used	
Fy	8000 lbs (Uplift)
Fx	10440 lbs
Mz	1740 lbs-ft
Using a 4" moment arm	
8 Bolts Used	
Fy	4000 lbs (Uplift)
Fx	5220 lbs
Mz	0 lbs-ft

**NOTE: Red "X" indicates location of omitted T-bolt, when only using 8 T-bolts.**

### PART NUMBERS 14NSF-P83, P84

Fy	4000 lbs
Fx	4000 lbs
Mz	0 lbs-ft
Fy/Fx per horizontal member	



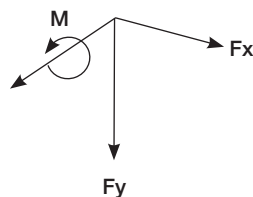
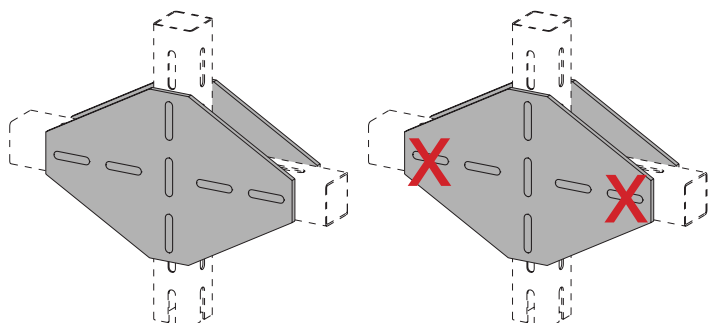


## NEXSPAN2™ PLATE CONNECTIONS

## PART NUMBERS 14NSF-P03, P04

14 Bolts Used	
Fy	6000 lbs
Fx	8000 lbs
Mz	1740 lbs-ft
Using a 4" moment arm	
10 Bolts Used	
Fz	5220 lbs
Fx	4000 lbs
Mz	0 lbs-ft
Fy/Fx per horizontal member	

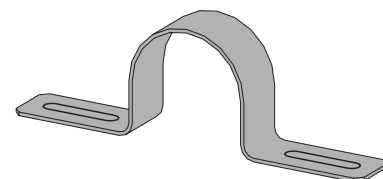
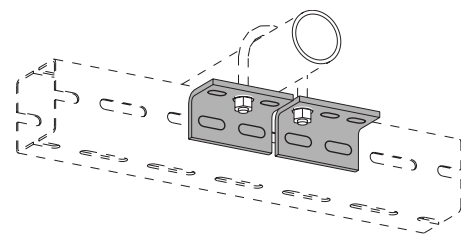
NOTE: Red "X" indicates location of omitted T-bolt, when only using 10 T-bolts.



## NEXSPAN2™ PIPE SUPPORTS

The pipe supports require the use of two T-bolts to prevent rotation of the part. They may only be used in two orientations: that where they are used to secure a pipe that is resting with its weight on a beam, or vertically to secure the pipe to a beam, unless the EOR evaluates for some other use.

These parts are not currently load rated.





## NEXSPAN2™ POST BASES

NexSpan2™ post bases are used to anchor columns by affixing them to supporting structures or concrete.

### PART NUMBER 14NSF-B13

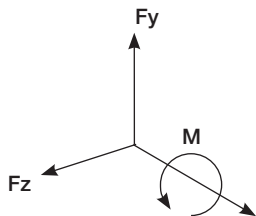
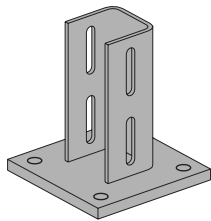
Fz	10440 lbs
Fy	8000 lbs
Mx	2300 lbs-ft

Mx: dependent on a minimum separation of 4" between T-bolts.

### PART NUMBER 14NSF-B14

Fz	10440 lbs
Fy	8000 lbs
Mx	3000 lbs-ft

Mx: dependent on a minimum separation of 4" between T-bolts.

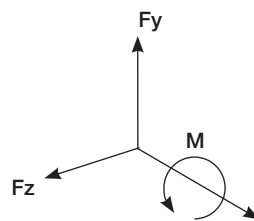
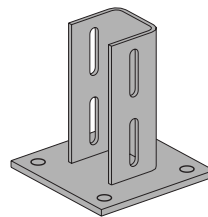


### PART NUMBER 14NSF-B23

Fz	10440 lbs
Fy	8000 lbs
Mx	0 lbs-ft

### PART NUMBER 14NSF-B24

Fz	10440 lbs
Fy	8000 lbs
Mx	0 lbs-ft



### PART NUMBER 14NSF-B33

Fz	10440 lbs
Fy	0 lbs
Mx	0 lbs-ft

### PART NUMBER 14NSF-B34

Fz	10440 lbs
Fy	0 lbs
Mx	0 lbs-ft

