

ROOFTOP BALLAST FRAME FOR WIRELESS ANTENNAS

GENERAL DESCRIPTION

Non-penetrating Rooftop Ballast Frames enable installation of wireless panel antennas for a sector. The Frames are secured using concrete-block ballast (not included) placed on the Frame's ballast trays. Alternatively, the Frames can be anchored to a roof structure using $\frac{5}{8}$ " diameter anchor bolts.

The Frame's bottom surface is smooth to prevent roof damage. The B1567 Rubber Mat Kit is also available to further protect the roof's surface.

Wireless panel antennas mount to the Frames on separately ordered Antenna-Mounting Pipes (page 8.1). Pipe lengths are selected according to antenna length and required mounting height above the roof.

Call for information regarding wind loading on a Frame using specific antennas and Antenna-Mounting Pipes.

Formula for determining Frame ballast:

$$W = (0.0158)(N)(P)(H) + (58)$$

N = Number of antennas

P = Wind load of one antenna (pounds)

H = Height of antenna centerline above roof (inches)

W = Weight of ballast on each side of frame assembly

Note: Equation includes a 1.5 factor of safety for overturning (W)(2) = Total ballast required

Example:

N = 3 antennas

P = 135 lbs.

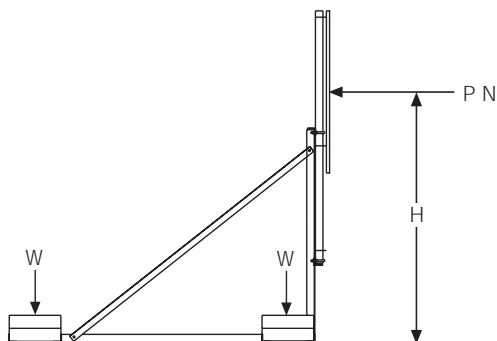
H = 90" antenna centerline above roof

$$W = (0.0158)(3)(135)(90) + (58) = 634 \text{ lbs.}$$

Total ballast required:

$$(W)(2) = (634)(2) = 1,268 \text{ lbs.}$$

Note: A nominal 4x8x16 solid concrete block (CMU) weighs 20-30 lbs. Verify weight with local supplier.

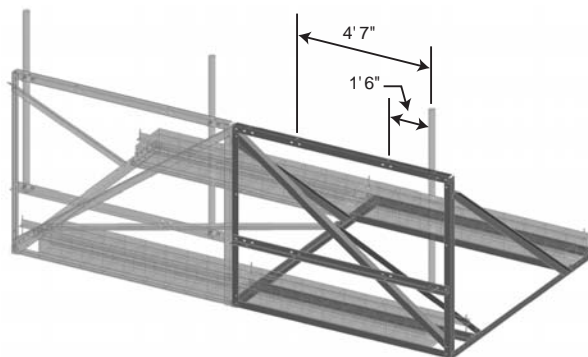


ROOFTOP BALLAST FRAME

FOR WIRELESS ANTENNAS

Supports two wireless antennas on a single Frame and provides a maximum 6'-1" antenna separation. The Frame is modular and multiple units may be bolted together to support more antennas and provide greater outside antenna separation. The Frame's footprint is 7'- $\frac{3}{8}$ " wide and 7'-11" deep.

One B1567 Rubber Mat Kit (page 14.4) protects the roof under the front and rear ballast trays. An optional 99544 Ballast Tie-Down Kit (page 14.4) is available to secure the concrete-block ballast.



Product Number	Description	List Price
99540	Rooftop Frame 6' Max Separation	\$395.00

ANTENNA SUPPORT STRUCTURES

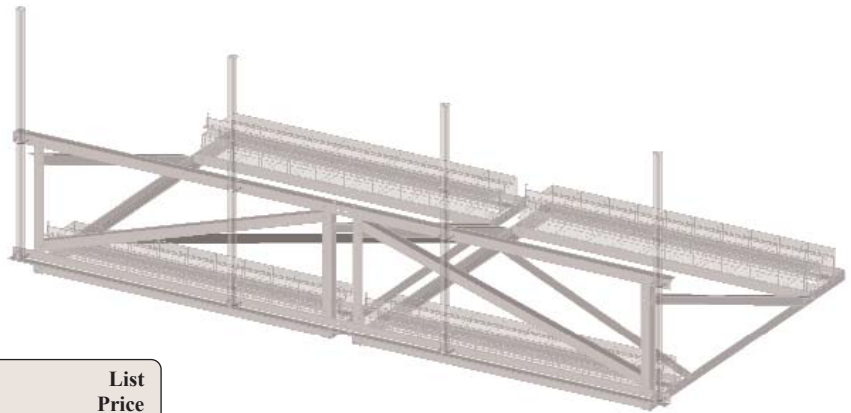
ROOFTOP FRAMES

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NON-PENETRATING ROOFTOP BALLAST FRAME

LOW VISIBILITY PROFILE

Frames are designed to securely support up to four wireless antennas, while keeping the roof surface damage-free. The Rubber Mat Kits (B1567) offer additional roof protection under the front and rear ballast trays. An optional Ballast Tie-Down Kit (99544) is available to secure the concrete block ballast. The Frames have a face width of 16' and are 3' high.



