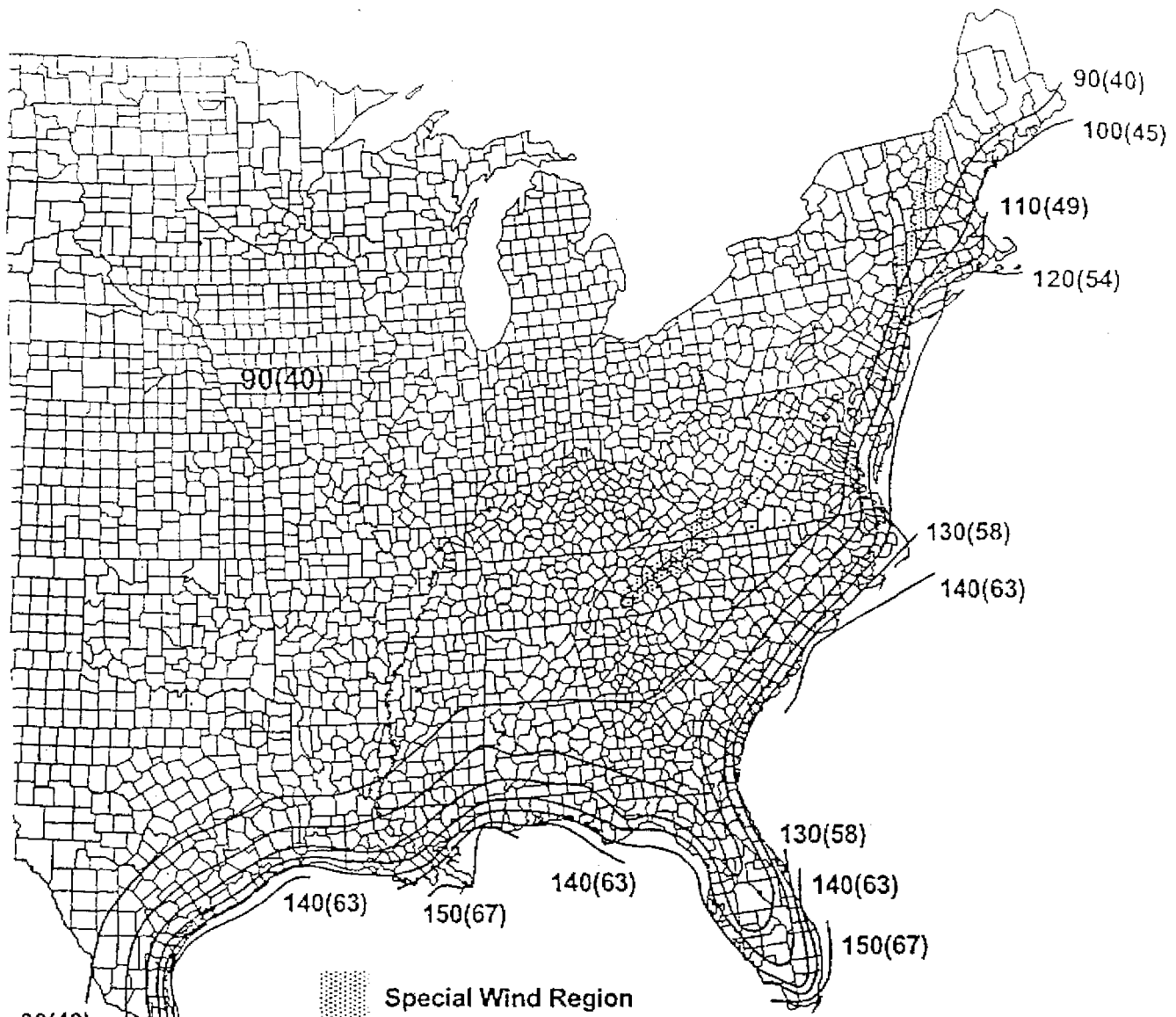


FIG. 6-1. Basic Wind Speed



90(40)
100(45) 130(58)
110(49) 120(54)

