

August 19, 2015

Everest Solar Systems, LLC
3809 Ocean Ranch Blvd, Suite 111
Oceanside, CA 92056
Attn: Andy Neshat



RE: *Tilt Up Kit PV Panel Mounting System Evaluation*

To whom it may concern:

Per your request, Moment Engineering + Design has performed a comprehensive structural analysis of the Everest Solar *Tilt Up Kit* Solar PV Mounting System for typical installations in the State of Vermont. When installed per the conditions and design criteria described herein, the Tilt Up Kit Solar PV Mounting System is compliant with the sections of the design reference documents noted below.

Design Reference Documents

- *2012 International Building Code, as amended*
- ASCE/SEI 7-10 – *Minimum Design Loads for Buildings and Other Structures*
- *2010 Aluminum Design Manual*, by the Aluminum Association
- Section and materials data provided by Everest Solar Systems
 - Rail section properties appear in Table A2.1 of this report

Overview

The Tilt Up Kit PV-panel roof mounting system consists of extruded aluminum support rails, module clamps, attachments, and fasteners spanning between points of attachment on an existing roof structure. Attachment of the Tilt Up Kit Mounting System to the existing roof structure shall be the responsibility of the installer, and should be analyzed by a registered design professional where required by the local authority having jurisdiction.

Methods & Design Parameters

Applicable combinations of dead, wind, snow, and seismic loads were evaluated in accordance with current code requirements to determine allowable rail span lengths, based on assumptions of single-span conditions and allowable deflection of $L/120$.

Design wind pressures were determined using Components and Cladding calculations in Chapter 26-30 of ASCE 7-10, using the loading parameters listed below. Calculation of applicable roof snow load should be based upon ground snow load maps and equations and factors of ASCE 7-10, Chapter 7 and applicable sections of the 2012 IBC. For designated Case Study areas noted in the 2012 International Building Code, as amended, refer to local jurisdiction requirements for snow and wind load determination. Seismic criteria were considered per provisions of ASCE 7-10,

Chapter 13. Seismic effects did not appear to govern the capacity of this system. Note that configurations not conforming to these parameters will require additional analysis.

Loading Parameters:

<u>General</u>	<u>Wind</u>	<u>Snow</u>	<u>Seismic</u>
risk category: II	$V_{3s,Ultimate} = 110-200$ mph	$p_g: 0-50$ psf	Site class: D
Roof mean height: ≤ 30 ft.	Exposure: B, C	$C_e: 1.0$	Design category: A-E
Roof slope: $0-7^\circ, 7-27^\circ, 27-45^\circ$	Pressure zones: 1 and 2	$C_t: 1.0$	$S_S: \leq 2.000,$
Panel slope: 7° to 15° (from roof)		$C_s: \text{Varies}$	$S_1: \leq 1.250$
Panel orientation: Portrait		$I_s: 1.0$	$I_p: 1.0$
			$a_p: 1.0$
			$R_p: 1.5$

Design Results

The allowable span lengths of the system are principally controlled by applicable wind (speed, exposure, pressure zone) and snow loads to the structure. Refer to the Tilt Up Kit span tables in the appendix to this document for recommended rail configurations based on combinations of these loading parameters. Note that reaction loads provided in the attached tables are only applicable when used with the span length recommendations provided herein. Reaction loads shown are based on worst case of front and rear mounting brackets. These reactions may be scaled linearly where shorter spans are used.

Installation & Configuration Notes

The following guidelines apply to all installations using the Tilt Up Kit product line:

- Refer to Tilt Up Kit allowable geometry and installation guidelines by Everest Solar Systems.
- All fasteners and connective hardware shall be installed per manufacturer specifications.
- This analysis is limited to installations south of any roof ridge, if present. On pitched roofs, the northernmost row of panels should be located between 3' and 12' from the ridge.
- Span tables assume two independent horizontal support rails per panel. Rails shall be located no further than 8" from cut end of diagonal member (refer to Appendix II: Figure 1).
- High edge of panel not to exceed 24" from roof surface.
- Maximum end cantilever of horizontal support rail shall not exceed one-third (1/3) of allowable span in the roof wind pressure zone of the cantilever.
- Rails shall be continuous (not spliced) over a minimum of two supports.
- Installations over roof overhangs or within 10" of any roof edge is not advised.
- Observe all local jurisdictional requirements regarding roof setback requirements.


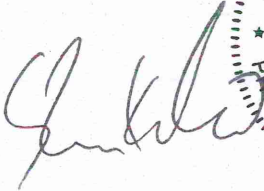
Summary

This assessment has provided design validation for code-compliant installations of the Tilt Up Kit PV Mounting system in the State of Vermont. For the configurations and design loadings noted previously, the attached span tables represent maximum span lengths based on allowable stresses and deflection criteria. For all other configurations, refer to Everest Solar Systems for engineering support.

This report does not provide analysis of any existing structures, as may be required by the local authority having jurisdiction.

We appreciate the opportunity to have assisted you with this project. Should you have any further questions regarding this analysis, please feel free to contact us by phone or email.

Best Regards,



Shawn P. Kelley, P.E.

Principal

moment ENGINEERING + DESIGN

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Exposure B		Table A1.1 : Maximum Span Length (in.)				Panel Pitch: 7° to 15°			
		V _{ult} (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS 0° TO 7°	<u>Roof Wind Pressure Zone 1</u>	110	X80	125	116	100	84	74	66
			X48	85	79	68	60	55	51
		115	X80	121	115	100	84	74	66
			X48	82	79	68	60	55	51
		120	X80	117	114	100	84	74	66
			X48	80	78	68	60	55	51
		130	X80	110	110	99	84	74	66
			X48	75	75	67	60	55	51
		140	X80	104	104	98	84	74	66
			X48	71	71	66	60	55	51
	150	X80	99	99	96	84	74	66	
		X48	68	68	66	60	55	51	
	160	X80	95	95	95	84	74	66	
		X48	65	65	65	60	55	51	
	170	X80	91	91	91	84	74	66	
		X48	62	62	62	59	55	51	
	180	X80	87	87	87	84	74	66	
		X48	59	59	59	58	55	51	
	200	X80	81	81	81	81	74	66	
		X48	55	55	55	55	54	51	
<u>Roof Wind Pressure Zone 2</u>	110	X80	103	103	100	84	74	66	
		X48	70	70	68	60	55	51	
	115	X80	100	100	100	84	74	66	
		X48	68	68	68	60	55	51	
	120	X80	97	97	97	84	74	66	
		X48	66	66	66	60	55	51	
	130	X80	92	92	92	84	74	66	
		X48	62	62	62	60	55	51	
	140	X80	87	87	87	84	74	66	
		X48	59	59	59	59	55	51	
	150	X80	83	83	83	83	74	66	
		X48	56	56	56	56	55	51	
	160	X80	79	79	79	79	74	66	
		X48	54	54	54	54	54	51	
	170	X80	70	70	70	70	70	66	
		X48	52	52	52	52	52	51	
	180	X80	63	63	63	63	63	63	
		X48	50	50	50	50	50	50	
	200	X80	50	50	50	50	50	50	
		X48	46	46	46	46	46	46	

Note: Reaction loads shown are based on maximum allowable span lengths.