Product Number	Description	List Price
B2530	Non-Penetrating Rooftop Ballast Frame 15'-5" separation	\$680.00

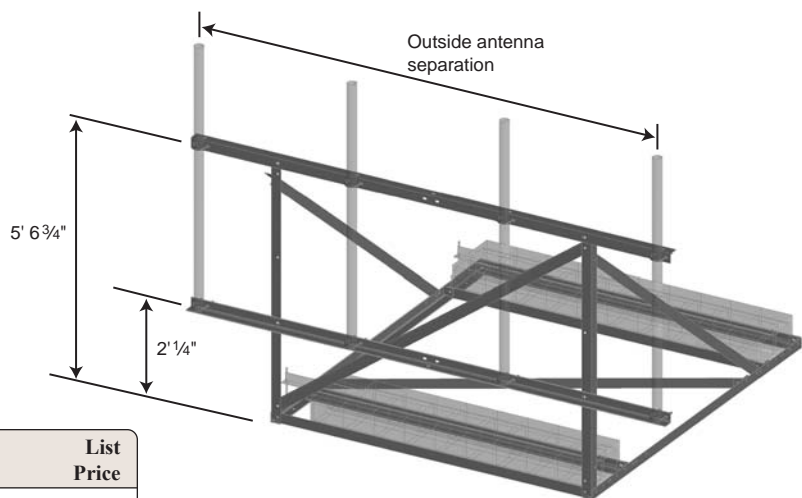
ROOFTOP BALLAST FRAME

FOR THREE OR FOUR WIRELESS ANTENNAS

Three Rooftop Ballast Frames, each with an extended-width antenna-mounting face, support up to four wireless antennas on a Frame. The Frame's footprint is 7'-³/₈" wide and 7'-11" deep.

One B1567 Rubber Mat Kit (page 14.4) protects the roof under the front and rear ballast trays. An optional 99544 Ballast Tie-Down Kit (page 14.4) is available to secure the concrete-block ballast.

Mounting pipe OD is 2³/₈" (*2⁷/₈").



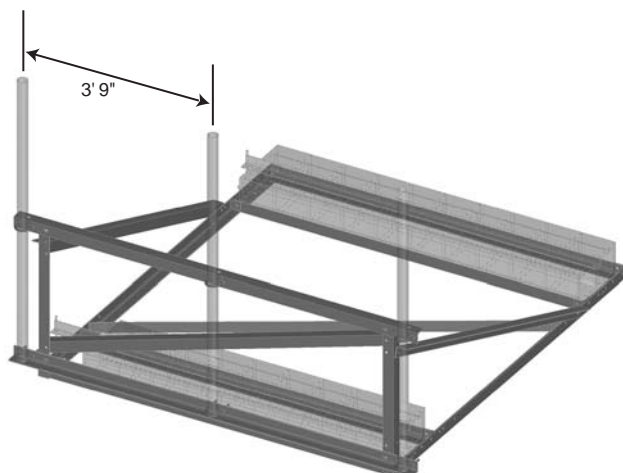
Product Number	Description	List Price
99546	Rooftop Frame 10' max separation	\$410.00
99547	Rooftop Frame 12' max separation	\$450.00
B2737*	Rooftop Frame 10' max separation	\$420.00

LOW PROFILE ROOFTOP BALLAST FRAME

FOR THREE WIRELESS ANTENNAS

B2096 Low Profile Rooftop Ballast Frame supports three wireless antennas on a single Frame and provides a maximum 7'-6" antenna separation. The Frame's footprint is 7'-³/₈" wide and 7'-11" deep.

One Rubber Mat Kit (page 14.4) protects the roof under the front and rear ballast trays. An optional 99544 Ballast Tie-Down Kit (page 14.4) is available to secure the concrete block ballast.



Product Number	Description	List Price
B2096	Low Profile Rooftop Ballast Frame 90" max separation	\$375.00

BALLAST FRAME

FOR PARAPET OVERHANG

The B2647 Frame supports one panel antenna on a separately ordered 2³/₈" OD Mounting Pipe (page 8.1). This pipe overhangs the parapet to place the antenna below the roofline so the antenna is not skylined. The frame height can be adjusted to accommodate parapet heights between 3' and 5'. The Frame includes a Ballast Tie-Down Kit and has a footprint of 5'-6" wide by 6'-2" deep. Overall height is 5'-6³/₈".



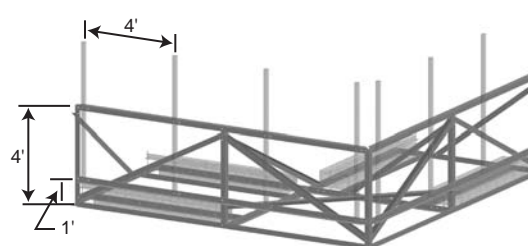
Product Number	Description	List Price
B2647	Parapet Overhang Ballast Frame	\$395.00

CORNER ROOFTOP BALLAST FRAME

FOR EIGHT WIRELESS ANTENNAS

The 99542 Corner Rooftop Ballast Frame supports four wireless antennas on each of two antenna-mounting faces that interconnect at 90° to each other. The Frame is intended for installation in a rooftop corner to support the antennas for two sectors. The maximum outside antenna separation on each face is 12'. The Frame's footprint for each face is 13'-1¹/₁₆" wide and 6'-4³/₁₆" deep.

Two B1567 Rubber Mat Kits (page 14.4) are available to protect the roof surface under the front and rear ballast trays. Two optional 99544 Ballast Tie-Down Kits (page 14.4) may be used to secure the concrete-block ballast.



