Hello Joe,

As a follow-up to last Tuesday's meeting with Anthony, Manny Hondroulis provided the following information regarding the performance of various 3M film products:

Everyone,

Please find below the analysis performed by 3M labs with respect to modeling Viracon VE1-2M glass with the requested 3M window films. Please note that the table below is a model and performance characteristics are not guaranteed.

UMB Goals → C A (B-) D C C A

Best choices

Glass	SHGC	VLT	Visible Reflection		U Value	UV Block	Glare Reduction	Heat Gain Reduction	Heat Loss Reduction	Light to Solar Gain	
			Exterior	Interior							
Base Glass - Viracon VE1-2M	0.38	71%	11%	11%	0.293	89.7%	N/A	N/A	N/A	1.9	
3M Thinsulate 40	0.31 1	29% X	10% 1	10% 3	0.231	99.9%	59% 2	17% 1	21% 1	0.9	
#1 → 3M Thinsulate 75	0.33 3	59% 1	16%	15%	0.231	99.9%	17%	13% 3	21% 1	1.8	1
3M Prestige 40	0.34 4	31%	10% 1	7% 1	0.289	99.9%	55% 3	10%	1%	0.9	
mockup 3M Prestige 50	0.35	40%	11% 2	8% 2	0.289	99.9%	44%	9%	1%	1.2	4
#3 → 3M Prestige 60	0.35	48% 3	11% 2	10% 3	0.289	99.9%	32%	7%	1%	1.4	3
#2 → 3M Prestige 70	0.36	55% 2	11% 2	11%	0.289	99.9%	22%	6%	1%	1.6	2
3M Ceramic 30	0.32 2	29% X	17%	16%	0.292	99.9%	60% 1	16% 2	0%	0.9	
3M Ceramic 40	0.33 3	35%	15%	13%	0.294	99.9%	50% 4	13% 3	0%	1.1	
#4 → 3M Ceramic 50	0.34 4	42% 4	13%	11%	0.294	99.9%	40%	10%	0%	1.2	4

all films equal

Prestige 50 has a good blend of the following performance characteristics:

"X" = blocks too much light

- Heat rejection during the summer
- No metals to interfere with digital signals
- Reducing glare while still allowing in a good amount of light (Note: glare reduction is a function of a film's darkness)
- Minimal change to building's appearance, inside and outside, day and night

If heat loss reduction during the winter is a requirement in order to minimize temperature imbalances year-round, the Thinsulate product would be the best fit due its U Value reduction. (Note: Thinsulate does contain metals.)

Regards,
Manny Hondroulis

SOL - Solar Film Ratings
10.9.18 A. Consoli

Ceramic Film Projects & Costs

9/15/2015

University	Building	Date	Installed Cost	SF Area	Cost/SF	Film Used	Installer	Notes
UMB	SSW	July '15	$6,979	373	$18.71	Ceramic 70	XLNT-Tint	Andre 9/15/15; includes some skylight areas
UMB	PLC	Apr '15	$4,967	375	$13.25	Ceramic 40	XLNT-Tint	Maria 9/15/15; SOP happy with results
JHU SPH	Wolfe St		$40,455					< 2 year pay back
JHU Homewd	Levering		$18,578					1.3 year payback
JHU Homewd	O'Connell		$14,445					1.3 year payback