

CMA-CR

# FRAMING SYSTEMS

- F1 – Aluminum Horizontal Slider
- F2 – Thermally Broken Aluminum Fixed Window
- F3 – Thermally Improved Curtainwall
- F4 – Thermally Broken Curtainwall
- F5 – Fiberglass Casement Window
- F6 – Reinforced PVC Fixed Window
- F7 – PVC Fixed Window

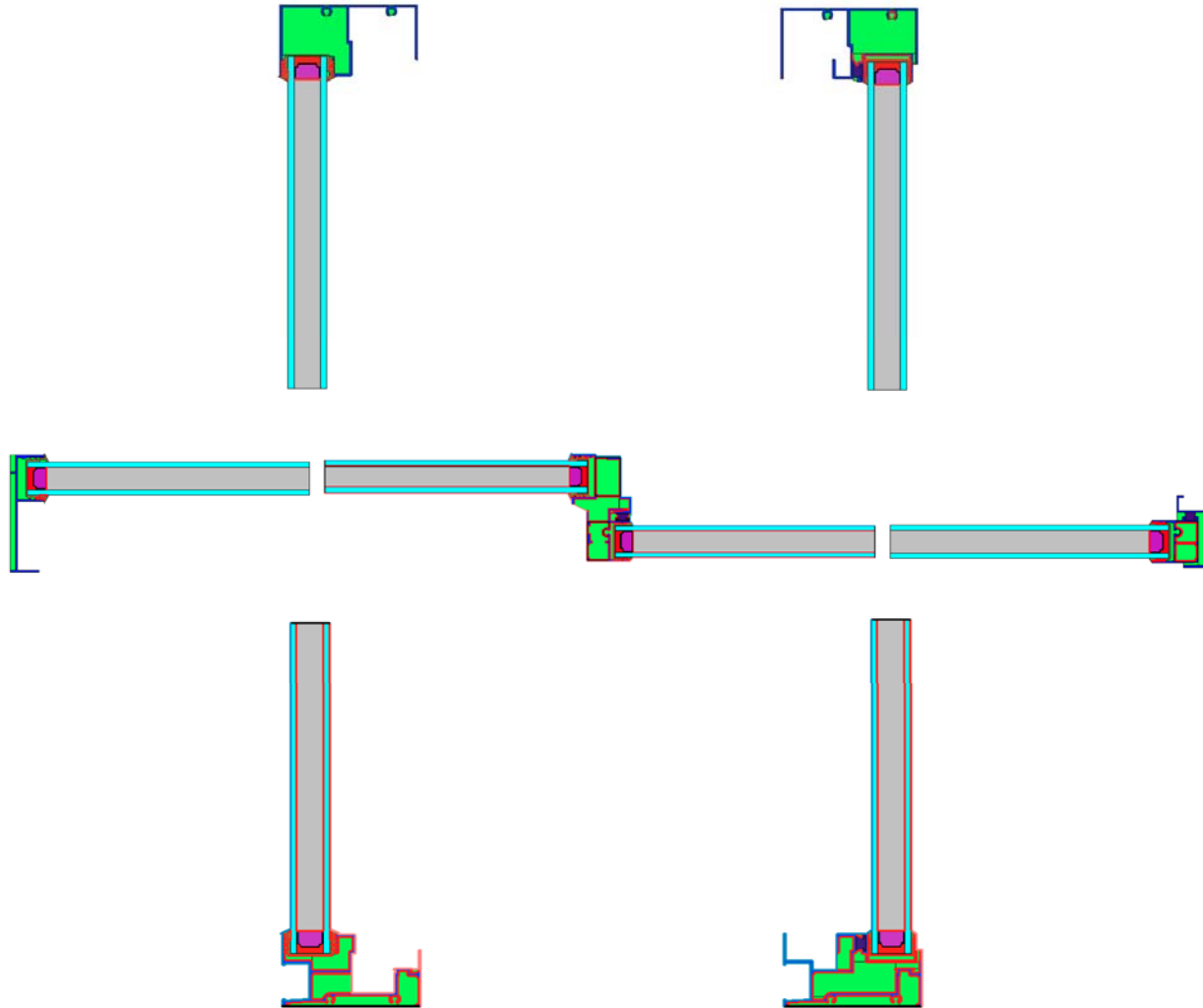
# GLAZING SYSTEMS

ID	Name	U factor		SHGC	VT
		W/m <sup>2</sup> ·K	Btu/hr·ft <sup>2</sup> ·F		
31	Double: Clear Air Clear	2.684	0.473	0.704	0.786
32	Double: Clear Argon Low-e (HC)	1.754	0.309	0.618	0.734
33	Double: Clear Argon Low-e (SC)	1.349	0.238	0.272	0.638
34	Double: Clear Krypton Low-e (SC)	1.247	0.220	0.270	0.638
35	Triple: Clear Argon Low-e (HC) Argon Low-e (HC)	1.126	0.198	0.224	0.490
36	Triple: Clear Krypton Low-e (SC) Krypton Low-e (SC)	0.708	0.125	0.221	0.490

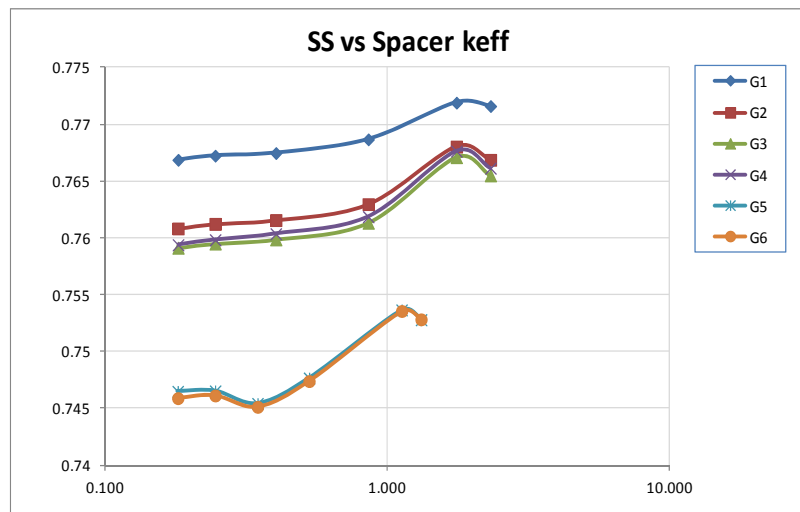
# SPACER SYSTEMS

- S1 – Standard Aluminum bar single seal
- S2 – Standard Steel bar dual seal
- S3 – Polymer with metal reinforcement
- S4 – U-shaped Stainless Steel Spacer
- S5 – Solid polymer bar
- S6 – Foam Spacer