Product Number	Description	List Price
99542	Corner Rooftop Ballast Frame 12' max separation	\$795.00

ANTENNA SUPPORT STRUCTURES

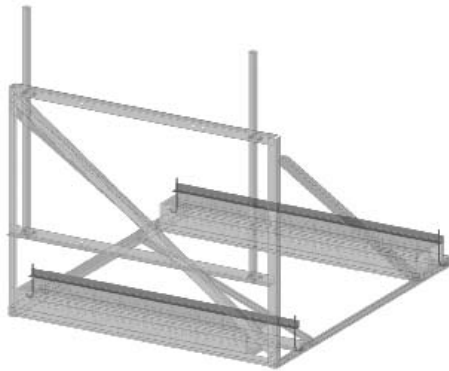
ROOFTOP FRAMES

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BALLAST TIE-DOWN KIT

FOR ROOFTOP BALLAST FRAMES

The 99544 Ballast Tie-Down Kit provides a means to secure concrete-block ballast to the trays of a Rooftop Ballast Frame. The Kit will hold a single layer of solid blocks or a single or double layer of hollow-core blocks. The Kit is furnished with 2" x 2" angles that extend over the blocks for the length of the ballast trays and are held to the Frame with 1/2" diameter x 9" long hookbolts, with 7" long thread.

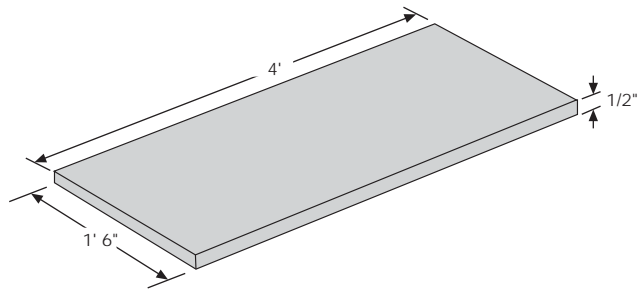


Product Number	Description	List Price
99544	Ballast Tie-Down Kit for Rooftop Ballast Frames	\$65.00

RUBBER MAT KIT

FOR ROOFTOP BALLAST FRAME

The Rubber Mat Kit provides protection of the roof surface for a Rooftop Ballast Frame. Each Kit, furnished with four 1/2" thick, 1'-6" wide, by 4' long mats, protects under the two trays of a single, 7' wide Rooftop Ballast Frame.



Product Number	Description	List Price
B1567	Rubber Mat Kit for Rooftop Ballast Frame	\$45.60

ROOFTOP BALLAST FRAME

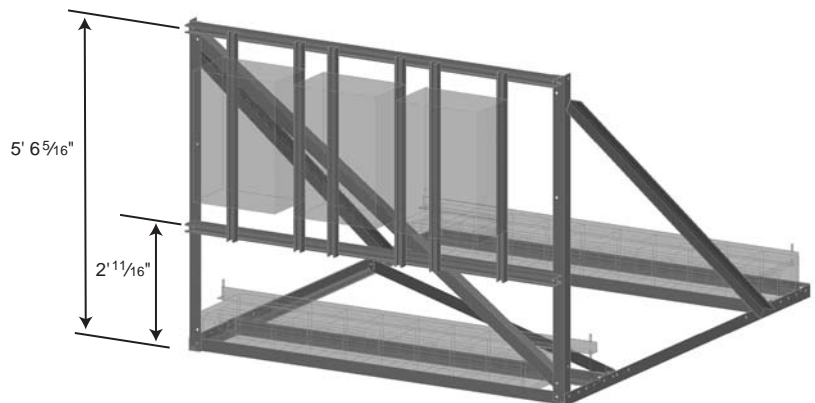
FOR THREE & SEVEN RADIO EQUIPMENT UNITS

The 99548 Frame supports up to three RFFE equipment units on the front of the 7' wide mounting face. The Frame's footprint is 7'-3/8" wide and 7'-11" deep.

One B1567 Rubber Mat Kit (page 14.4) protects the roof under the front and rear ballast trays. An optional 99544 Ballast Tie-Down Kit (page 14.4) is available to secure the concrete-block ballast.

The 99549 Frame supports up to seven equipment units, five RFFE and one PPC on the front, and one additional RFFE unit on the back of the 14' wide mounting face. The Frame's footprint is 14'-3/4" wide and 7'-11" deep.

Two optional B1567 Rubber Mat Kits (page 14.4) are required to protect the roof under the front and rear ballast trays. Two optional 99544 Ballast Tie-Down Kits (page 14.4) are necessary to secure the concrete-block ballast.



Product Number	Description	List Price
99548	Rooftop Ballast Frame for three equipment units	\$460.00
99549	Rooftop Ballast Frame for seven equipment units	\$935.00

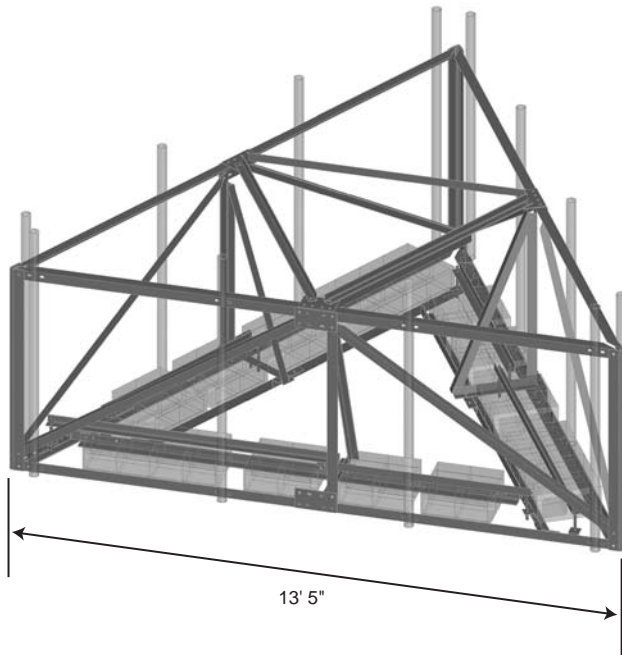
TRI-SECTOR ROOFTOP BALLAST FRAME

FOR WIRELESS ANTENNAS

The Tri-Sector Rooftop Ballast Frame enables installation of up to twelve panel antennas for three sectors on one non-penetrating, three-leg structure. The Frame, available in a height of 5', is secured by placing concrete-block ballast (not included) on the Frame's three ballast trays. An optional ballast tie-down kit secures the ballast to the trays.

