



Calculation based on ISO 10077-2, EN 673, EN 410

Product name: Alpen Tyrol TR-9 PH+ Fixed		Center-of-glass properties						
ASHRAE/IECC /DOE North American Climate Zone	North, East, South- facing	West - facing						
		Alpen Balanced-9 PH+		No Grids				
Climate specific recommendations:		Whole-window installed U-value		Ucog-Value				
		W/m2K	BTU/hr.ft2.F	SHGC	W/m2K	BTU/hr.ft2.F		
8		0.67	0.12	0.333	0.417	0.074		
7	✓	0.66	0.12	0.333	0.397	0.070		
6	✓	0.64	0.11	0.333	0.376	0.066		
5	✓	0.64	0.11	0.333	0.373	0.066		
4	✓	0.64	0.11	0.333	0.376	0.066		
Marine North	✓	0.64	0.11	0.333	0.378	0.067		
Marine South	✓	0.65	0.11	0.333	0.381	0.067		
3	✓	0.64	0.11	0.333	0.379	0.067		
2 West		0.65	0.11	0.333	0.388	0.068		
2 East		0.65	0.11	0.333	0.388	0.068		
Alpen Tyrol TR-9 PH+ Fixed SS-D		FRAME			Psi-spacer		Psi-opaque	
		Frame height		U-frame		Ψ		
		mm	in	W/m2K	BTU/hr.ft2.F	W/mK		
Head		74	2.92	0.74	0.13	0.042	0.024	0.100
Sill		74	2.92	0.74	0.13	0.042	0.024	BTU/hr.ft.F
left jamb		74	2.92	0.74	0.13	0.042	0.024	0.058
right jamb		74	2.92	0.74	0.13	0.042	0.024	Grade A


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Product name: Alpen Tyrol TR-9 PH+ Fixed		Center-of-glass properties					
ASHRAE/IECC /DOE North American Climate Zone	North, East, South- facing West - facing			Alpen HighGain-9 PH+ No Grids			
Climate specific recommendations:		Whole-window installed U-value			Ucog-Value		
		W/m2K	BTU/hr.ft2.F	SHGC	W/m2K	BTU/hr.ft2.F	
8		0.72	0.13	0.453	0.470	0.083	
7	✓	0.70	0.12	0.453	0.451	0.079	
6	✓	0.69	0.12	0.453	0.434	0.077	
5	✓	0.69	0.12	0.453	0.432	0.076	
4		0.69	0.12	0.453	0.434	0.076	
Marine North		0.69	0.12	0.453	0.436	0.077	
Marine South	✓	0.69	0.12	0.453	0.440	0.077	
3	✓	0.69	0.12	0.453	0.438	0.077	
2 West		0.70	0.12	0.453	0.448	0.079	
2 East		0.70	0.12	0.453	0.448	0.079	
Alpen Tyrol TR-9 PH+ Fixed SS-D		FRAME			Psi-spacer		Psi-opaque
		Frame height		U-frame		Ψ	
mm	in	W/m2K	BTU/hr.ft2.F	W/mK	BTU/hr.ft.F	BTU/hr.ft.F	
Head	74	2.92	0.74	0.13	0.042	0.024	0.100
Sill	74	2.92	0.74	0.13	0.042	0.024	BTU/hr.ft.F
left jamb	74	2.92	0.74	0.13	0.042	0.024	0.058
right jamb	74	2.92	0.74	0.13	0.042	0.024	Grade A


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Product name: Alpen Tyrol TR-9 PH+ Tilt Turn				Center-of-glass properties				
ASHRAE/IECC /DOE North American Climate Zone		North, East, West - facing South-facing						
				Alpen Balanced-9 PH+ No Grids				
Climate specific recommendations:				Whole-window installed U-value		Ucog-Value		
				W/m2K	BTU/hr.ft2.F	SHGC	W/m2K	BTU/hr.ft2.F
8			0.75	0.13	0.333	0.417	0.074	
7			0.74	0.13	0.333	0.397	0.070	
6		✓	0.72	0.13	0.333	0.376	0.066	
5		✓	0.72	0.13	0.333	0.373	0.066	
4		✓	0.72	0.13	0.333	0.376	0.066	
Marine North		✓	0.72	0.13	0.333	0.378	0.067	
Marine South	✓		0.72	0.13	0.333	0.381	0.067	
3	✓		0.72	0.13	0.333	0.379	0.067	
2 West			0.73	0.13	0.333	0.388	0.068	
2 East			0.73	0.13	0.333	0.388	0.068	
Alpen Tyrol TR-9 PH+ Tilt Tur SS-D		FRAME				Psi-spacer		Psi-opaque
		Frame height		U-frame		Ψ		
		mm	in	W/m2K	BTU/hr.ft2.F	W/mK	BTU/hr.ft.F	
Head		117	4.61	0.86	0.15	0.047	0.027	0.157
Sill		117	4.61	0.86	0.15	0.047	0.027	0.157
left jamb		117	4.61	0.85	0.15	0.047	0.027	0.091
right jamb		117	4.61	0.85	0.15	0.047	0.027	Grade C

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Product name: Alpen Tyrol TR-9 PH+ Tilt Turn		Center-of-glass properties						
ASHRAE/IECC /DOE North American Climate Zone	North, East, South- facing West - facing			Alpen HighGain-9 PH+ No Grids				
Climate specific recommendations:		Whole-window installed U-value		Ucog-Value				
		W/m2K	BTU/hr.ft2.F	SHGC	W/m2K	BTU/hr.ft2.F		
8		0.79	0.14	0.453	0.470	0.083		
7		0.77	0.14	0.453	0.451	0.079		
6	✓	0.76	0.13	0.453	0.434	0.077		
5	✓	0.76	0.13	0.453	0.432	0.076		
4		0.76	0.13	0.453	0.434	0.076		
Marine North		0.76	0.13	0.453	0.436	0.077		
Marine South	✓	0.76	0.13	0.453	0.440	0.077		
3	✓	0.76	0.13	0.453	0.438	0.077		
2 West		0.77	0.14	0.453	0.448	0.079		
2 East		0.77	0.14	0.453	0.448	0.079		
Alpen Tyrol TR-9 PH+ Tilt Tur SS-D	FRAME				Psi-spacer		Psi-opaque	
	Frame height		U-frame		Ψ		W/mK	
	mm	in	W/m2K	BTU/hr.ft2.F	W/mK	BTU/hr.ft.F		
	Head	117	4.61	0.86	0.15	0.048	0.028	0.157
	Sill	117	4.61	0.86	0.15	0.047	0.027	BTU/hr.ft.F
left jamb	117	4.61	0.85	0.15	0.047	0.027	0.091	
right jamb	117	4.61	0.85	0.15	0.047	0.027	Grade C	

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