Special Wind Region

Location	V mph	(m/s)
Hawaii	105	(47)
Puerto Rico	145	(65)
Guam	170	(76)
Virgin Islands	145	(65)
American Samoa	125	(56)

Notes:

1. Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10 m) above ground for Exposure C category.
2. Linear interpolation between wind contours is permitted.
3. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.
4. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

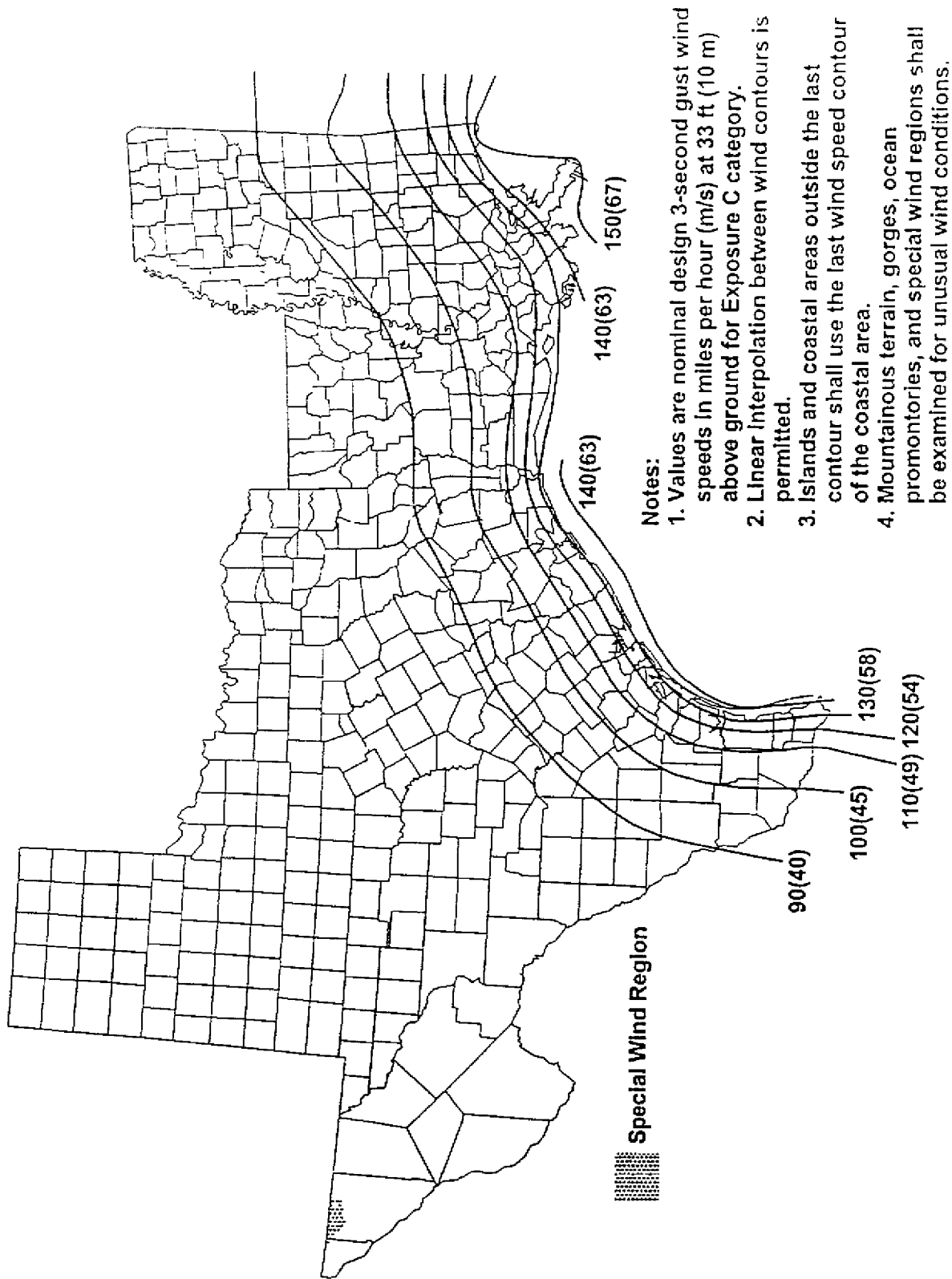


FIG. 6-1a. Basic Wind Speed - Western Gulf of Mexico Hurricane Coastline

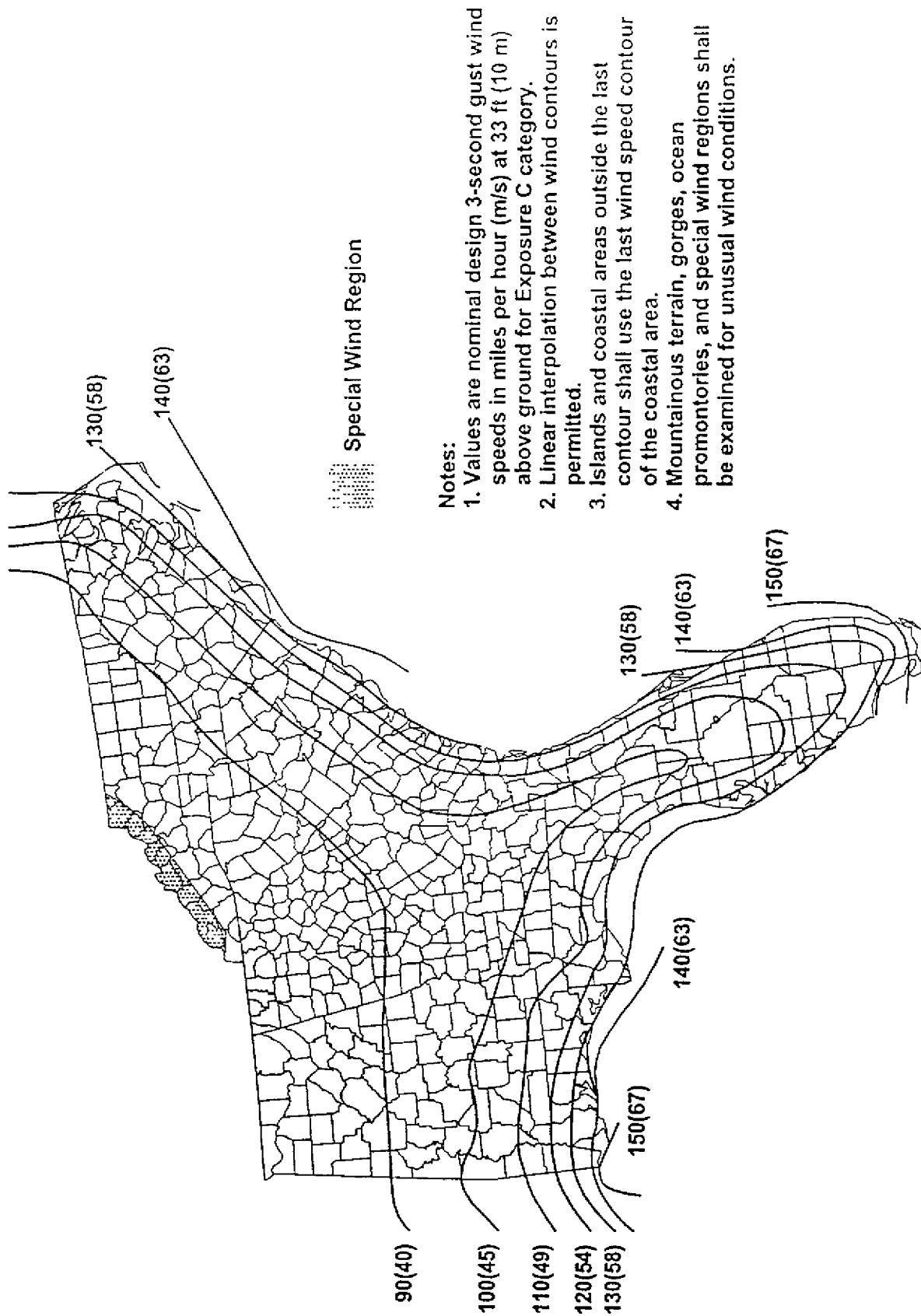
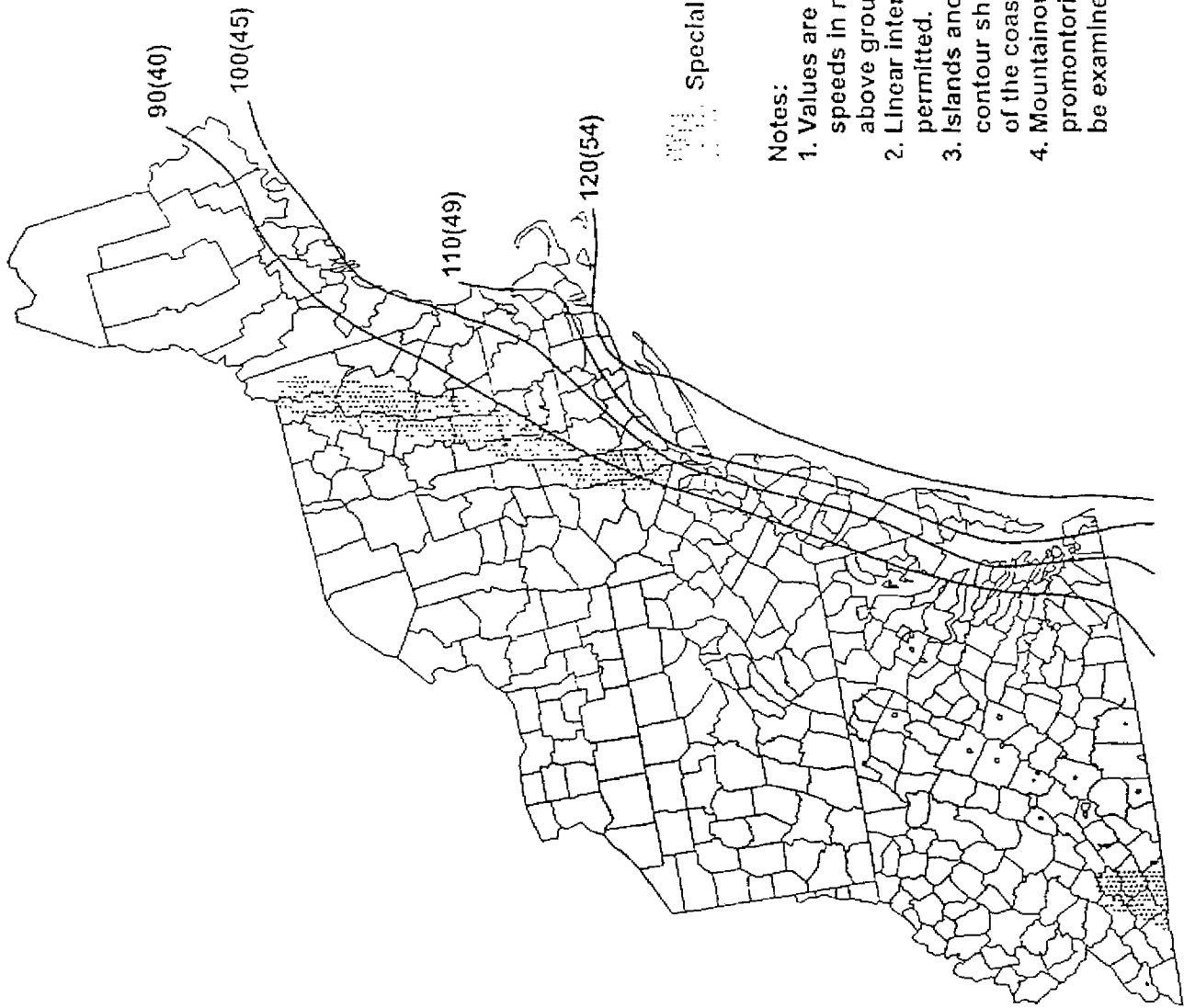