The Frame's bottom surface is smooth to prevent roof damage. The optional B1969 Rubber Mat Kit (following) is available to further protect the roof's surface.

Antenna separation with four antennas per sector is 4', with an outside separation of 12'. When mounting three antennas per sector, an alternate center-antenna location provides for a 6' antenna separation. Wireless antennas mount to the Frame on separately ordered 2³/₈" OD Antenna-Mounting Pipes (page 8.1). A Pipe length is selected to match the antenna length and the required mounting height above the roof.

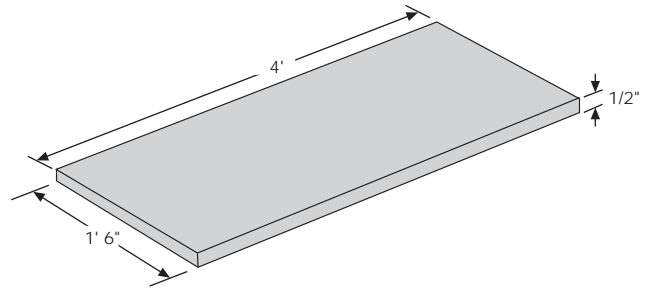


Product Number	Description	List Price
92110	Tri-Sector Rooftop Ballast Frame for wireless antennas	\$1,030.00
92111	Ballast Tie Down Kit for Tri-Sector Rooftop Ballast Frame	\$150.00

RUBBER MAT KIT

FOR TRI-SECTOR ROOFTOP BALLAST FRAME

The Rubber Mat Kit provides protection of the roof surface for a Tri-Sector Rooftop Ballast Frame. Each Kit, furnished with nine 1/2" thick, 1'-6" wide, 4' long mats, protects under the three trays of the 13'-5" wide Tri-Sector Rooftop Ballast Frame.

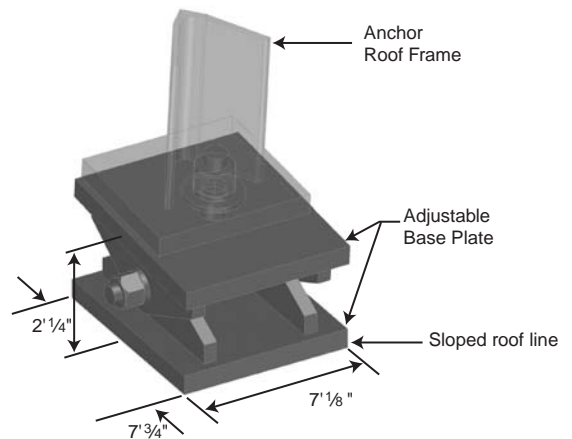


Product Number	Description	List Price
B1969	Rubber Mat Kit for Tri-Sector Rooftop Ballast Frame	\$103.00

ADJUSTABLE BASE PLATE

FOR ANCHORED ROOF FRAME

The Adjustable Base Plate enables the installation of the 5' through 20' Anchored Roof Frame on a sloped or uneven steel roof surface.



Product Number	Description	List Price
B2055	Adjustable Base Plate	\$395.00

ANTENNA SUPPORT STRUCTURES

ROOFTOP FRAMES

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TRI-SECTOR ROOFTOP FRAME

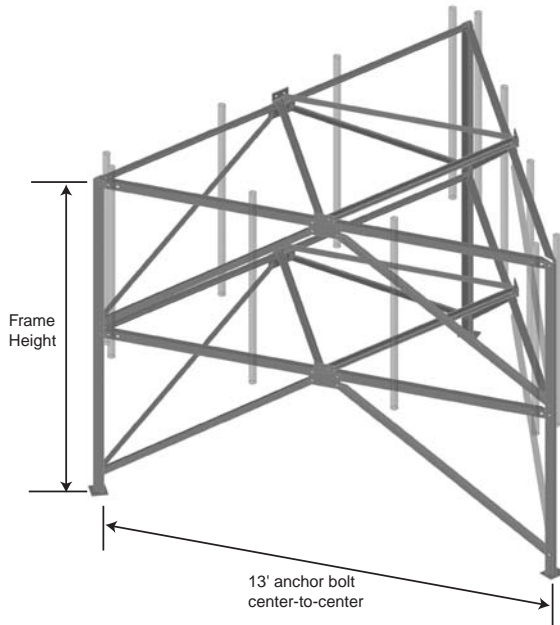
FOR ANCHORED INSTALLATION

The Tri-Sector Rooftop Frame enables installation of up to twelve panel antennas for three sectors on one rooftop, three-leg structure. The Frames are secured to the roof using separately ordered Anchor Bolt Kits, below.

Antenna separation with four antennas per sector is 4', with an outside-antenna separation of 12'. When mounting three antennas per sector, an alternate center-antenna location provides for a 6' antenna separation.

Wireless panel antennas mount to the Frames on separately ordered 2³/₈" OD Antenna-Mounting Pipes (page 8.1). Pipe lengths are selected to match the antenna length and the required mounting height above the roof.