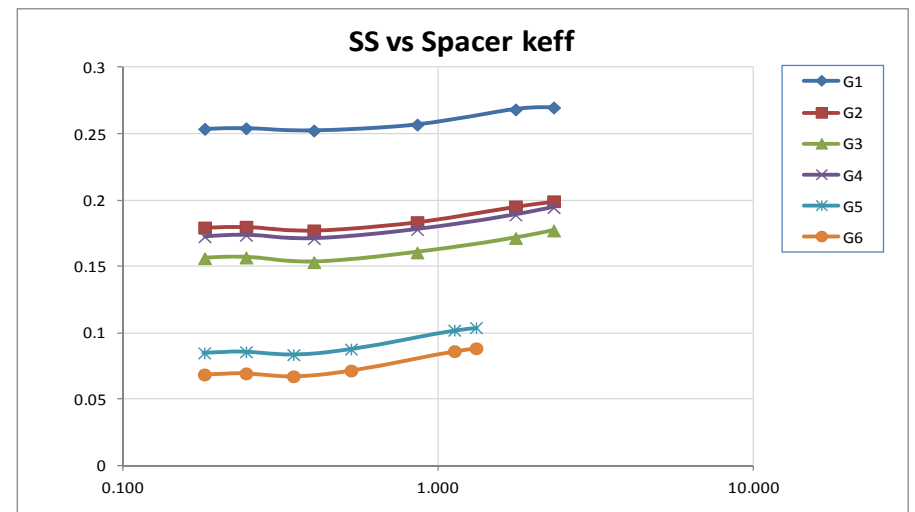
# FRAMING SYSTEM 1



## Frame



## Edge



Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	16	17	17	17	17	17
S2	16	17	17	17	17	17
S3	17	17	17	17	17	18
S4	17	17	17	17	17	18
S5	17	17	17	17	17	18
S6	17	17	17	17	17	18

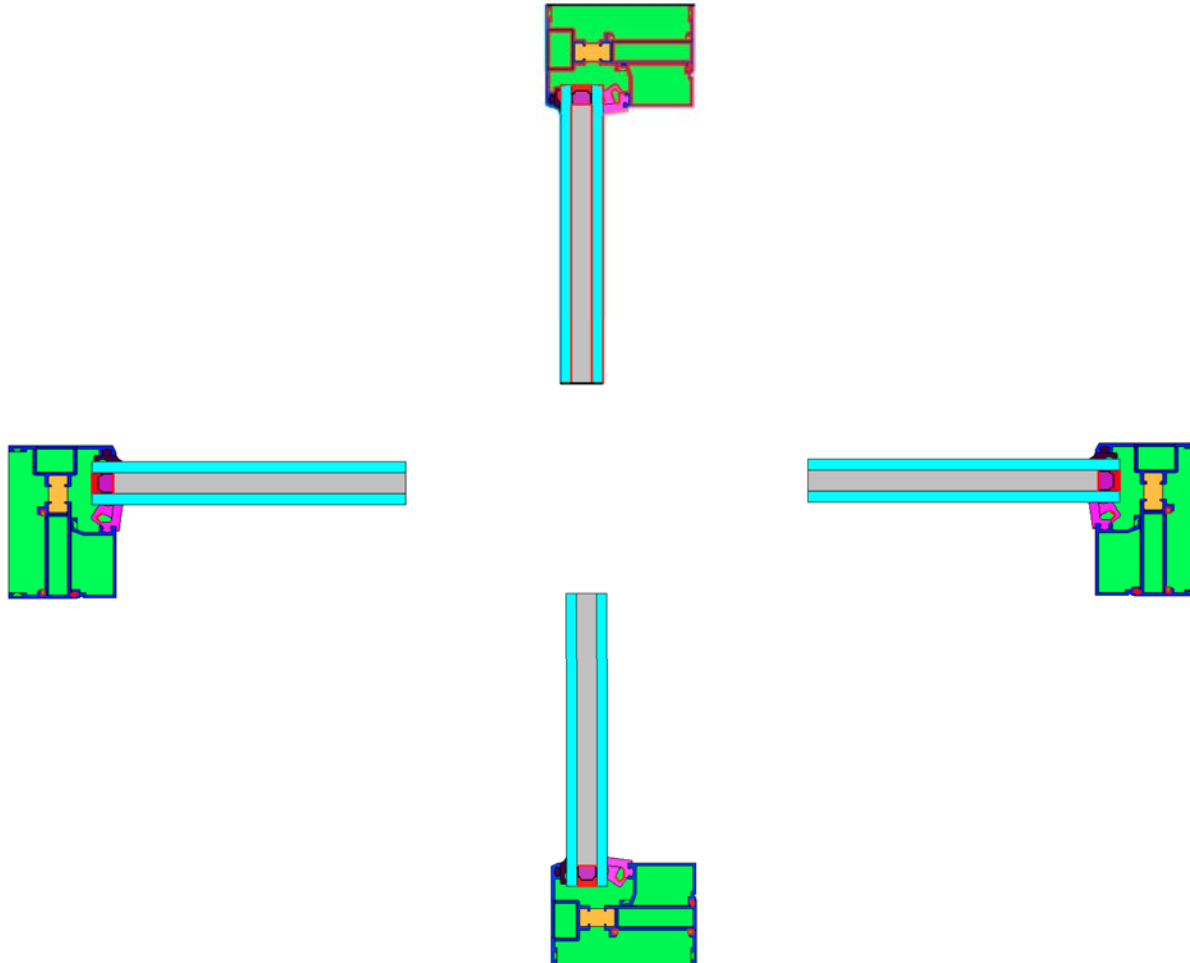
Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	16	17	17	17	17	17
S2	16	17	17	17	17	17
S3	16	17	17	17	17	17
S4	16	17	17	17	17	17
S5	17	17	17	17	17	17
S6	17	17	17	17	17	17

Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	0	0	0	0	0	0
S2	0	0	0	0	0	0
S3	-1	0	0	0	0	-1
S4	-1	0	0	0	0	-1
S5	0	0	0	0	0	-1
S6	0	0	0	0	0	-1