FIG. 6-1b. Basic Wind Speed - Eastern Gulf of Mexico and Southeastern US Hurricane Coastline



Notes:

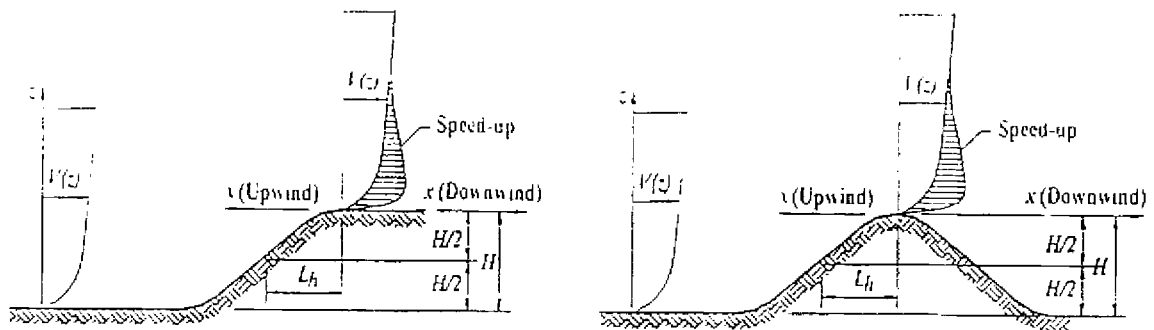
1. Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10 m) above ground for Exposure C category.
2. Linear interpolation between wind contours is permitted.
3. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.
4. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

FIG. 6-1c. Basic Wind Speed - Mid and Northern Atlantic Hurricane Coastline

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Topographic Factor, K_{z1}

Figure 6-2



ESCARPMENT

2-D RIDGE OR 3-D AXISYMMETRICAL HILL

Topographic Multipliers for Exposure C

H/L_h	K_1 Multiplier			x/L_h	K_2 Multiplier		z/L_h	K_3 Multiplier		
	2-D Ridge	2-D Escarp.	3-D Axisym. Hill		2-D Escarp.	All Other Cases		2-D Ridge	2-D Escarp.	3-D Axisym. Hill
0.20	0.29	0.17	0.21	0.00	1.00	1.00	0.00	1.00	1.00	1.00
0.25	0.36	0.21	0.26	0.50	0.88	0.67	0.10	0.74	0.78	0.67
0.30	0.43	0.26	0.32	1.00	0.75	0.33	0.20	0.55	0.61	0.45
0.35	0.51	0.30	0.37	1.50	0.63	0.00	0.30	0.41	0.47	0.30
0.40	0.58	0.34	0.42	2.00	0.50	0.00	0.40	0.30	0.37	0.20
0.45	0.65	0.38	0.47	2.50	0.38	0.00	0.50	0.22	0.29	0.14
0.50	0.72	0.43	0.53	3.00	0.25	0.00	0.60	0.17	0.22	0.09
				3.50	0.13	0.00	0.70	0.12	0.17	0.06
				4.00	0.00	0.00	0.80	0.09	0.14	0.04
							0.90	0.07	0.11	0.03
							1.00	0.05	0.08	0.02
							1.50	0.01	0.02	0.00
							2.00	0.00	0.00	0.00