Tri-Sector Rooftop Frames are designed to support twelve 1' wide by 8' tall panel antennas. Design loading, per TIA/EIA 222-F, is for 100 mph basic wind speed, 1/2" of radial ice and a roof elevation of 100' above grade line.



Product Number	Description	List Price
92101	5' High	\$830.00
92102	10' High	\$1,120.00
92103	15' High	\$1,680.00
92104	20' High	\$2,225.00

Product Number	Description	List Price
92107	Anchor bolt Kit 7/8" x 1'-6" Threaded Rod	\$115.00

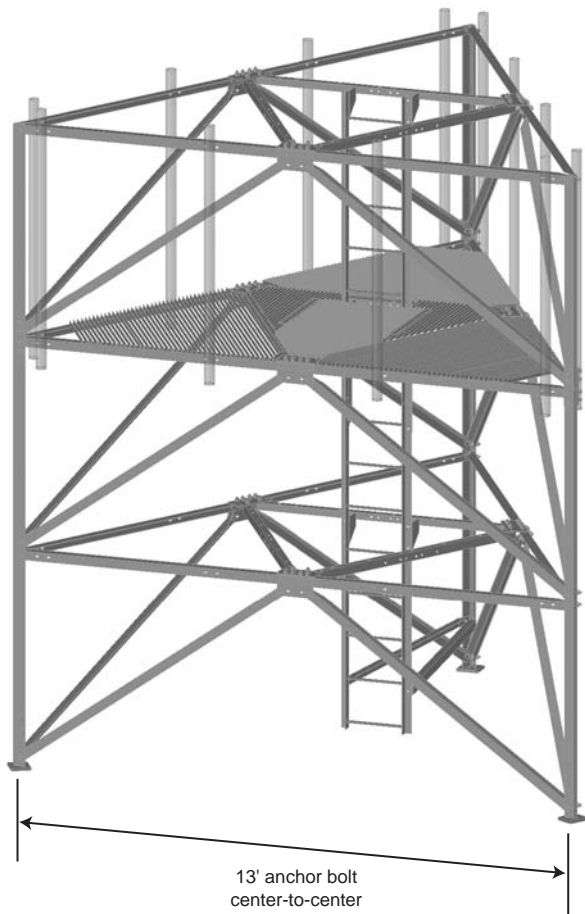
THREE-LEG TRI-SECTOR ROOFTOP FRAME WITH CLIMBING LADDER & PLATFORM

FOR ANCHORED INSTALLATION

Three-Leg Tri-Sector Rooftop Frame provides mounting locations for up to twelve 2⁷/₈" OD mounting pipes. The Frame is designed to support up to forty-eight 2' diameter shielded antennas. Design loading, per TIA/EIA222F, is for 100 mph basic wind speed, 1/2" radial ice and a roof elevation of 100' above grade line.

The Frame is secured to the roof using separately ordered Anchor Bolt Kits (page 14.9). An inside climbing ladder and a platform with an access hatch is included.

Antennas mount to the frame on separately ordered 2⁷/₈" OD Antenna-Mounting-Pipes (page 8.1). Pipe lengths are determined by the number and size of antennas per mount.



Product Number	Description	List Price
B2411	15' High Tri-Sector Frame w/ ladder	\$3,600.00
B2412	20' High Tri-Sector Frame w/ ladder	\$4,150.00