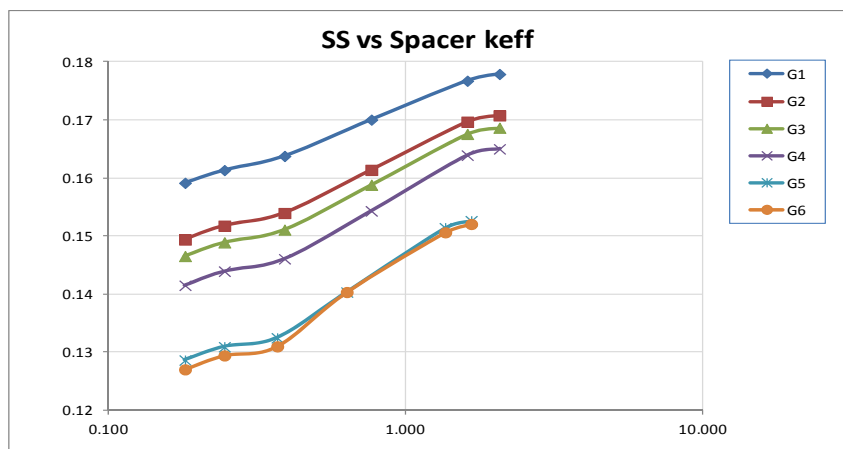
Abs. Diff.	Count
0	30
±1	6
±2	0
±3	0
±4	0
>	0

Worst diff	Absolute	%
Overall	-0.4958	-2.8
Positive	0.0749	0.4
Negative	-0.4958	-2.8
Average	-0.1608	
Std. Dev.	0.1382	

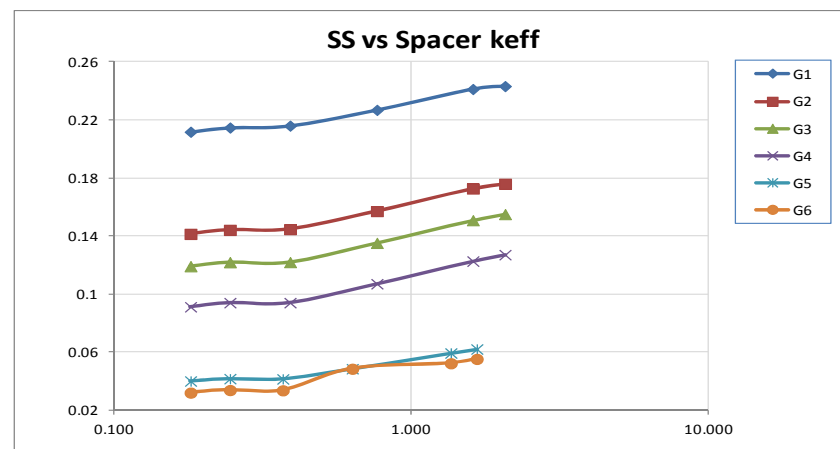
# FRAMING SYSTEM 2



## Frame



## Edge



Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	40	45	45	46	46	46
S2	40	45	45	46	46	47
S3	41	46	47	47	48	48
S4	42	47	48	48	49	49
S5	43	47	48	48	49	49
S6	43	48	48	48	49	50

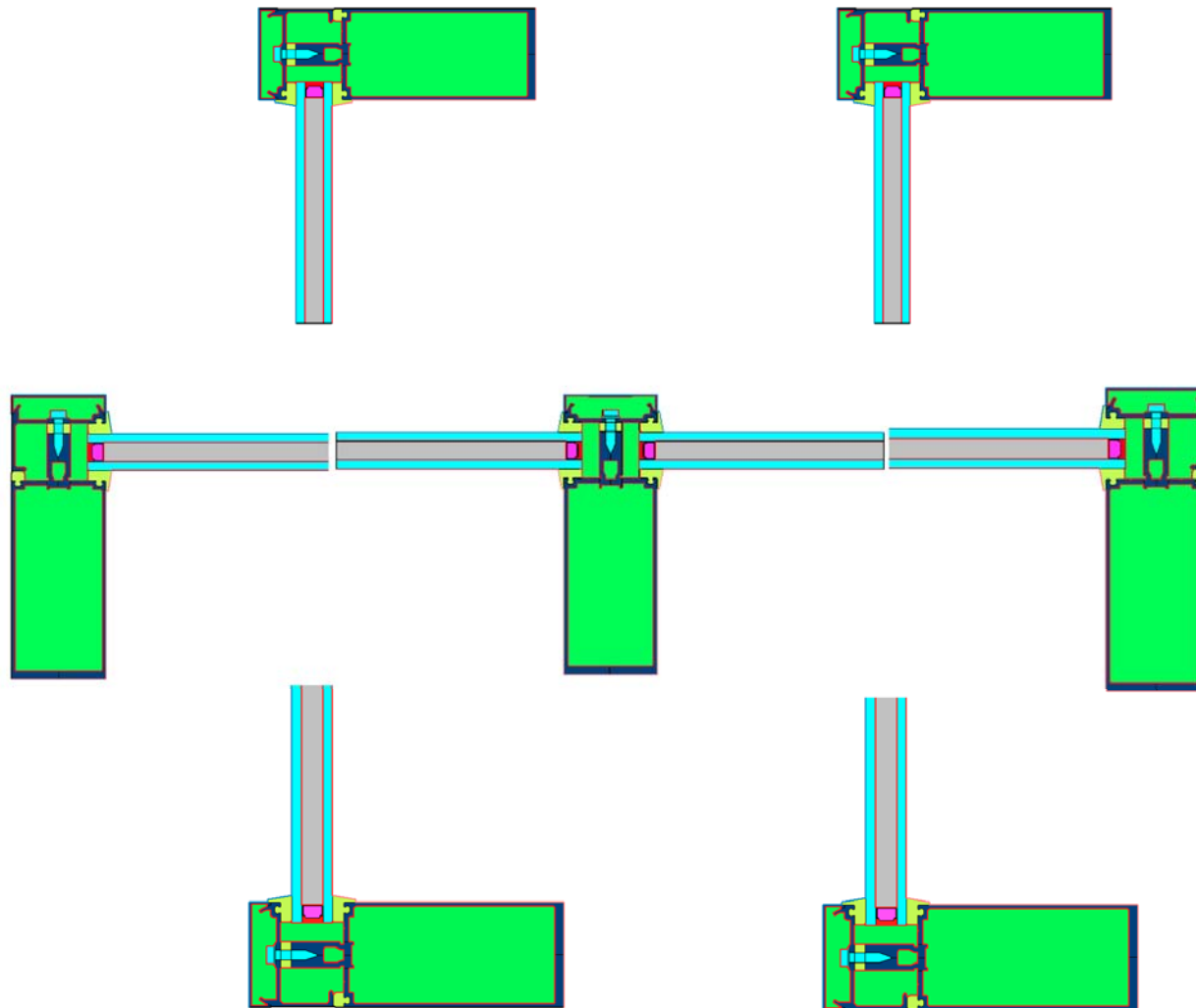
Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	40	46	46	46	47	47
S2	40	46	46	47	47	47
S3	41	47	47	47	48	48
S4	42	47	48	48	48	48
S5	42	48	48	49	49	49
S6	43	48	49	49	49	49

Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	0	1	1	0	1	1
S2	0	1	1	1	1	0
S3	0	1	0	0	0	0
S4	0	0	0	0	-1	-1
S5	-1	1	0	1	0	0
S6	0	0	1	1	0	-1

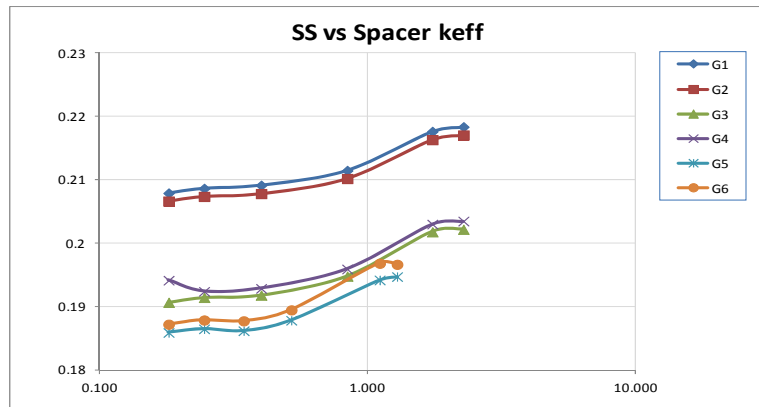
Abs. Diff.	Count
0	19
±1	17
±2	0
±3	0
±4	0
>	0

Worst diff	Absolute	%
Overall	1.0567	2.3
Positive	1.0567	2.3
Negative	-0.6613	-1.4
Average	0.3345	
Std. Dev.	0.4772	

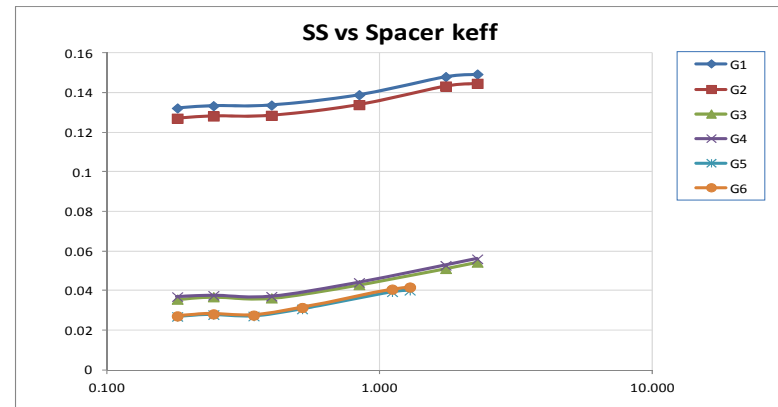
# FRAMING SYSTEM 3



## Frame



## Edge



Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	40	41	42	42	42	42
S2	41	42	42	42	42	42
S3	41	42	42	42	43	43
S4	41	42	43	43	43	43
S5	41	42	43	43	43	43
S6	41	42	43	43	43	43

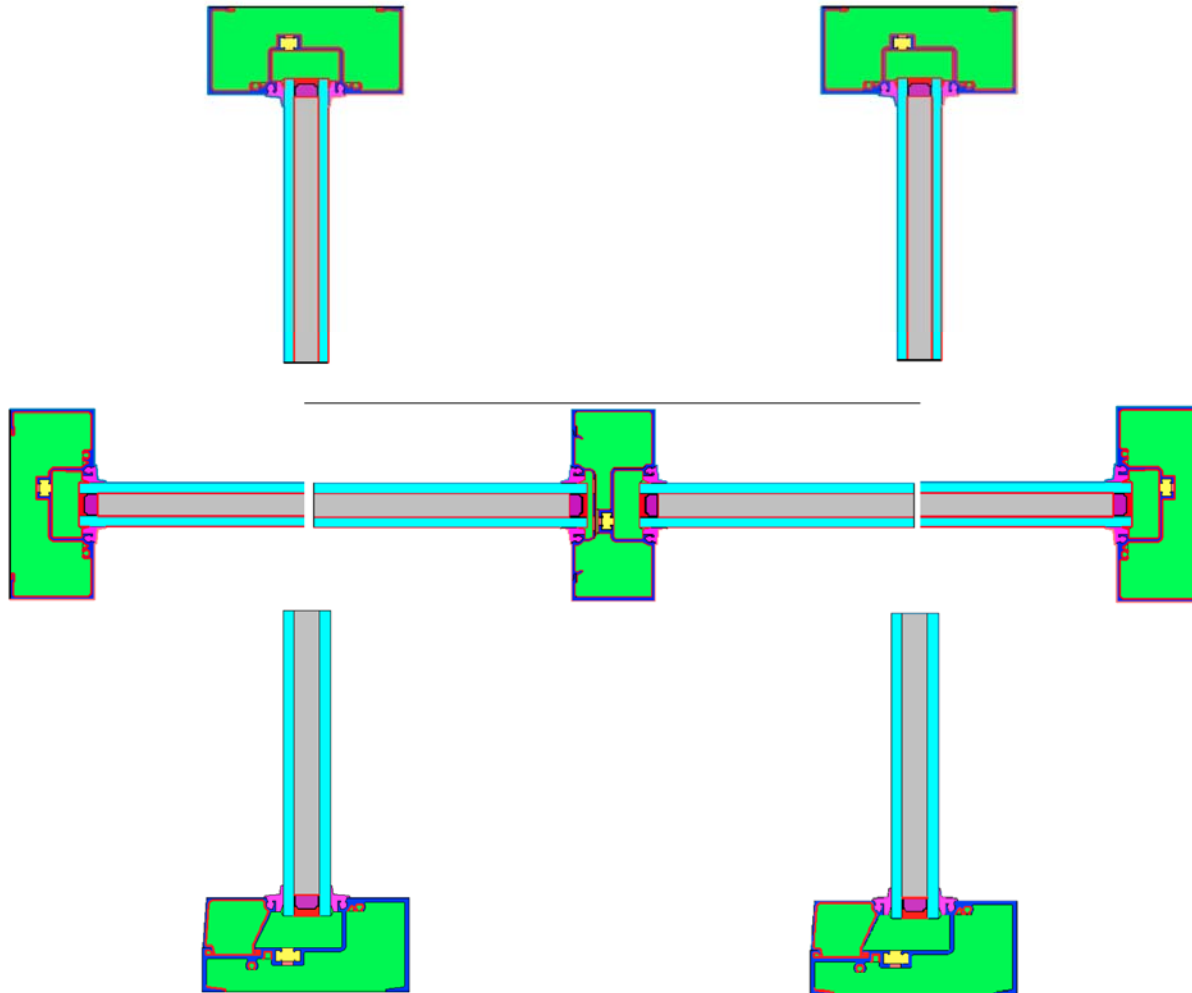
Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	39	41	42	42	42	42
S2	40	42	42	42	42	43
S3	41	42	42	42	43	43
S4	41	42	43	43	43	43
S5	41	42	43	43	43	43
S6	41	43	43	43	43	43

Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	-1	0	0	0	0	0
S2	-1	0	0	0	0	1
S3	0	0	0	0	0	0
S4	0	0	0	0	0	0
S5	0	0	0	0	0	0
S6	0	1	0	0	0	0

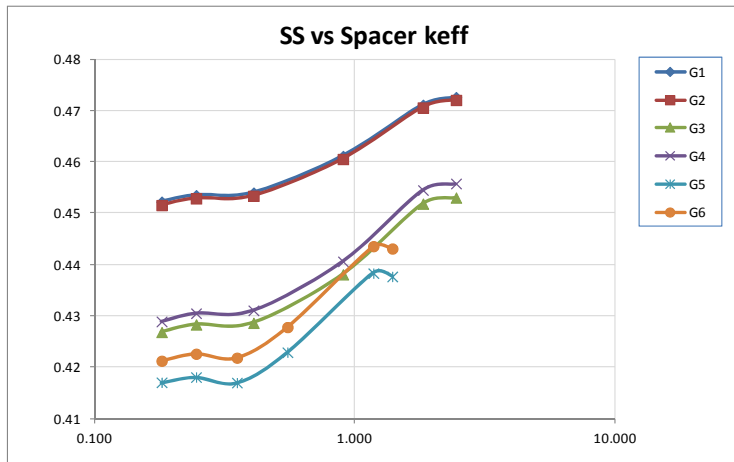
Abs. Diff.	Count
0	32
±1	4
±2	0
±3	0
±4	0
>	0

Worst diff	Absolute	%
Overall	-0.7301	-1.8
Positive	0.4411	1.1
Negative	-0.7301	-1.8
Average	-0.0958	
Std. Dev.	0.2756	

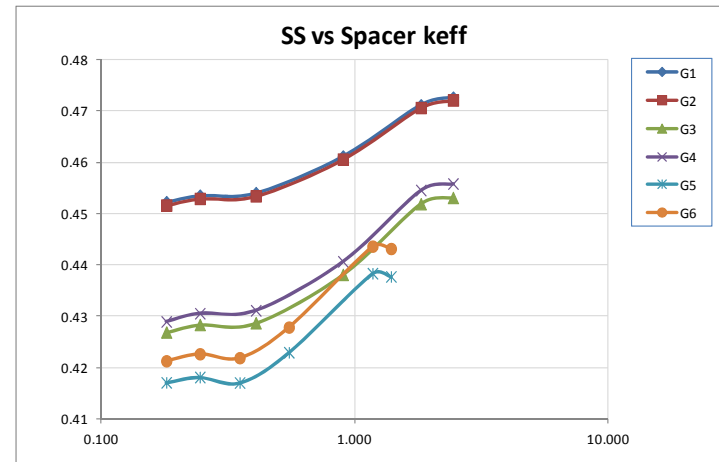
# FRAMING SYSTEM 4



## Frame



## Edge



Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	22	22	23	23	23	23
S2	22	22	23	23	23	23
S3	23	23	24	24	24	24
S4	23	23	24	24	25	25
S5	23	24	24	24	25	25
S6	23	24	24	24	25	25

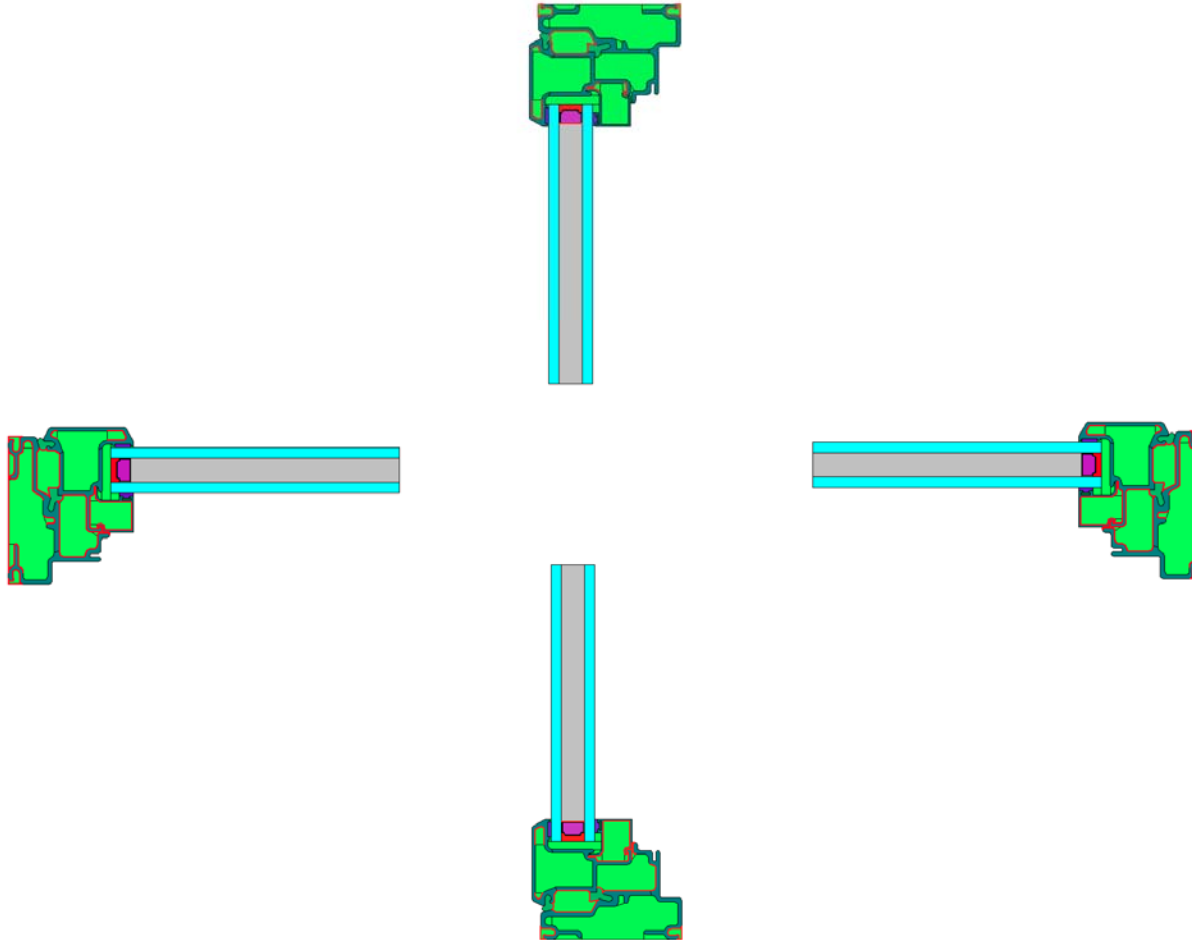
Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	22	23	23	23	23	23
S2	22	23	23	23	24	24
S3	22	23	24	24	24	24
S4	23	24	24	24	24	24
S5	23	24	24	24	24	24
S6	23	24	24	24	25	25

Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	0	1	0	0	0	0
S2	0	1	0	0	1	1
S3	-1	0	0	0	0	0
S4	0	1	0	0	-1	-1
S5	0	0	0	0	-1	-1
S6	0	0	0	0	0	0

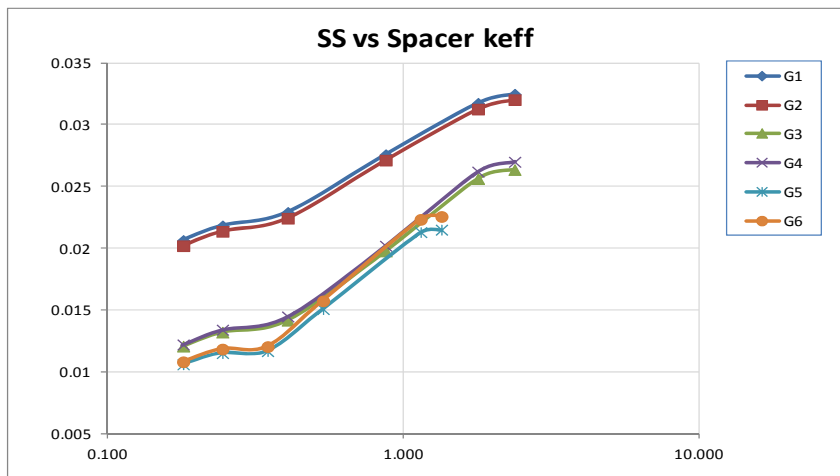
Abs. Diff.	Count
0	26
±1	10
±2	0
±3	0
±4	0
>	0

Worst diff	Absolute	%
Overall	0.6787	3.0
Positive	0.6787	3.0
Negative	-0.5906	-2.4
Average	-0.0287	
Std. Dev.	0.3164	

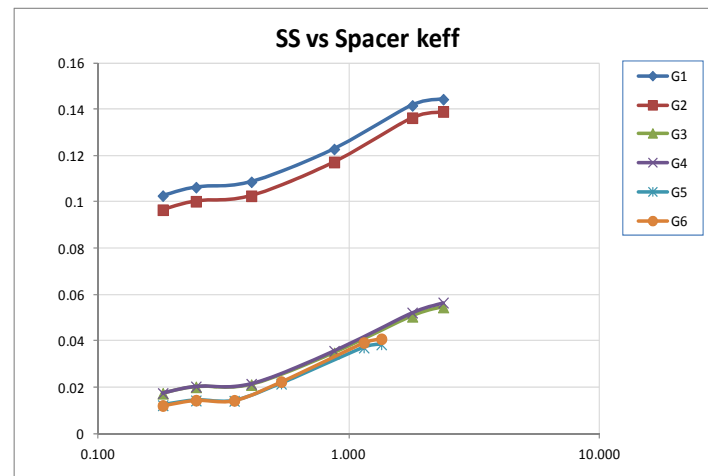
# FRAMING SYSTEM 5



## Frame



## Edge



Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	42	48	53	54	57	59
S2	42	48	54	54	57	59
S3	44	51	57	58	61	64
S4	46	54	61	61	64	68
S5	46	54	61	62	64	68
S6	47	55	62	63	65	69

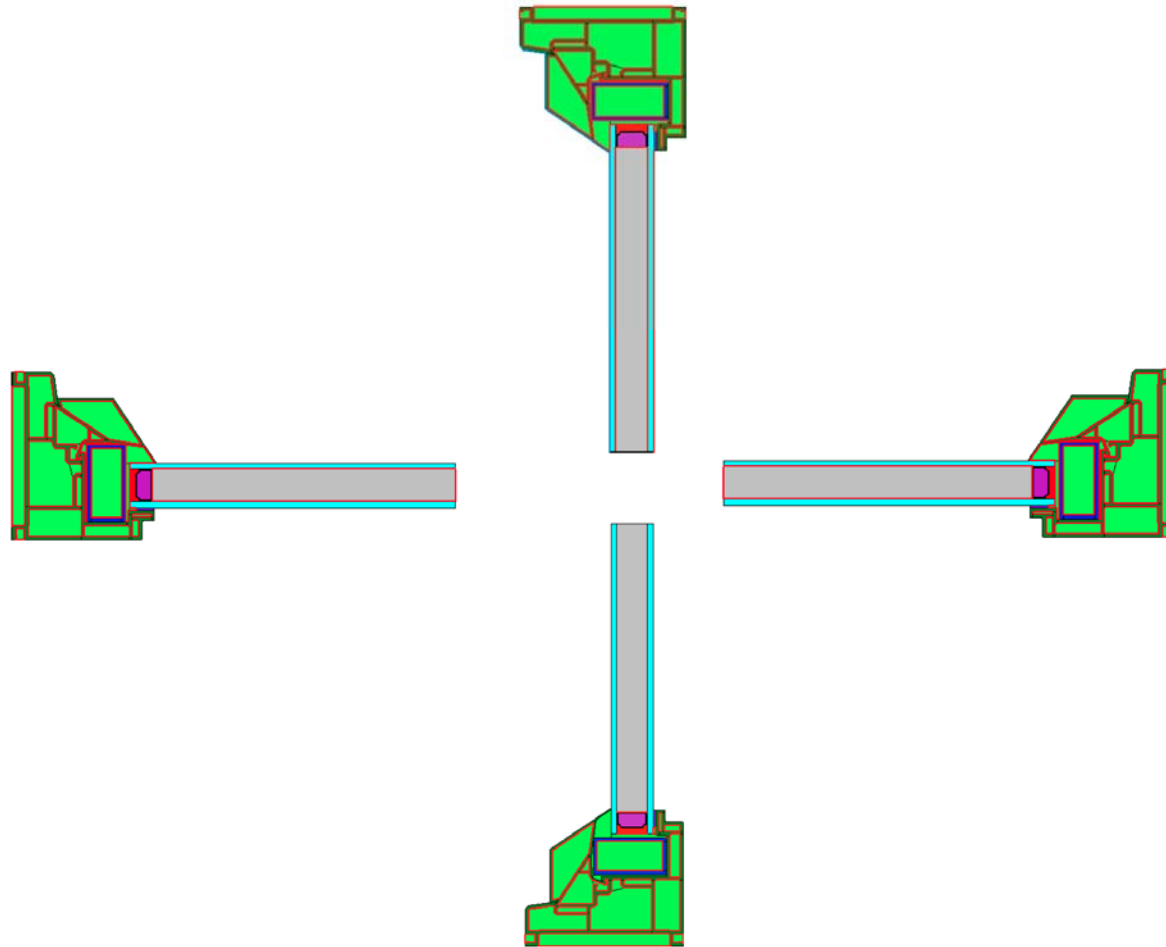
Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	40	51	54	54	58	59
S2	41	51	54	55	58	60
S3	42	53	56	57	61	63
S4	43	55	59	60	63	65
S5	44	56	61	62	64	66
S6	44	57	62	63	66	68

Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	-2	3	1	0	1	0
S2	-1	3	0	1	1	1
S3	-2	2	-1	-1	0	-1
S4	-3	1	-2	-1	-1	-3
S5	-2	2	0	0	0	-2
S6	-3	2	0	0	1	-1

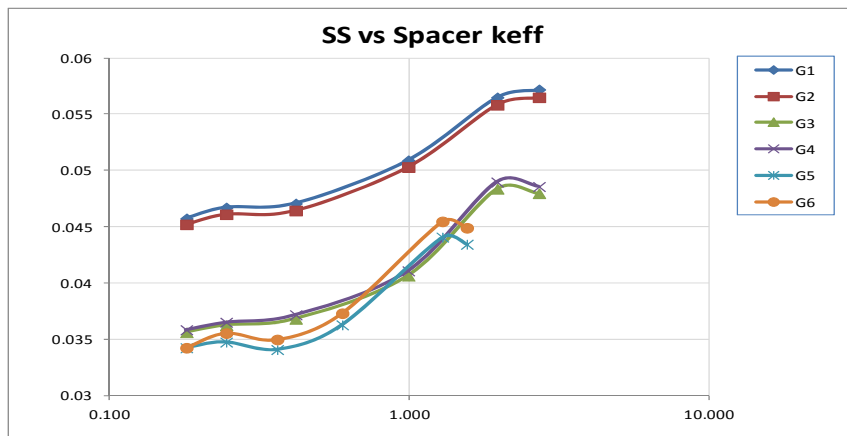
Abs. Diff.	Count
0	9
±1	14
±2	8
±3	5
±4	0
>	0

Worst diff	Absolute	%
Overall	-3.1617	6.1
Positive	2.9298	6.1
Negative	-3.1617	-6.0
Average	-0.1680	
Std. Dev.	1.5719	

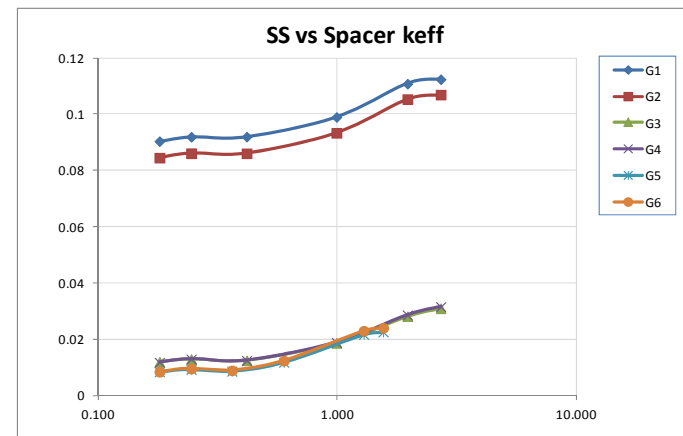
# FRAMING SYSTEM 6



## Frame



## Edge



Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	46	53	61	61	62	62
S2	47	53	61	61	62	62
S3	48	55	63	63	64	65
S4	48	56	64	64	65	65
S5	48	56	64	64	65	65
S6	48	57	65	65	65	65

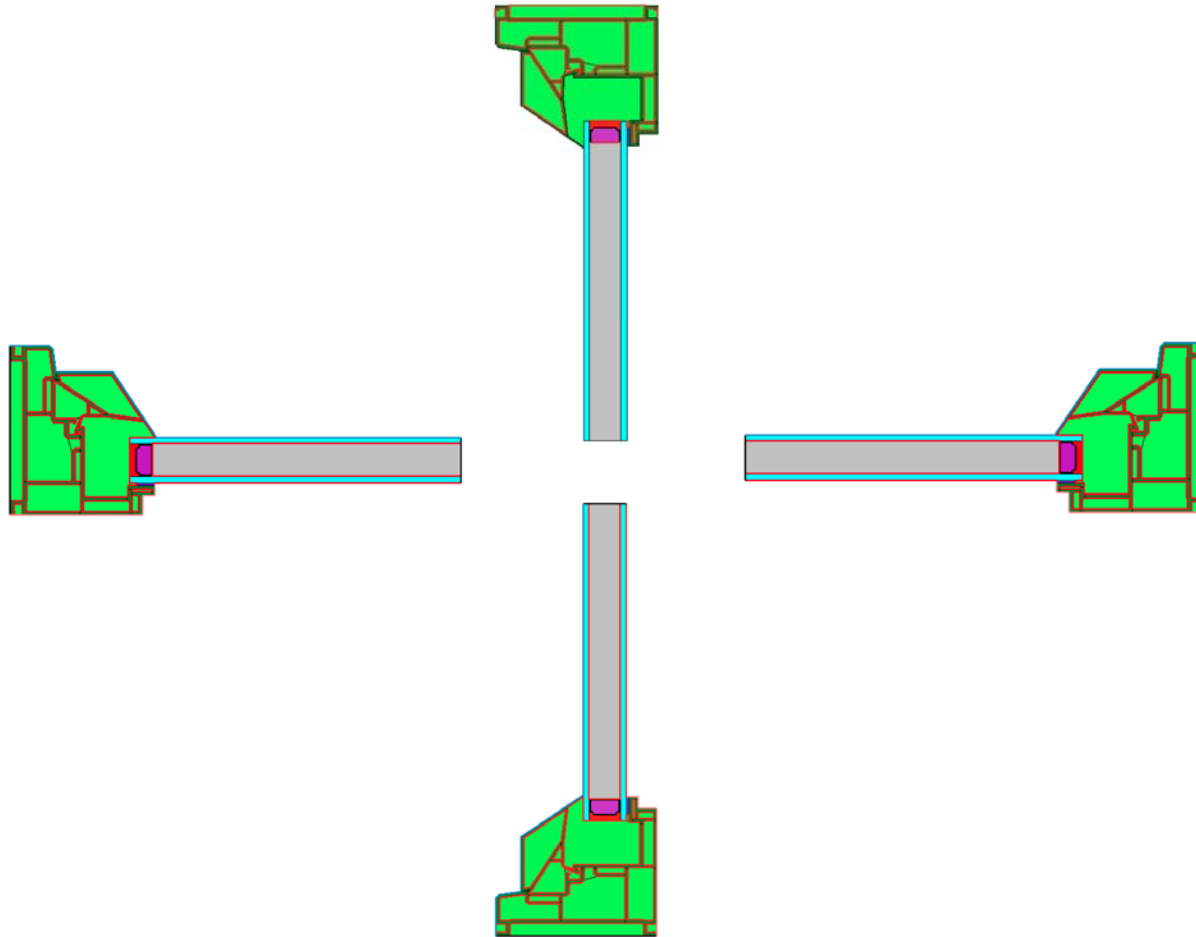
Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	43	55	58	59	62	62
S2	43	55	59	60	62	62
S3	44	56	60	61	63	63
S4	45	58	62	63	64	64
S5	45	59	63	64	64	64
S6	45	59	64	64	65	65

Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	-3	2	-3	-2	0	0
S2	-4	2	-2	-1	0	0
S3	-4	1	-3	-2	-1	-2
S4	-3	2	-2	-1	-1	-1
S5	-3	3	-1	0	-1	-1
S6	-3	2	-1	-1	0	0

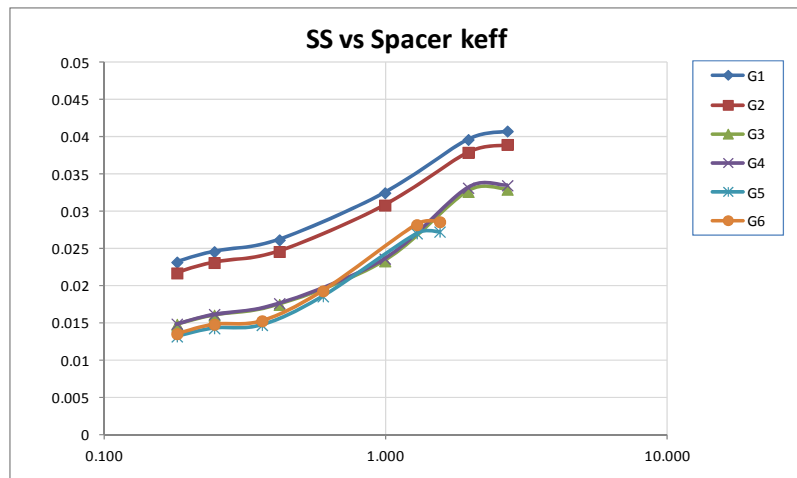
Abs. Diff.	Count
0	7
±1	11
±2	9
±3	7
±4	2
>	0

Worst diff	Absolute	%
Overall	-4.2828	-8.9
Positive	2.4585	4.3
Negative	-4.2828	-8.9
Average	-1.1054	
Std. Dev.	1.7305	

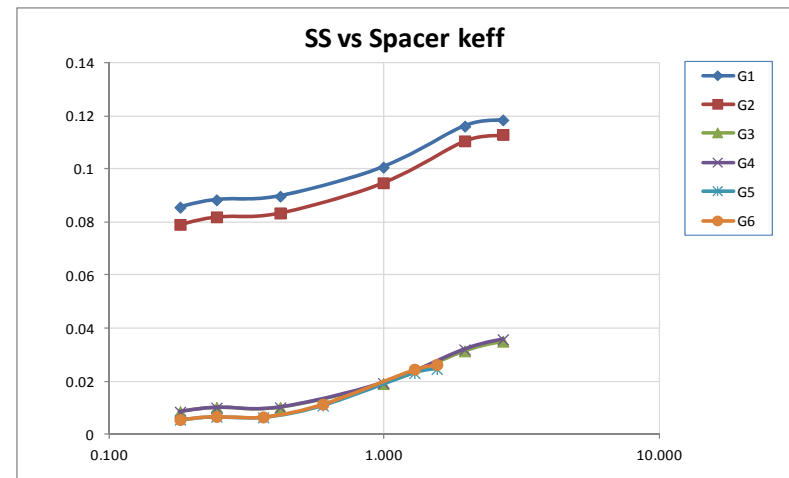
# FRAMING SYSTEM 7



## Frame



## Edge



Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	44	52	58	59	63	65
S2	45	52	59	60	63	66
S3	47	55	62	64	68	70
S4	48	57	66	67	71	72
S5	48	58	66	67	71	73
S6	48	58	67	68	72	73

Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	42	54	57	58	64	64
S2	43	55	58	59	64	65
S3	44	56	60	61	67	68
S4	45	58	62	64	69	70
S5	46	59	64	66	71	71
S6	46	60	65	67	72	72

Spac. ID\Glz. ID	G1	G2	G3	G4	G5	G6
S1	-2	2	-1	-1	1	-1
S2	-2	3	-1	-1	1	-1
S3	-3	1	-2	-3	-1	-2
S4	-3	1	-4	-3	-2	-2
S5	-2	1	-2	-1	0	-2
S6	-2	2	-2	-1	0	-1

Abs. Diff.	Count
0	2
±1	15
±2	13
±3	5
±4	1
>	0

Worst diff	Absolute	%
Overall	-3.3121	-6.7
Positive	2.4710	4.7
Negative	-3.3121	-6.7
Average	-1.0142	
Std. Dev.	1.6358	

# CORRELATIONS

$$SS = SS_b + \frac{(SS_w - SS_b) \cdot (SS_c - SS_{c,b})}{SS_{c,w} - SS_{c,b}}$$

$$SS_w = SS_{w1} + \frac{(SS_{w2} - SS_{w1}) \cdot [Ln(keff) - Ln(keff_1)]}{Ln(keff_2) - Ln(keff_1)}$$

$$SS_b = SS_{b1} + \frac{(SS_{b2} - SS_{b1}) \cdot [Ln(keff) - Ln(keff_1)]}{Ln(keff_2) - Ln(keff_1)}$$

$$CR = \left\{ 1 - \left\{ \frac{\sum_k SS_k * A_k}{\sum_k A_k} \right\}^{1/3} \right\} * 100$$