	Table A1.2: Maximum Uplift (lb)							Panel Pitch:	7° to 15°
	Exposure	V_ult (mph)	Rail Type	Roof Snow Load (psf)					
	B			0	10	20	30	40	50
ROOFS 0° TO 7°	<u>Roof Wind Pressure Zone 1</u>	110	X80	353	328	282	250	228	207
			X48	240	223	192	170	156	145
		115	X80	376	360	312	276	252	228
			X48	256	245	212	187	172	160
		120	X80	401	393	342	303	278	251
			X48	273	267	233	207	189	176
		130	X80	452	452	404	362	332	300
			X48	307	307	276	247	226	210
		140	X80	504	504	471	426	390	352
			X48	343	343	320	290	266	248
	150	X80	557	557	539	494	453	409	
		X48	378	378	366	336	308	288	
	160	X80	611	611	611	562	520	470	
		X48	415	415	415	383	353	330	
	170	X80	665	665	665	632	591	534	
		X48	452	452	452	430	402	375	
	180	X80	720	720	720	704	661	602	
		X48	489	489	489	480	451	422	
	200	X80	834	834	834	834	809	751	
		X48	567	567	567	567	551	524	
ROOFS 0° TO 7°	<u>Roof Wind Pressure Zone 2</u>	110	X80	517	517	499	442	404	365
			X48	351	351	340	301	276	256
		115	X80	550	550	549	486	445	402
			X48	374	374	374	331	303	282
		120	X80	586	586	586	534	489	442
			X48	398	398	398	363	333	310
		130	X80	655	655	655	632	578	523
			X48	445	445	445	430	393	367
		140	X80	727	727	727	727	677	612
			X48	495	495	495	495	460	429
	150	X80	801	801	801	801	781	707	
		X48	544	544	544	544	532	496	
	160	X80	876	876	876	876	876	808	
		X48	595	595	595	595	595	567	
	170	X80	945	945	945	945	945	915	
		X48	647	647	647	647	647	643	
	180	X80	945	945	945	945	945	945	
		X48	701	701	701	701	701	701	
	200	X80	945	945	945	945	945	945	
		X48	809	809	809	809	809	809	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure B	Table A1.3: Maximum Downforce (lb)				Panel Pitch: 7° to 15°				
	V _{ult} (mph)	Rail Type	Roof Snow Load (psf)						
			0	10	20	30	40	50	
ROOFS 0° TO 7°	<u>Roof Wind Pressure Zone 1</u>	110	X80	250	406	552	704	841	936
			X48	171	276	376	479	571	657
		115	X80	257	413	552	704	841	936
			X48	174	281	376	479	571	657
		120	X80	262	420	552	704	841	936
			X48	178	286	376	479	571	657
		130	X80	278	428	564	704	841	936
			X48	189	292	384	479	571	657
		140	X80	292	427	577	704	841	936
			X48	199	291	392	479	571	657
	150	X80	311	431	593	704	841	936	
		X48	212	293	403	479	571	657	
	160	X80	328	435	607	719	841	936	
		X48	223	296	413	489	571	657	
	170	X80	347	441	606	735	841	936	
		X48	236	300	413	499	571	657	
	180	X80	367	449	608	751	852	936	
		X48	250	305	413	511	579	657	
	200	X80	408	468	616	763	884	953	
		X48	278	318	419	519	602	665	
ROOFS 0° TO 7°	<u>Roof Wind Pressure Zone 2</u>	110	X80	207	361	552	704	841	936
			X48	141	245	376	479	571	657
		115	X80	213	358	552	704	841	936
			X48	144	243	376	479	571	657
		120	X80	217	355	536	704	841	936
			X48	148	242	365	479	571	657
		130	X80	231	356	522	704	841	936
			X48	157	242	355	479	571	657
		140	X80	244	356	514	692	841	936
			X48	166	243	350	471	571	657
	150	X80	259	359	510	661	841	936	
		X48	176	245	347	450	571	657	
	160	X80	274	363	507	651	823	936	
		X48	186	247	345	443	559	657	
	170	X80	288	366	504	641	784	936	
		X48	197	250	345	439	537	657	
	180	X80	282	345	467	589	711	860	
		X48	209	256	346	436	527	637	
	200	X80	271	312	410	508	606	705	
		X48	233	267	351	435	520	603	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure B		Table A1.4: Maximum Shear (lb)						Panel Pitch: 7° to 15°	
		V _{ult} (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS 0° TO 7°	<u>Roof Wind Pressure Zone 1</u>	110	X80	112	163	248	297	341	378
			X48	76	112	170	216	260	297
		115	X80	116	162	248	297	341	378
			X48	79	109	170	216	260	297
		120	X80	121	161	248	297	341	378
			X48	83	109	170	216	260	297
		130	X80	130	153	247	297	341	378
			X48	88	103	167	216	260	297
		140	X80	141	144	243	297	341	378
			X48	95	99	166	216	260	297
	150	X80	151	151	239	297	341	378	
		X48	102	102	163	216	260	297	
	160	X80	161	161	234	297	341	378	
		X48	110	110	158	213	260	297	
	170	X80	173	173	224	297	341	378	
		X48	117	117	152	211	258	297	
	180	X80	187	187	215	297	341	378	
		X48	127	127	147	208	256	297	
	200	X80	217	217	217	288	341	378	
		X48	148	148	148	197	251	295	
<u>Roof Wind Pressure Zone 2</u>	110	X80	142	143	248	297	341	378	
		X48	96	98	170	216	260	297	
	115	X80	149	149	247	297	341	378	
		X48	100	100	167	216	260	297	
	120	X80	156	156	238	297	341	378	
		X48	106	106	162	216	260	297	
	130	X80	170	170	225	297	341	378	
		X48	116	116	153	216	260	297	
	140	X80	189	189	215	297	341	378	
		X48	129	129	145	210	260	297	
	150	X80	208	208	208	293	341	378	
		X48	142	142	142	199	260	297	
	160	X80	228	228	228	280	341	378	
		X48	155	155	155	190	248	297	
	170	X80	229	229	229	249	326	378	
		X48	168	168	168	184	239	296	
	180	X80	229	229	229	229	289	357	
		X48	182	182	182	182	229	283	
200	X80	229	229	229	229	233	287		
	X48	210	210	210	210	215	264		