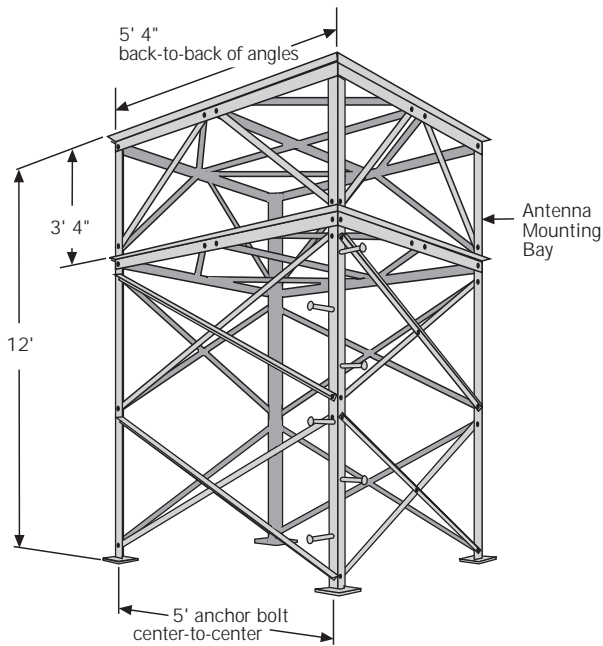
ROOFTOP FRAME

FOR MICROWAVE ANTENNAS

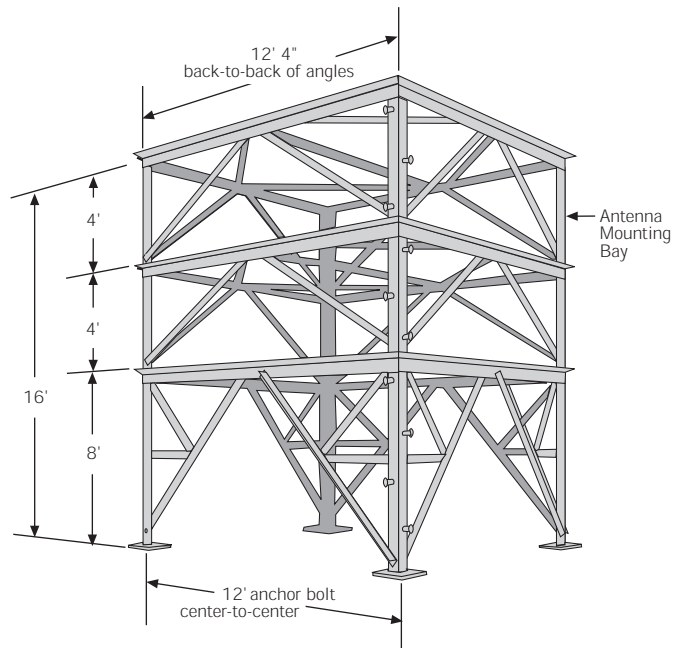
Rooftop H, J & K Frames are engineered for minimal reaction forces at each leg, thus allowing installation on most existing roof structures without costly support reinforcements. The efficient design provides a high ratio of antenna capacity compared with the static weight of the structure.

The Frames are furnished with step-bolts for climbing. An Anchor Bolt Kit for the Frame (page 14.9) is ordered separately.

Antenna Pipe Mounts (section 8), for installation on a corner or on the center of a face and/or an optional Work Platform for the Rooftop Frame can be ordered separately.



12' K Frame Shown



16' J Frame Shown

Product Number	Model	Height	Width	Design Antenna Wind Loading	Uplift	Base Reactions Per Leg		List Price
						Download	Shear	
91011	K	9'-4"	5'	10,750 lbs.	11,800 lbs.	12,800 lbs.	4,090 lbs.	\$720.00
91012	K	12'	5'	7,600 lbs.	11,700 lbs.	12,700 lbs.	2,470 lbs.	\$910.00
91009	H	12'	8'-8"	7,500 lbs.	6,480 lbs.	7,760 lbs.	2,980 lbs.	\$1,310.00
91010	J	16'	12'	12,000 lbs.	9,890 lbs.	12,300 lbs.	3,630 lbs.	\$2,495.00

Above reactions are based on design loading, per EIA-RS-222-C, of 100 mph, 40 psf, and 1/2" of radial ice.

WORK PLATFORM

FOR ROOFTOP FRAMES

Work Platforms, are available as options for the K- and H-Frames. The Platform mounts to either girt level on the Frame.

Product Number	Description	List Price
91117	K-Frame	\$405.00
91118	H-Frame	\$1,205.00

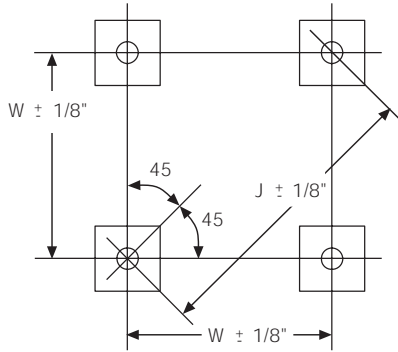
ANTENNA SUPPORT STRUCTURES

ROOFTOP FRAMES

14.B

ANCHOR BOLT LAYOUT FOR ROOFTOP FRAMES

GENERAL DESCRIPTION



Rooftop Product Number	Use With Model	Layout Dimensions W	Layout Dimensions J
91009	H	8'-8"	12'-3"
91010	J	12'	16'-11 ⁵ / ₈ "
91011	K	5'	7'-7 ⁷ / ₈ "
91012	K	5'	7'-7 ⁷ / ₈ "

WIND LOADING FOR TYPICAL ANTENNA CONFIGURATIONS

GENERAL DESCRIPTION

The lateral wind loads from standard dish antennas in typical configurations are shown below. The loads, applied to the Frame at the antenna's centerline, are the result of 100 mph wind exerting 40 psf, with 1/2" of radial ice on the antenna.

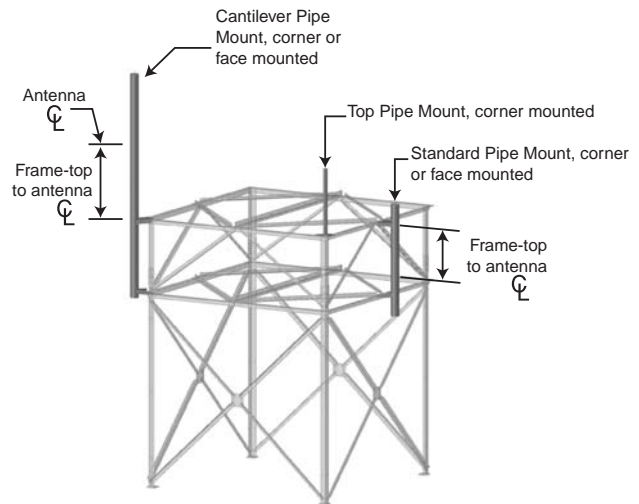
Standard Dish Antenna Diameter	Number of Antennas	Antenna Configuration	Loading from Standard Dish Antenna
8'	1		2,160 lb.
	2	Same Direction	4,320 lb.
	2	Back-to-Back	3,350 lb.
10'	2	2 each, Back-to-Back	6,700 lb.
	4		3,380 lb.
	2	Same Direction	6,750 lb.
12'	2	Back-to-Back	5,230 lb.
	4	2 each Back-to-Back	10,500 lb.
	2	Same Direction	4,860 lb.
15'	2	Back-to-Back	9,720 lb.
	2	Same Direction	7,530 lb.
15'	1		7,580 lb.