Notes:

1. For values of H/L_h , x/L_h and z/L_h other than those shown, linear interpolation is permitted.
2. For $H/L_h > 0.5$, assume $H/L_h = 0.5$ for evaluating K_1 and substitute $2H$ for L_h for evaluating K_2 and K_3 .
3. Multipliers are based on the assumption that wind approaches the hill or escarpment along the direction of maximum slope.
4. Notation:

- H: Height of hill or escarpment relative to the upwind terrain, in feet (meters).
- L_h : Distance upwind of crest to where the difference in ground elevation is half the height of hill or escarpment, in feet (meters).
- K_1 : Factor to account for shape of topographic feature and maximum speed-up effect.
- K_2 : Factor to account for reduction in speed-up with distance upwind or downwind of crest.
- K_3 : Factor to account for reduction in speed-up with height above local terrain.
- x: Distance (upwind or downwind) from the crest to the building site, in feet (meters).
- z: Height above local ground level, in feet (meters).
- μ : Horizontal attenuation factor.
- γ : Height attenuation factor.

Equations:

$$K_{zt} = (1 + K_1 K_2 K_3)^2$$

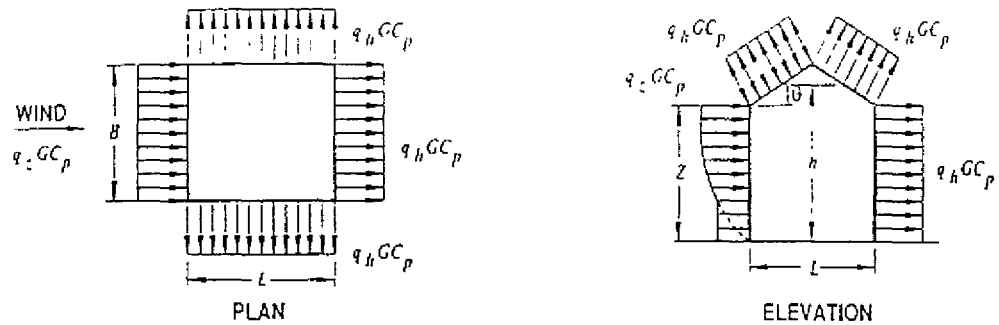
K_1 determined from table below

$$K_2 = \left(1 - \frac{|\lambda|}{\mu L_h}\right)$$

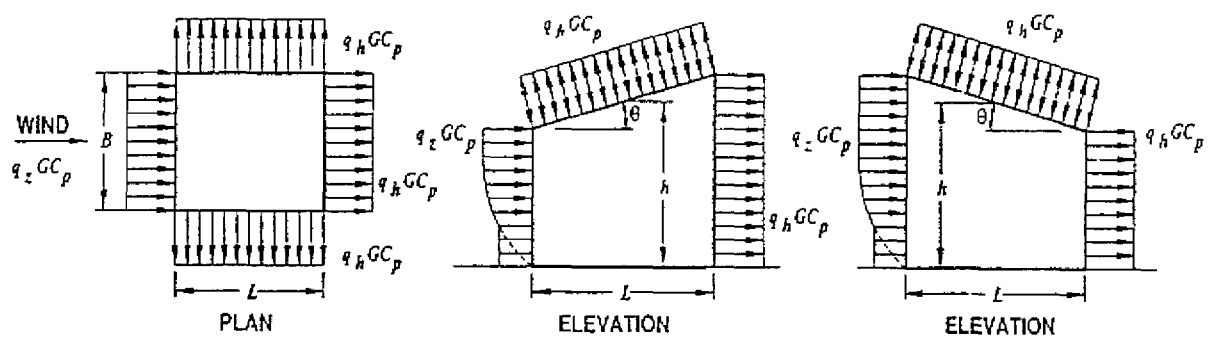
$$K_3 = e^{-\gamma z/L_h}$$

Parameters for Speed-Up Over Hills and Escarpments						
Hill Shape	$K_1/(H/L_h)$			γ	μ	
	Exposure				Upwind of Crest	Downwind of Crest
	B	C	D			
2-dimensional ridges (or valleys with negative H in $K_1/(H/L_h)$)	1.30	1.45	1.55	3	1.5	1.5
2-dimensional escarpments	0.75	0.85	0.95	2.5	1.5	4
3-dimensional axisym. hill	0.95	1.05	1.15	4	1.5	1.5