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure C		Table A1.5 : Maximum Span Length (in.)				Panel Pitch: 7° to 15°			
		V _{ult} (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS 0° TO 7°	<u>Roof Wind Pressure Zone 1</u>	110	X80	110	110	99	84	74	66
			X48	75	75	67	60	55	51
		115	X80	107	107	98	84	74	66
			X48	73	73	67	60	55	51
		120	X80	104	104	97	84	74	66
			X48	70	70	66	60	55	51
		130	X80	98	98	96	84	74	66
			X48	66	66	65	60	55	51
		140	X80	93	93	93	84	74	66
			X48	63	63	63	59	55	51
	150	X80	88	88	88	84	74	66	
		X48	60	60	60	58	55	51	
	160	X80	84	84	84	84	74	66	
		X48	57	57	57	57	54	51	
	170	X80	81	81	81	81	74	66	
		X48	55	55	55	55	54	51	
	180	X80	78	78	78	78	74	66	
		X48	53	53	53	53	53	50	
	200	X80	65	65	65	65	65	65	
		X48	49	49	49	49	49	49	
<u>Roof Wind Pressure Zone 2</u>	110	X80	92	92	92	84	74	66	
		X48	62	62	62	60	55	51	
	115	X80	89	89	89	84	74	66	
		X48	60	60	60	60	55	51	
	120	X80	86	86	86	84	74	66	
		X48	59	59	59	59	55	51	
	130	X80	82	82	82	82	74	66	
		X48	55	55	55	55	55	51	
	140	X80	77	77	77	77	74	66	
		X48	53	53	53	53	53	51	
	150	X80	69	69	69	69	69	66	
		X48	50	50	50	50	50	50	
	160	X80	60	60	60	60	60	60	
		X48	48	48	48	48	48	48	
	170	X80	53	53	53	53	53	53	
		X48	46	46	46	46	46	46	
	180	X80	48	48	48	48	48	48	
		X48	44	44	44	44	44	44	
	200	X80	38	38	38	38	38	38	
		X48	38	38	38	38	38	38	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure C		Table A1.6: Maximum Uplift (lb)					Panel Pitch: 7° to 15°		
		V_ult (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS 0° TO 7°	<u>Roof Wind Pressure Zone 1</u>	110	X80	453	453	407	363	333	301
			X48	308	308	277	248	226	211
		115	X80	483	483	444	400	367	331
			X48	329	329	303	273	250	232
		120	X80	513	513	483	439	402	363
			X48	349	349	329	298	273	255
		130	X80	576	576	565	519	478	431
			X48	392	392	385	353	324	303
		140	X80	641	641	641	602	560	506
			X48	436	436	436	410	380	354
	150	X80	706	706	706	686	644	585	
		X48	480	480	480	467	438	411	
	160	X80	772	772	772	772	730	670	
		X48	526	526	526	526	497	470	
	170	X80	840	840	840	840	818	759	
		X48	571	571	571	571	556	529	
	180	X80	909	909	909	909	909	854	
		X48	619	619	619	619	619	590	
	200	X80	945	945	945	945	945	945	
		X48	715	715	715	715	715	715	
ROOFS 0° TO 7°	<u>Roof Wind Pressure Zone 2</u>	110	X80	656	656	656	633	580	524
			X48	446	446	446	431	394	367
		115	X80	698	698	698	696	636	576
			X48	475	475	475	473	433	404
		120	X80	742	742	742	742	697	630
			X48	505	505	505	505	474	442
		130	X80	829	829	829	829	823	744
			X48	564	564	564	564	560	522
		140	X80	919	919	919	919	919	868
			X48	625	625	625	625	625	609
	150	X80	945	945	945	945	945	945	
		X48	687	687	687	687	687	687	
	160	X80	945	945	945	945	945	945	
		X48	751	751	751	751	751	751	
	170	X80	945	945	945	945	945	945	
		X48	815	815	815	815	815	815	
	180	X80	945	945	945	945	945	945	
		X48	881	881	881	881	881	881	
	200	X80	945	945	945	945	945	945	
		X48	945	945	945	945	945	945	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure C		Table A1.7: Maximum Downforce (lb)					Panel Pitch: 7° to 15°		
		V _{ult} (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS 0° TO 7°	<u>Roof Wind Pressure Zone 1</u>	110	X80	278	428	564	704	841	936
			X48	189	292	384	479	571	657
		115	X80	288	428	571	704	841	936
			X48	196	292	389	479	571	657
		120	X80	296	428	580	704	841	936
			X48	201	291	395	479	571	657
		130	X80	318	433	599	710	841	936
			X48	216	294	408	483	571	657
		140	X80	338	438	606	727	841	936
			X48	230	299	413	495	571	657
	150	X80	363	448	608	747	848	936	
		X48	247	304	413	508	577	657	
	160	X80	386	456	610	764	866	936	
		X48	262	311	415	520	590	657	
	170	X80	409	468	616	762	886	955	
		X48	279	318	419	519	603	666	
	180	X80	435	481	623	765	906	984	
		X48	296	328	424	520	617	679	
	200	X80	440	459	601	744	840	933	
		X48	333	348	437	527	616	705	
ROOFS 0° TO 7°	<u>Roof Wind Pressure Zone 2</u>	110	X80	232	356	538	704	841	936
			X48	158	242	368	479	571	657
		115	X80	240	356	535	704	841	936
			X48	162	242	364	479	571	657
		120	X80	246	356	519	686	841	936
			X48	168	243	354	469	571	657
		130	X80	266	361	509	677	841	936
			X48	181	246	347	469	571	657
		140	X80	283	366	507	670	804	936
			X48	193	249	345	455	560	657
	150	X80	284	351	497	643	774	885	
		X48	207	255	346	437	560	643	
	160	X80	276	355	494	634	774	859	
		X48	220	260	347	434	542	643	
	170	X80	276	348	478	607	739	859	
		X48	234	267	351	435	520	641	
	180	X80	270	329	443	558	673	809	
		X48	248	274	355	436	516	617	
	200	X80	260	297	390	482	575	667	
		X48	259	271	342	424	506	587	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure C		Table A1.8: Maximum Shear (lb)						Panel Pitch: 7° to 15°	
		V _{ult} (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS 0° TO 7°	<u>Roof Wind Pressure Zone 1</u>	110	X80	112	163	248	297	341	378
			X48	76	112	170	216	260	297
		115	X80	116	162	248	297	341	378
			X48	79	109	170	216	260	297
		120	X80	121	161	248	297	341	378
			X48	83	109	170	216	260	297
		130	X80	130	153	247	297	341	378
			X48	88	103	167	216	260	297
		140	X80	141	144	243	297	341	378
			X48	95	99	166	216	260	297
	150	X80	151	151	239	297	341	378	
		X48	102	102	163	216	260	297	
	160	X80	161	161	234	297	341	378	
		X48	110	110	158	213	260	297	
	170	X80	173	173	224	297	341	378	
		X48	117	117	152	211	258	297	
	180	X80	187	187	215	297	341	378	
		X48	127	127	147	208	256	297	
	200	X80	217	217	217	288	341	378	
		X48	148	148	148	197	251	295	
<u>Roof Wind Pressure Zone 2</u>	110	X80	142	143	248	297	341	378	
		X48	96	98	170	216	260	297	
	115	X80	149	149	247	297	341	378	
		X48	100	100	167	216	260	297	
	120	X80	156	156	238	297	341	378	
		X48	106	106	162	216	260	297	
	130	X80	170	170	225	297	341	378	
		X48	116	116	153	216	260	297	
	140	X80	189	189	215	297	341	378	
		X48	129	129	145	210	260	297	
	150	X80	208	208	208	293	341	378	
		X48	142	142	142	199	260	297	
	160	X80	228	228	228	280	341	378	
		X48	155	155	155	190	248	297	
	170	X80	229	229	229	249	326	378	
		X48	168	168	168	184	239	296	
	180	X80	229	229	229	229	289	357	
		X48	182	182	182	182	229	283	
	200	X80	229	229	229	229	233	287	
		X48	210	210	210	210	215	264	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure B		Table A1.9 : Maximum Span Length (in.)					Panel Pitch: 7° to 15°		
		V_ult (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS >7° TO 27°	<u>Roof Wind Pressure Zone 1</u>	110	X80	110	110	99	84	74	66
			X48	75	75	67	60	55	51
		115	X80	107	107	98	84	74	66
			X48	73	73	67	60	55	51
		120	X80	103	103	97	84	74	66
			X48	70	70	66	60	55	51
		130	X80	98	98	96	84	74	66
			X48	66	66	65	60	55	51
		140	X80	93	93	93	84	74	66
			X48	63	63	63	59	55	51
	150	X80	88	88	88	84	74	66	
		X48	60	60	60	58	55	51	
	160	X80	84	84	84	84	74	66	
		X48	57	57	57	57	54	51	
	170	X80	81	81	81	81	74	66	
		X48	55	55	55	55	54	51	
	180	X80	78	78	78	78	74	66	
		X48	53	53	53	53	53	50	
	200	X80	63	63	63	63	63	63	
		X48	49	49	49	49	49	49	
<u>Roof Wind Pressure Zone 2</u>	110	X80	92	92	92	84	74	66	
		X48	62	62	62	60	55	51	
	115	X80	89	89	89	84	74	66	
		X48	60	60	60	60	55	51	
	120	X80	86	86	86	84	74	66	
		X48	59	59	59	59	55	51	
	130	X80	81	81	81	81	74	66	
		X48	55	55	55	55	55	51	
	140	X80	77	77	77	77	74	66	
		X48	53	53	53	53	53	51	
	150	X80	67	67	67	67	67	66	
		X48	50	50	50	50	50	50	
	160	X80	59	59	59	59	59	59	
		X48	48	48	48	48	48	48	
	170	X80	52	52	52	52	52	52	
		X48	46	46	46	46	46	46	
	180	X80	46	46	46	46	46	46	
		X48	44	44	44	44	44	44	
	200	X80	37	37	37	37	37	37	
		X48	37	37	37	37	37	37	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure B	Table A1.10: Maximum Uplift (lb)						Panel Pitch: 7° to 15°		
	V_ult (mph)	Rail Type	Roof Snow Load (psf)						