High Performance Dish Antenna 75% of Standard Dish Antenna Load
 Dish Antenna with Radome 53% of Standard Dish Antenna Load

ANTENNA PIPE MOUNT

FOR ROOFTOP FRAMES

Antenna Pipe Mounts for the Rooftop Frames mount to the top bay on the corner or on the center of the Frame face. Mounting hardware is included.

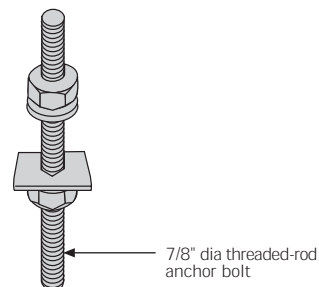


Product Number	For Frame Model	Mount Type	Pipe Mount Size Outside Diameter	Length	Frame-Top to Antenna Centerline	List Price
91097	K & H	Standard	4 ¹ / ₂ "	5'	1'-8"	\$100.00
91099	K & H	Standard	4 ¹ / ₂ "	8'-4"	1'-8"	\$134.00
91119	K & H	Cantilever	4 ¹ / ₂ "	10'	4'	\$156.00
92049	J	Standard	4 ¹ / ₂ "	5'	2'	\$98.00
91091	J	Standard	4 ¹ / ₂ "	8'-4"	4'	\$151.00
99314	J	Standard	2 ⁷ / ₈ "	8'-4"	4'	\$135.00
92044	All	Top	2 ⁷ / ₈ "	3'	N/A	\$56.00

ANCHOR BOLT KIT

FOR ROOFTOP FRAME

The Anchor Bolt Kits provide a set of threaded rod anchors with a 3" square back-up plate, and the necessary hardware. Use with H, J and K Frame models.



Product Number	Anchor Bolt Length	Maximum Roof Thickness	Dia	Qty/Kit	List Price
92067	1'-6"	8"	7/8"	4	\$82.00
92068	2'	1'-2"	7/8"	4	\$110.00
92069	3'	2'-2"	7/8"	4	\$166.00

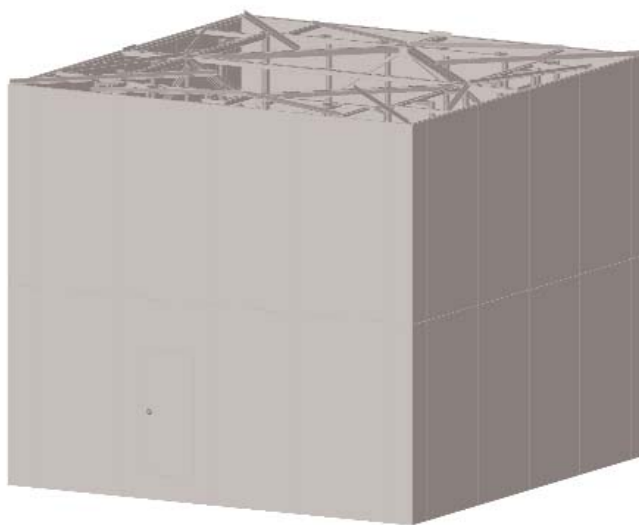
COVERED HW- AND JW- ROOFTOP FRAME KIT

FOR MICROWAVE ANTENNAS

Covered Frames provide a support structure that supports plastic panels that camouflage the frame as a penthouse. These all inclusive Kits provide the Rooftop Frame, plastic panels, cable trays, full work platform with hatch, climbing ladder, pipe mounts and antenna position labeling kit. An Anchor Bolt Kit for the Frame (above) is ordered separately. Frame members, with lengths of 10' or less, are easily transported to the roof by elevator.

Covered HW-Frame has a 8'-8" foot print with an overall 16'-8" covered face width and is 15' tall. The Frame has twelve 2 7/8" OD x 8'-1" pipe mounts that support thirty-six 2' diameter antennas or seventy-two 1' diameter antennas. The 6" x 6" perimeter cable tray provides protection for transmission line cable around the perimeter of the platform. Two vertical cable trays run down two tower legs, terminating 12" above the base plate.

Covered JW-Frame has a 12' foot print with an overall 20' covered face width and come in heights of 16' or 20'. The frame has twenty 2 7/8" OD x 8'-1" pipe mounts that support sixty 2' diameter antennas or one hundred-twenty 1' diameter antennas. The 6" x 6" perimeter cable tray provides protection for transmission line cable around the perimeter of the platform. Two vertical cable trays run down two tower legs, terminating 12" above the baseplate.



Product Number	Rooftop Frame Model	Maximum Overturning Moment at Base ft.-lbs	Total Weight	Total Shear	Uplift Per Leg	Download Per Leg	Shear Per Leg	List Price
B2497	15' HW	186,170	9,720 lbs.	24,830 lbs.	12,200 lbs.	17,060 lbs.	6,290 lbs.	\$44,200.00
B2596	16' JW	253,500	13,600 lbs.	31,080 lbs.	11,500 lbs.	18,300 lbs.	7,820 lbs.	\$58,500.00
B2330	20' JW	400,500	17,430 lbs.	39,690 lbs.	19,240 lbs.	27,960 lbs.	10,000 lbs.	\$69,800.00

Above reactions are based on design loading, per 1994 UBC, of 100 mph basic wind speed, Exposure C, Importance factor 1.0 and a roof elevation of 100' above grade line. Custom Heights available. Call for custom heights and reactions based on different design loading, 1-888-880-9191.