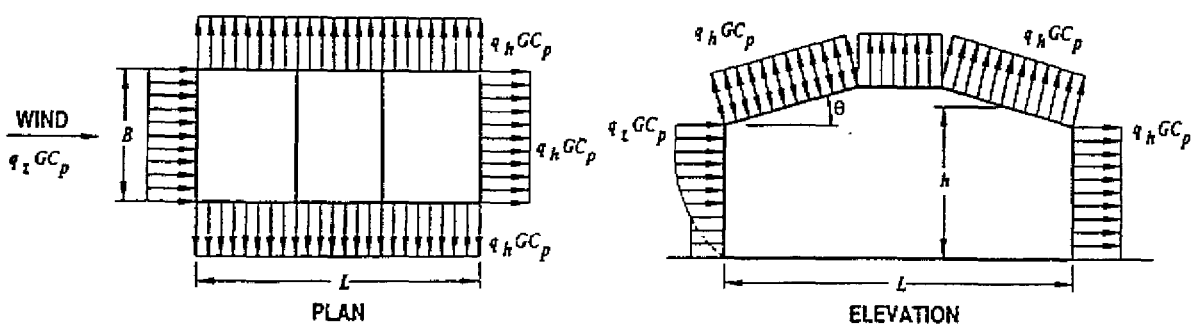
Main Wind Force Resisting System		All h
Figure 6-3	External Pressure Coefficients, C_p	Walls & Roofs
Enclosed, Partially Enclosed Buildings		



GABLE, HIP ROOF



MONOSLOPE ROOF (NOTE 4)



MANSARD ROOF (NOTE 8)

Main Wind Force Resisting System		All h
Figure 6-3 (con't)	External Pressure Coefficients, C_p	
Enclosed, Partially Enclosed Buildings		

Walls & Roofs

Wall Pressure Coefficients, C_p			
Surface	L/B	C_p	Use With
Windward Wall	All values	0.8	q_z
Leeward Wall	0-1	-0.5	q_w
	2	-0.3	
	≥ 4	-0.2	
Side Wall	All values	-0.7	q_w