			0	10	20	30	40	50	
ROOFS >7° TO 27°	<u>Roof Wind Pressure Zone 1</u>	110	X80	453	453	407	363	333	301
			X48	308	308	277	248	226	211
		115	X80	483	483	444	400	367	331
			X48	329	329	303	273	250	232
		120	X80	513	513	483	439	402	363
			X48	349	349	329	298	273	255
		130	X80	576	576	565	519	478	431
			X48	392	392	385	353	324	303
		140	X80	641	641	641	602	560	506
			X48	436	436	436	410	380	354
	150	X80	706	706	706	686	644	585	
		X48	480	480	480	467	438	411	
	160	X80	772	772	772	772	730	670	
		X48	526	526	526	526	497	470	
	170	X80	840	840	840	840	818	759	
		X48	571	571	571	571	556	529	
	180	X80	909	909	909	909	909	854	
		X48	619	619	619	619	619	590	
	200	X80	945	945	945	945	945	945	
		X48	715	715	715	715	715	715	
<u>Roof Wind Pressure Zone 2</u>	110	X80	656	656	656	633	580	524	
		X48	446	446	446	431	394	367	
	115	X80	698	698	698	696	636	576	
		X48	475	475	475	473	433	404	
	120	X80	742	742	742	742	697	630	
		X48	505	505	505	505	474	442	
	130	X80	829	829	829	829	823	744	
		X48	564	564	564	564	560	522	
	140	X80	919	919	919	919	919	868	
		X48	625	625	625	625	625	609	
	150	X80	945	945	945	945	945	945	
		X48	687	687	687	687	687	687	
	160	X80	945	945	945	945	945	945	
		X48	751	751	751	751	751	751	
	170	X80	945	945	945	945	945	945	
		X48	815	815	815	815	815	815	
	180	X80	945	945	945	945	945	945	
		X48	881	881	881	881	881	881	
	200	X80	945	945	945	945	945	945	
		X48	945	945	945	945	945	945	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure B	Table A1.11: Maximum Downforce (lb)					Panel Pitch: 7° to 15°			
	V_ult (mph)	Rail Type	Roof Snow Load (psf)						
			0	10	20	30	40	50	
ROOFS >7° TO 27°	<u>Roof Wind Pressure Zone 1</u>	110	X80	278	428	564	704	841	936
			X48	189	292	384	479	571	657
		115	X80	288	428	571	704	841	936
			X48	196	292	389	479	571	657
		120	X80	296	428	580	704	841	936
			X48	201	291	395	479	571	657
		130	X80	318	433	599	710	841	936
			X48	216	294	408	483	571	657
		140	X80	338	438	606	727	841	936
			X48	230	299	413	495	571	657
	150	X80	363	448	608	747	848	936	
		X48	247	304	413	508	577	657	
	160	X80	386	456	610	764	866	936	
		X48	262	311	415	520	590	657	
	170	X80	409	468	616	762	886	955	
		X48	279	318	419	519	603	666	
	180	X80	435	481	623	765	906	984	
		X48	296	328	424	520	617	679	
	200	X80	440	459	580	716	815	933	
		X48	333	348	437	527	616	705	
<u>Roof Wind Pressure Zone 2</u>	110	X80	232	356	536	704	841	936	
		X48	158	242	368	479	571	657	
	115	X80	240	356	532	704	841	936	
		X48	162	242	361	479	571	657	
	120	X80	246	356	516	686	841	936	
		X48	168	243	350	469	571	657	
	130	X80	266	361	509	658	841	936	
		X48	181	246	347	469	571	657	
	140	X80	283	366	507	647	804	936	
		X48	193	249	345	452	560	657	
	150	X80	284	351	478	634	734	885	
		X48	207	255	346	437	560	643	
	160	X80	276	343	475	608	734	816	
		X48	220	260	347	434	538	643	
	170	X80	270	322	440	559	703	816	
		X48	234	267	351	435	518	637	
	180	X80	266	304	409	514	625	771	
		X48	248	274	355	436	516	613	
	200	X80	260	275	360	444	529	621	
		X48	259	271	340	410	485	570	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure B		Table A1.12: Maximum Shear (lb)						Panel Pitch: 7° to 15°	
		V_ult (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS >7° TO 27°	<u>Roof Wind Pressure Zone 1</u>	110	X80	112	163	248	297	341	378
			X48	76	112	170	216	260	297
		115	X80	116	162	248	297	341	378
			X48	79	109	170	216	260	297
		120	X80	121	161	248	297	341	378
			X48	83	109	170	216	260	297
		130	X80	130	153	247	297	341	378
			X48	88	103	167	216	260	297
		140	X80	141	144	243	297	341	378
			X48	95	99	166	216	260	297
	150	X80	151	151	239	297	341	378	
		X48	102	102	163	216	260	297	
	160	X80	161	161	234	297	341	378	
		X48	110	110	158	213	260	297	
	170	X80	173	173	224	297	341	378	
		X48	117	117	152	211	258	297	
	180	X80	187	187	215	297	341	378	
		X48	127	127	147	208	256	297	
	200	X80	217	217	217	288	341	378	
		X48	148	148	148	197	251	295	
<u>Roof Wind Pressure Zone 2</u>	110	X80	142	143	248	297	341	378	
		X48	96	98	170	216	260	297	
	115	X80	149	149	247	297	341	378	
		X48	100	100	167	216	260	297	
	120	X80	156	156	238	297	341	378	
		X48	106	106	162	216	260	297	
	130	X80	170	170	225	297	341	378	
		X48	116	116	153	216	260	297	
	140	X80	189	189	215	297	341	378	
		X48	129	129	145	210	260	297	
	150	X80	208	208	208	293	341	378	
		X48	142	142	142	199	260	297	
	160	X80	228	228	228	280	341	378	
		X48	155	155	155	190	248	297	
	170	X80	229	229	229	249	326	378	
		X48	168	168	168	184	239	296	
	180	X80	229	229	229	229	289	357	
		X48	182	182	182	182	229	283	
	200	X80	229	229	229	229	233	287	
		X48	210	210	210	210	215	264	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure C	Table A1.13 : Maximum Span Length (in.)				Panel Pitch: 7° to 15°				
	V _{ult} (mph)	Rail Type	Roof Snow Load (psf)						
			0	10	20	30	40	50	
ROOFS >7° TO 27°	<u>Roof Wind Pressure Zone 1</u>	110	X80	110	110	99	84	74	66
			X48	75	75	67	60	55	51
		115	X80	107	107	98	84	74	66
			X48	73	73	67	60	55	51
		120	X80	103	103	97	84	74	66
			X48	70	70	66	60	55	51
		130	X80	98	98	96	84	74	66
			X48	66	66	65	60	55	51
		140	X80	93	93	93	84	74	66
			X48	63	63	63	59	55	51
	150	X80	88	88	88	84	74	66	
		X48	60	60	60	58	55	51	
	160	X80	84	84	84	84	74	66	
		X48	57	57	57	57	54	51	
	170	X80	81	81	81	81	74	66	
		X48	55	55	55	55	54	51	
	180	X80	75	75	75	75	74	66	
		X48	53	53	53	53	53	50	
	200	X80	61	61	61	61	61	61	
		X48	49	49	49	49	49	49	
<u>Roof Wind Pressure Zone 2</u>	110	X80	92	92	92	84	74	66	
		X48	62	62	62	60	55	51	
	115	X80	89	89	89	84	74	66	
		X48	60	60	60	60	55	51	
	120	X80	86	86	86	84	74	66	
		X48	59	59	59	59	55	51	
	130	X80	81	81	81	81	74	66	
		X48	55	55	55	55	55	51	
	140	X80	74	74	74	74	74	66	
		X48	53	53	53	53	53	51	
	150	X80	64	64	64	64	64	64	
		X48	50	50	50	50	50	50	
	160	X80	56	56	56	56	56	56	
		X48	48	48	48	48	48	48	
	170	X80	50	50	50	50	50	50	
		X48	46	46	46	46	46	46	
	180	X80	44	44	44	44	44	44	
		X48	44	44	44	44	44	44	
	200	X80	36	36	36	36	36	36	
		X48	36	36	36	36	36	36	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure C	Table A1.14: Maximum Uplift (lb)					Panel Pitch: 7° to 15°			
	V_ult (mph)	Rail Type	Roof Snow Load (psf)						
			0	10	20	30	40	50	
ROOFS >7° TO 27°	<u>Roof Wind Pressure Zone 1</u>	110	X80	453	453	407	363	333	301
			X48	308	308	277	248	226	211
		115	X80	483	483	444	400	367	331
			X48	329	329	303	273	250	232
		120	X80	513	513	483	439	402	363
			X48	349	349	329	298	273	255
		130	X80	576	576	565	519	478	431
			X48	392	392	385	353	324	303
		140	X80	641	641	641	602	560	506
			X48	436	436	436	410	380	354
	150	X80	706	706	706	686	644	585	
		X48	480	480	480	467	438	411	
	160	X80	772	772	772	772	730	670	
		X48	526	526	526	526	497	470	
	170	X80	840	840	840	840	818	759	
		X48	571	571	571	571	556	529	
	180	X80	909	909	909	909	909	854	
		X48	619	619	619	619	619	590	
	200	X80	945	945	945	945	945	945	
		X48	715	715	715	715	715	715	
<u>Roof Wind Pressure Zone 2</u>	110	X80	656	656	656	633	580	524	
		X48	446	446	446	431	394	367	
	115	X80	698	698	698	696	636	576	
		X48	475	475	475	473	433	404	
	120	X80	742	742	742	742	697	630	
		X48	505	505	505	505	474	442	
	130	X80	829	829	829	829	823	744	
		X48	564	564	564	564	560	522	
	140	X80	919	919	919	919	919	868	
		X48	625	625	625	625	625	609	
	150	X80	945	945	945	945	945	945	
		X48	687	687	687	687	687	687	
	160	X80	945	945	945	945	945	945	
		X48	751	751	751	751	751	751	
	170	X80	945	945	945	945	945	945	
		X48	815	815	815	815	815	815	
	180	X80	945	945	945	945	945	945	
		X48	881	881	881	881	881	881	
	200	X80	945	945	945	945	945	945	
		X48	945	945	945	945	945	945	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure C	Table A1.15: Maximum Downforce (lb)					Panel Pitch: 7° to 15°			