ANTENNA SUPPORT STRUCTURES

ROOFTOP FRAMES

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HW- & JW- ROOFTOP FRAME KIT

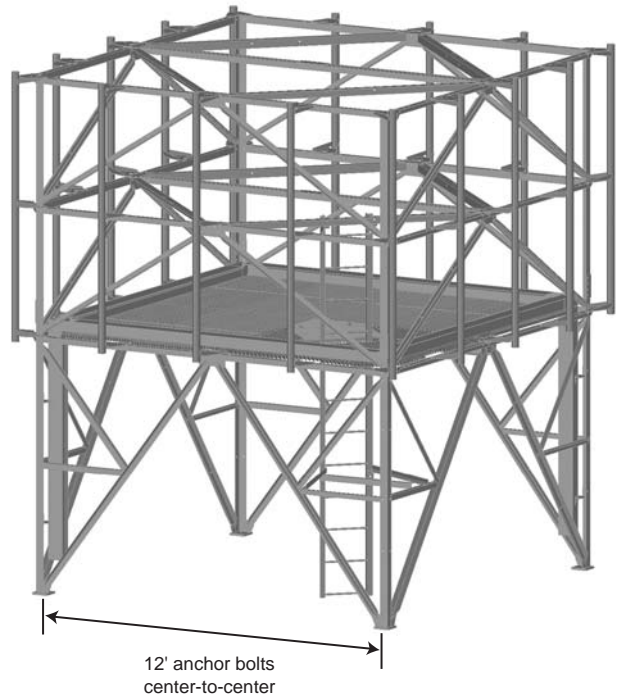
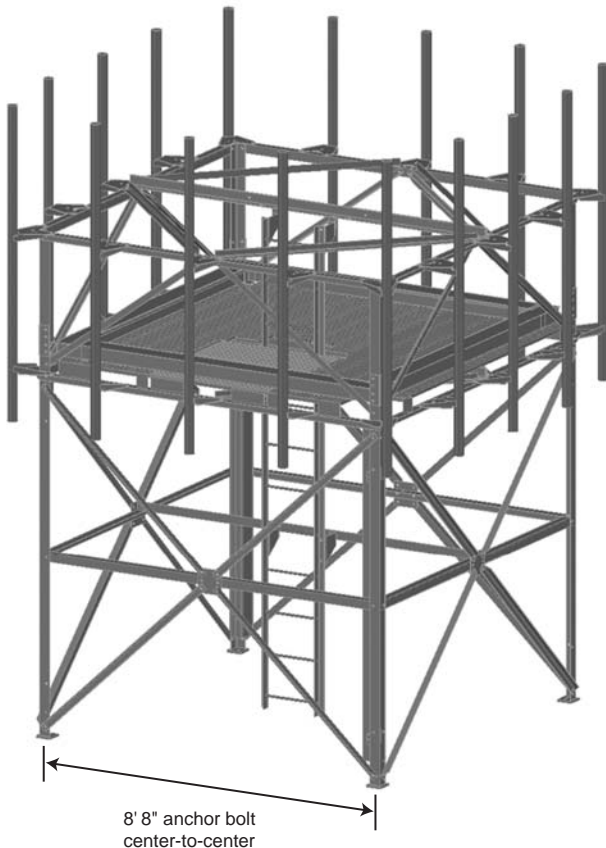
FOR MICROWAVE ANTENNAS

These all-inclusive Kits provide the Rooftop Frame, cable trays, full work platform with hatch, climbing ladder, pipe mounts and antenna position labeling kit. Frame members, with lengths of 10' or less, are easily transported to the roof by elevator.

HW-Frame has 9' face width and is 12' tall with an overall height, which includes the pipe mount cantilever, of 15'-1". The Frame includes sixteen 2⁷/₈" OD x 8'-4" pipe mounts. This provides mounting locations for twenty-four 2' diameter antennas or sixty-four 1' diameter antennas. The 6" x 6" perimeter cable tray provides protection for transmission line cable around the perimeter of the platform. Two vertical cable trays run down two tower legs, terminating 12" above the base plate.

JW-Frames have a 12'-4" face width and come in heights of 16' or 20'. The Frame includes sixteen 2⁷/₈" OD x 8'-4" pipe mounts. This provides mounting locations for forty-eight 2' diameter antennas or eighty 1' diameter antennas. The 6"x6" perimeter cable tray provides protection for transmission line cable around the perimeter of the platform. Two vertical cable trays run down two tower legs, terminating 12" above the base plate.

The HW- and JW- Frames, designed specifically for roof mounting, are engineered for minimal reaction forces at each leg, thus allowing installation on most existing roof structures without costly support reinforcements. The efficient design provides a high ratio of antenna capacity compared with the static weight of the structure. An Anchor Bolt Kit for the Frame (page 14.9) is ordered separately.



Product Number	Rooftop Frame Model	Maximum Overturning Moment at Base ft.-lbs	Total Weight	Total Shear	Uplift Per Leg	Download Per Leg	Shear Per Leg	List Price
99312	12' HW	69,000	4,000 lbs.	6,600 lbs.	4,600 lbs.	6,600 lbs.	1,700 lbs.	\$5,595.00
B2590	16' JW	138,000	6,200 lbs.	12,800 lbs.	6,400 lbs.	9,900 lbs.	3,200 lbs.	\$8,900.00
B2495	20' JW	196,000	7,000 lbs.	13,700 lbs.	10,000 lbs.	13,100 lbs.	3,500 lbs.	\$10,270.00

Above reactions are based on design loading, per TIA/EIA-RS-222-F, of 100 mph basic wind speed, 1/2" of radial ice, and a roof elevation of 100' above grade line. Custom Heights available. Call for custom heights and reactions based on different design loading, 1-888-880-9191.