	V _{ult} (mph)	Rail Type	Roof Snow Load (psf)						
			0	10	20	30	40	50	
ROOFS >7° TO 27°	<u>Roof Wind Pressure Zone 1</u>	110	X80	278	428	564	704	841	936
			X48	189	292	384	479	571	657
		115	X80	288	428	571	704	841	936
			X48	196	292	389	479	571	657
		120	X80	296	428	580	704	841	936
			X48	201	291	395	479	571	657
		130	X80	318	433	599	710	841	936
			X48	216	294	408	483	571	657
		140	X80	338	438	606	727	841	936
			X48	230	299	413	495	571	657
	150	X80	363	448	608	747	848	936	
		X48	247	304	413	508	577	657	
	160	X80	386	456	610	764	866	936	
		X48	262	311	415	520	590	657	
	170	X80	409	468	616	762	886	955	
		X48	279	318	419	519	603	666	
	180	X80	435	481	623	765	906	984	
		X48	296	328	424	520	617	679	
	200	X80	440	459	578	696	815	933	
		X48	333	348	437	527	616	705	
<u>Roof Wind Pressure Zone 2</u>	110	X80	232	356	522	704	841	936	
		X48	158	242	356	479	571	657	
	115	X80	240	356	517	704	841	936	
		X48	162	242	352	479	571	657	
	120	X80	246	356	513	686	841	936	
		X48	168	243	349	466	571	657	
	130	X80	266	361	509	658	841	936	
		X48	181	246	347	448	571	657	
	140	X80	283	366	507	647	804	936	
		X48	193	249	345	440	547	657	
	150	X80	284	351	476	602	727	885	
		X48	207	255	346	437	529	643	
	160	X80	276	327	437	547	657	774	
		X48	220	260	347	434	522	616	
	170	X80	270	309	406	503	601	698	
		X48	234	267	351	435	518	602	
	180	X80	266	294	381	467	553	640	
		X48	248	274	355	436	516	597	
	200	X80	260	271	341	410	480	550	
		X48	259	271	340	410	480	549	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure C	Table A1.16: Maximum Shear (lb)					Panel Pitch: 7° to 15°			
	V _{ult} (mph)	Rail Type	Roof Snow Load (psf)						
			0	10	20	30	40	50	
ROOFS >7° TO 27°	<u>Roof Wind Pressure Zone 1</u>	110	X80	130	152	247	297	341	378
			X48	90	103	167	216	260	297
		115	X80	136	148	244	297	341	378
			X48	92	100	166	216	260	297
		120	X80	142	143	243	297	341	378
			X48	97	98	166	216	260	297
		130	X80	154	154	238	297	341	378
			X48	104	104	162	215	260	297
		140	X80	167	167	229	297	341	378
			X48	114	114	156	212	260	297
	150	X80	184	184	217	297	341	378	
		X48	125	125	148	210	256	297	
	160	X80	201	201	207	297	341	378	
		X48	137	137	140	203	253	297	
	170	X80	219	219	219	287	341	378	
		X48	149	149	149	194	251	293	
	180	X80	229	229	229	266	341	378	
		X48	161	161	161	188	244	292	
	200	X80	229	229	229	229	279	346	
		X48	186	186	186	186	228	280	
<u>Roof Wind Pressure Zone 2</u>	110	X80	171	171	225	297	341	378	
		X48	116	116	153	216	260	297	
	115	X80	182	182	219	297	341	378	
		X48	124	124	148	215	260	297	
	120	X80	193	193	212	297	341	378	
		X48	131	131	144	207	260	297	
	130	X80	216	216	216	288	341	378	
		X48	147	147	147	197	256	297	
	140	X80	229	229	229	263	341	378	
		X48	163	163	163	185	243	297	
	150	X80	229	229	229	229	298	367	
		X48	179	179	179	179	233	287	
	160	X80	229	229	229	229	261	322	
		X48	195	195	195	195	221	274	
	170	X80	229	229	229	229	231	284	
		X48	212	212	212	212	212	262	
	180	X80	229	229	229	229	229	253	
		X48	229	229	229	229	229	252	
	200	X80	229	229	229	229	229	229	
		X48	229	229	229	229	229	229	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure B		Table A1.17 : Maximum Span Length (in.)				Panel Pitch: 7° to 15°			
		V _{ult} (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS >27° TO 45°	<u>Roof Wind Pressure Zone 1</u>	110	X80	110	110	89	62	47	38
			X48	75	75	68	61	47	38
		115	X80	107	107	89	62	47	38
			X48	73	73	67	61	47	38
		120	X80	103	103	89	62	47	38
			X48	70	70	67	61	47	38
		130	X80	98	98	89	62	47	38
			X48	66	66	66	60	47	38
		140	X80	93	93	89	62	47	38
			X48	63	63	63	59	47	38
	150	X80	88	88	88	62	47	38	
		X48	60	60	60	59	47	38	
	160	X80	84	84	84	62	47	38	
		X48	57	57	57	57	47	38	
	170	X80	81	81	81	62	47	38	
		X48	55	55	55	55	47	38	
	180	X80	75	75	75	62	47	38	
		X48	53	53	53	53	47	38	
	200	X80	61	61	61	61	47	38	
		X48	49	49	49	49	47	38	
<u>Roof Wind Pressure Zone 2</u>	110	X80	92	92	89	62	47	38	
		X48	62	62	62	61	47	38	
	115	X80	89	89	89	62	47	38	
		X48	60	60	60	60	47	38	
	120	X80	86	86	86	62	47	38	
		X48	59	59	59	59	47	38	
	130	X80	81	81	81	62	47	38	
		X48	55	55	55	55	47	38	
	140	X80	74	74	74	62	47	38	
		X48	53	53	53	53	47	38	
	150	X80	64	64	64	62	47	38	
		X48	50	50	50	50	47	38	
	160	X80	56	56	56	56	47	38	
		X48	48	48	48	48	47	38	
	170	X80	50	50	50	50	47	38	
		X48	46	46	46	46	46	38	
	180	X80	44	44	44	44	44	38	
		X48	44	44	44	44	44	38	
	200	X80	36	36	36	36	36	36	
		X48	36	36	36	36	36	36	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure B		Table A1.18: Maximum Uplift (lb)						Panel Pitch: 7° to 15°	
		V_ult (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS >27° TO 45°	<u>Roof Wind Pressure Zone 1</u>	110	X80	449	449	405	358	313	282
			X48	305	305	276	247	226	211
		115	X80	478	478	443	395	345	311
			X48	325	325	300	272	248	232
		120	X80	508	508	481	433	378	340
			X48	346	346	327	298	272	254
		130	X80	570	570	562	513	449	404
			X48	388	388	382	351	324	302
		140	X80	634	634	634	599	526	474
			X48	431	431	431	407	379	354
	150	X80	698	698	698	682	608	548	
		X48	475	475	475	464	436	409	
	160	X80	764	764	764	764	697	628	
		X48	520	520	520	520	493	468	
	170	X80	831	831	831	831	791	712	
		X48	566	566	566	566	554	527	
	180	X80	900	900	900	900	890	801	
		X48	612	612	612	612	612	586	
	200	X80	910	910	910	910	910	910	
		X48	707	707	707	707	707	707	
<u>Roof Wind Pressure Zone 2</u>	110	X80	650	650	650	624	546	492	
		X48	442	442	442	430	393	367	
	115	X80	691	691	691	684	600	540	
		X48	470	470	470	470	432	403	
	120	X80	734	734	734	734	656	591	
		X48	499	499	499	499	473	440	
	130	X80	820	820	820	820	775	698	
		X48	558	558	558	558	558	520	
	140	X80	908	908	908	908	904	814	
		X48	619	619	619	619	619	608	
	150	X80	910	910	910	910	910	910	
		X48	679	679	679	679	679	679	
	160	X80	910	910	910	910	910	910	
		X48	743	743	743	743	743	743	
	170	X80	921	921	921	910	910	910	
		X48	806	806	806	806	806	806	
	180	X80	945	945	945	910	910	910	
		X48	872	872	872	872	872	872	
	200	X80	945	945	945	945	910	910	
		X48	910	910	910	910	910	910	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure B		Table A1.19: Maximum Downforce (lb)				Panel Pitch: 7° to 15°			
		V _{ult} (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS >27° TO 45°	<u>Roof Wind Pressure Zone 1</u>	110	X80	316	417	551	677	774	859
			X48	214	284	375	469	560	643
		115	X80	328	425	560	677	774	859
			X48	223	289	381	469	560	643
		120	X80	339	434	568	677	774	859
			X48	231	296	386	469	560	643
		130	X80	363	456	586	690	774	859
			X48	247	310	398	473	560	643
		140	X80	389	478	591	712	774	859
			X48	264	325	402	484	560	643
	150	X80	386	469	593	732	788	859	
		X48	262	318	404	497	565	643	
	160	X80	443	504	601	744	814	859	
		X48	301	343	429	506	577	642	
	170	X80	473	520	634	743	842	880	
		X48	322	353	446	510	590	651	
	180	X80	503	535	672	746	874	908	
		X48	341	363	462	525	600	666	
	200	X80	565	570	705	661	772	884	
		X48	385	388	479	559	600	688	
<u>Roof Wind Pressure Zone 2</u>	110	X80	257	377	508	677	774	859	
		X48	175	257	360	469	560	643	
	115	X80	268	378	504	677	774	859	
		X48	181	258	367	464	560	643	
	120	X80	277	381	499	663	774	859	
		X48	188	259	366	451	560	643	
	130	X80	297	387	513	639	774	859	
		X48	202	263	365	455	557	643	
	140	X80	319	395	537	630	774	859	
		X48	217	269	365	462	529	643	
	150	X80	317	386	520	570	688	834	
		X48	215	262	354	446	514	623	
	160	X80	365	415	545	518	622	730	
		X48	249	282	371	458	508	595	
	170	X80	391	429	553	542	570	661	
		X48	265	291	376	461	505	586	
	180	X80	393	419	532	566	525	606	
		X48	282	300	381	462	510	581	
	200	X80	384	388	479	570	551	522	
		X48	318	321	397	472	548	521	

Note: Reaction loads shown are based on maximum allowable span lengths.

		Table A1.20: Maximum Shear (lb)					Panel Pitch: 7° to 15°		
Exposure B	V _{ult} (mph)	Rail Type	Roof Snow Load (psf)						
			0	10	20	30	40	50	
ROOFS >27° TO 45°	<u>Roof Wind Pressure Zone 1</u>	110	X80	130	314	432	432	432	432
			X48	90	215	338	432	432	432
		115	X80	136	311	432	432	432	432
			X48	92	211	333	432	432	432
		120	X80	142	307	432	432	432	432
			X48	97	208	331	432	432	432
		130	X80	154	300	432	432	432	432
			X48	104	204	325	432	432	432
		140	X80	167	292	432	432	432	432
			X48	114	200	320	425	432	432
	150	X80	184	279	432	432	432	432	
		X48	125	191	318	423	432	432	
	160	X80	201	267	432	432	432	432	
		X48	137	182	309	414	432	432	
	170	X80	219	256	432	432	432	432	
		X48	149	173	303	408	432	432	
	180	X80	229	246	432	432	432	432	
		X48	161	167	298	401	432	432	
	200	X80	229	229	406	432	432	432	
		X48	186	186	276	388	432	432	
<u>Roof Wind Pressure Zone 2</u>	110	X80	171	285	432	432	432	432	
		X48	116	195	338	432	432	432	
	115	X80	182	276	432	432	432	432	
		X48	124	189	333	432	432	432	
	120	X80	193	270	432	432	432	432	
		X48	131	182	325	432	432	432	
	130	X80	216	254	432	432	432	432	
		X48	147	173	307	432	432	432	
	140	X80	229	241	430	432	432	432	
		X48	163	164	292	421	432	432	
	150	X80	229	230	410	432	432	432	
		X48	179	179	278	401	432	432	
	160	X80	229	229	390	432	432	432	
		X48	195	195	265	384	432	432	
	170	X80	229	229	375	432	432	432	
		X48	212	212	254	368	432	432	
	180	X80	229	229	343	432	432	432	
		X48	229	229	246	353	432	432	
	200	X80	229	229	276	397	432	432	
		X48	229	229	229	329	430	432	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure C		Table A1.21 : Maximum Span Length (in.)				Panel Pitch: 7° to 15°			
		V _{ult} (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS >27° TO 45°	<u>Roof Wind Pressure Zone 1</u>	110	X80	110	110	82	57	44	36
			X48	75	75	68	57	44	36
		115	X80	107	107	82	57	44	36
			X48	73	73	68	57	44	36
		120	X80	103	103	82	57	44	36
			X48	70	70	67	57	44	36
		130	X80	98	98	82	57	44	36
			X48	66	66	66	57	44	36
		140	X80	93	93	82	57	44	36
			X48	63	63	63	57	44	36
	150	X80	88	88	82	57	44	36	
		X48	60	60	60	57	44	36	
	160	X80	84	84	82	57	44	36	
		X48	57	57	57	57	44	36	
	170	X80	81	81	81	57	44	36	
		X48	55	55	55	55	44	36	
	180	X80	75	75	75	57	44	36	
		X48	53	53	53	53	44	36	
	200	X80	61	61	61	57	44	36	
		X48	49	49	49	49	44	36	
<u>Roof Wind Pressure Zone 2</u>	110	X80	92	92	82	57	44	36	
		X48	62	62	62	57	44	36	
	115	X80	89	89	82	57	44	36	
		X48	60	60	60	57	44	36	
	120	X80	86	86	82	57	44	36	
		X48	59	59	59	57	44	36	
	130	X80	81	81	81	57	44	36	
		X48	55	55	55	55	44	36	
	140	X80	74	74	74	57	44	36	
		X48	53	53	53	53	44	36	
	150	X80	64	64	64	57	44	36	
		X48	50	50	50	50	44	36	
	160	X80	56	56	56	56	44	36	
		X48	48	48	48	48	44	36	
	170	X80	50	50	50	50	44	36	
		X48	46	46	46	46	44	36	
	180	X80	44	44	44	44	44	36	
		X48	44	44	44	44	44	36	
	200	X80	36	36	36	36	36	36	
		X48	36	36	36	36	36	36	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure C		Table A1.22: Maximum Uplift (lb)						Panel Pitch: 7° to 15°	
		V_ult (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS >27° TO 45°	<u>Roof Wind Pressure Zone 1</u>	110	X80	440	440	401	337	294	265
			X48	300	300	273	245	224	209
		115	X80	470	470	438	370	324	292
			X48	320	320	298	270	247	230
		120	X80	500	500	477	406	356	320
			X48	340	340	324	296	271	253
		130	X80	560	560	556	482	422	380
			X48	381	381	378	348	322	300
		140	X80	622	622	622	565	494	445
			X48	424	424	424	403	377	351
	150	X80	686	686	686	653	572	514	
		X48	467	467	467	459	431	406	
	160	X80	750	750	750	747	654	589	
		X48	511	511	511	511	488	464	
	170	X80	816	816	816	816	741	668	
		X48	555	555	555	555	547	521	
	180	X80	855	855	855	855	835	752	
		X48	600	600	600	600	600	580	
	200	X80	855	855	855	855	855	855	
		X48	694	694	694	694	694	694	
<u>Roof Wind Pressure Zone 2</u>	110	X80	637	637	637	585	512	461	
		X48	433	433	433	427	390	364	
	115	X80	678	678	678	642	562	507	
		X48	461	461	461	461	429	399	
	120	X80	720	720	720	704	616	554	
		X48	490	490	490	490	469	437	
	130	X80	805	805	805	805	727	655	
		X48	547	547	547	547	547	516	
	140	X80	855	855	855	855	848	764	
		X48	607	607	607	607	607	602	
	150	X80	855	855	855	855	855	855	
		X48	667	667	667	667	667	667	
	160	X80	855	855	855	855	855	855	
		X48	728	728	728	728	728	728	
	170	X80	921	921	921	855	855	855	
		X48	791	791	791	791	791	791	
	180	X80	945	945	945	855	855	855	
		X48	855	855	855	855	855	855	
	200	X80	945	945	945	945	855	855	
		X48	855	855	855	855	855	855	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure C		Table A1.23: Maximum Downforce (lb)				Panel Pitch: 7° to 15°			
		V _{ult} (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS >27° TO 45°	<u>Roof Wind Pressure Zone 1</u>	110	X80	316	415	533	643	734	816
			X48	214	282	363	469	560	643
		115	X80	328	425	541	643	734	816
			X48	223	289	369	469	560	643
		120	X80	339	434	549	643	734	816
			X48	231	296	373	469	560	643
		130	X80	363	456	568	643	734	816
			X48	247	310	386	465	560	643
		140	X80	389	478	569	657	734	816
			X48	264	325	400	468	560	643
	150	X80	386	469	572	684	734	816	
		X48	262	318	404	482	554	643	
	160	X80	443	504	601	712	747	816	
		X48	301	343	429	494	558	642	
	170	X80	473	520	634	715	774	816	
		X48	322	353	446	510	571	636	
	180	X80	503	535	672	696	803	834	
		X48	341	363	462	525	577	644	
	200	X80	565	570	705	620	712	815	
		X48	385	388	479	559	578	661	
<u>Roof Wind Pressure Zone 2</u>	110	X80	257	377	487	643	734	816	
		X48	175	257	360	469	560	643	
	115	X80	268	378	483	643	734	816	
		X48	181	258	367	462	560	643	
	120	X80	277	381	486	643	734	816	
		X48	188	259	366	448	560	643	
	130	X80	297	387	513	623	734	816	
		X48	202	263	365	455	553	643	
	140	X80	319	395	537	579	734	816	
		X48	217	269	365	462	526	643	
	150	X80	317	386	520	525	643	794	
		X48	215	262	354	446	501	619	
	160	X80	365	415	545	517	573	695	
		X48	249	282	371	458	487	591	
	170	X80	391	429	553	542	524	614	
		X48	265	291	376	461	490	568	
	180	X80	393	419	532	566	509	558	
		X48	282	300	381	462	510	558	
	200	X80	384	388	479	570	551	510	
		X48	318	321	397	472	548	509	

Note: Reaction loads shown are based on maximum allowable span lengths.

Exposure B		Table A1.24: Maximum Shear (lb)						Panel Pitch: 7° to 15°	
		V _{ult} (mph)	Rail Type	Roof Snow Load (psf)					
				0	10	20	30	40	50
ROOFS >27° TO 45°	<u>Roof Wind Pressure Zone 1</u>	110	X80	130	343	432	432	432	432
			X48	90	234	369	432	432	432
		115	X80	136	338	432	432	432	432
			X48	92	229	364	432	432	432
		120	X80	142	333	432	432	432	432
			X48	97	227	362	432	432	432
		130	X80	154	326	432	432	432	432
			X48	104	222	355	432	432	432
		140	X80	167	317	432	432	432	432
			X48	114	215	350	432	432	432
	150	X80	184	300	432	432	432	432	
		X48	125	206	347	432	432	432	
	160	X80	201	288	432	432	432	432	
		X48	137	196	336	432	432	432	
	170	X80	219	274	432	432	432	432	
		X48	149	187	329	432	432	432	
	180	X80	229	265	432	432	432	432	
		X48	161	180	321	432	432	432	
	200	X80	229	246	432	432	432	432	
		X48	186	186	298	423	432	432	
<u>Roof Wind Pressure Zone 2</u>	110	X80	171	307	432	432	432	432	
		X48	116	210	369	432	432	432	
	115	X80	182	298	432	432	432	432	
		X48	124	203	362	432	432	432	
	120	X80	193	289	432	432	432	432	
		X48	131	196	350	432	432	432	
	130	X80	216	274	432	432	432	432	
		X48	147	187	331	432	432	432	
	140	X80	229	260	432	432	432	432	
		X48	163	177	314	432	432	432	
	150	X80	229	248	432	432	432	432	
		X48	179	179	300	430	432	432	
	160	X80	229	236	421	432	432	432	
		X48	195	195	286	413	432	432	
	170	X80	229	229	404	432	432	432	
		X48	212	212	274	395	432	432	
	180	X80	229	229	359	432	432	432	
		X48	229	229	265	380	432	432	
	200	X80	229	229	289	416	432	432	
		X48	229	229	246	354	432	432	

Note: Reaction loads shown are based on maximum allowable span lengths.

Table A2.1: CrossRail Section Properties			
	X48	X80	(unit)
Cross Sectional Area (A)	0.7130	0.7770	(in ²)
Moments of Inertia:			
Principal (Ix)	0.2518	0.8000	(in ⁴)
Secondary (Iy)	0.2306	0.1970	(in ⁴)
Section Moduli:			
Principal (Sx)	0.2457	0.5290	(in ³)
Secondary (Sy)	0.2966	0.2514	(in ³)
Material:	AL EN AW 6063-T66 AL 6005A-T61 AL 6005-T5 AL 6061-T6		
Note:	Material selection is region dependent. Analysis based on worst-case.		

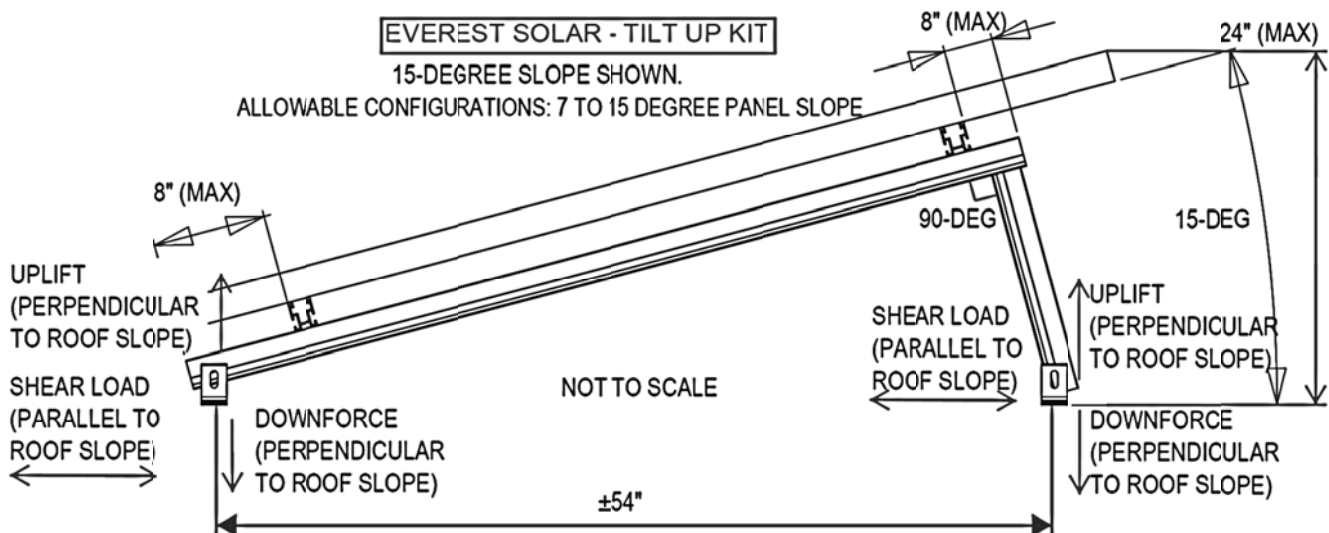


Figure A2.1: Tilt Up Kit Reference Geometry & Reaction Load Orientation