Roof Pressure Coefficients, C_p , for use with q_h

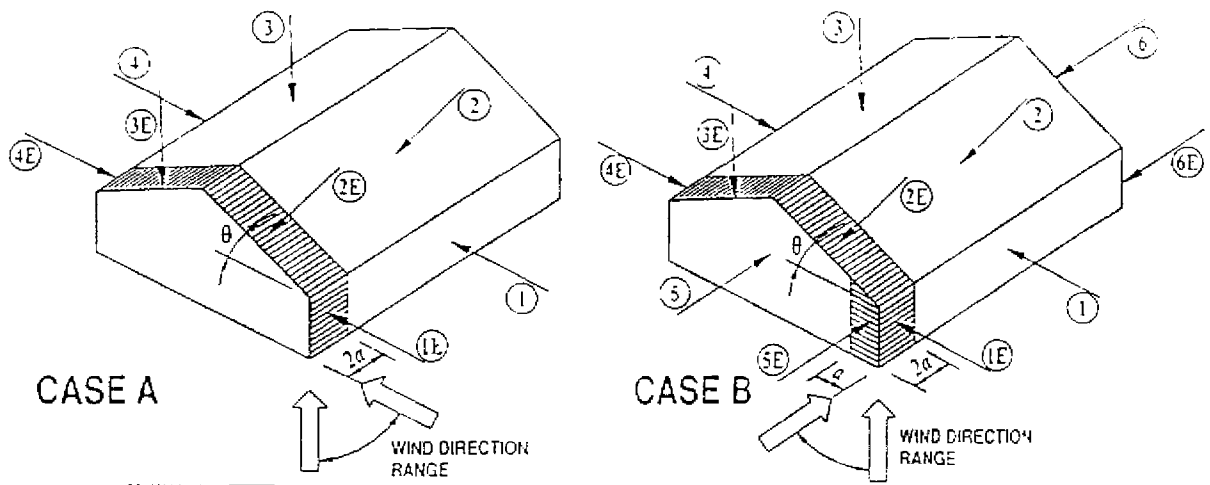
Wind Direction	Windward									Leeward			
	Angle, θ (degrees)												
	h/L	10	15	20	25	30	35	45	$\geq 60^\#$	10	15	≥ 20	
Normal to ridge for $\theta \geq 10^\circ$	≤ 0.25	-0.7	-0.5	-0.3	-0.2	-0.2	0.0*	0.4	0.4	0.01 θ	-0.3	-0.5	-0.6
	0.5	-0.9	-0.7	-0.4	-0.3	-0.2	-0.2	0.0*	0.4	0.01 θ	-0.5	0.5	-0.6
	≤ 1.0	-1.3**	-1.0	-0.7	-0.5	-0.3	-0.2	0.0*	0.3	0.01 θ	0.7	-0.6	-0.6
Normal to ridge for $\theta < 10^\circ$ and Parallel to ridge for all θ	≤ 0.5	Horiz distance from windward edge		C_p		*Value is provided for interpolation purposes **Value can be reduced linearly with area over which it is applicable as follows							
		0 to h/2		-0.9									
		h/2 to h		-0.9									
		h to 2h		-0.5									
≥ 1.0	0 to h/2	C_p	-1.3**	Area (sq ft)		Reduction Factor							
				≤ 100 (9.29 sq m)		1.0							
				200 (23.23 sq m)		0.9							
≥ 1.0	$> h/2$	C_p	-0.7	≥ 1000 (92.9 sq m)		0.8							

Notes:

- Plus and minus signs signify pressures acting toward and away from the surfaces, respectively
- Linear interpolation is permitted for values of L/B, h/L and θ other than shown. Interpolation shall only be carried out between values of the same sign. Where no value of the same sign is given, assume 0.0 for interpolation purposes.
- Where two values of C_p are listed, this indicates that the windward roof slope is subjected to either positive or negative pressures and the roof structure shall be designed for both conditions. Interpolation for intermediate ratios of h/L in this case shall only be carried out between C_p values of like sign.
- For monoslope roofs, entire roof surface is either a windward or leeward surface.
- For flexible buildings use appropriate G_f as determined by rational analysis.
- Refer to Table 6-8 for arched roofs.
- Notation:
 B: Horizontal dimension of building, in feet (meter), measured normal to wind direction.
 L: Horizontal dimension of building, in feet (meter), measured parallel to wind direction.
 h: Mean roof height in feet (meters), except that eave height shall be used for $\theta \leq 10$ degrees.
 z: Height above ground, in feet (meters).
 G: Gust effect factor.
 q_z, q_h : Velocity pressure, in pounds per square foot (N/m^2), evaluated at respective height
 θ : Angle of plane of roof from horizontal, in degrees.
- For mansard roofs, the top horizontal surface and leeward inclined surface shall be treated as leeward surfaces from the table.

#For roof slopes greater than 80° , use $C_p = 0.8$

Main Wind Force Resisting System		$h \leq 60$ ft
Figure 6-4	External Pressure Coefficients, GC_{pf}	Walls & Gable Roof
Enclosed, Partially Enclosed Buildings		

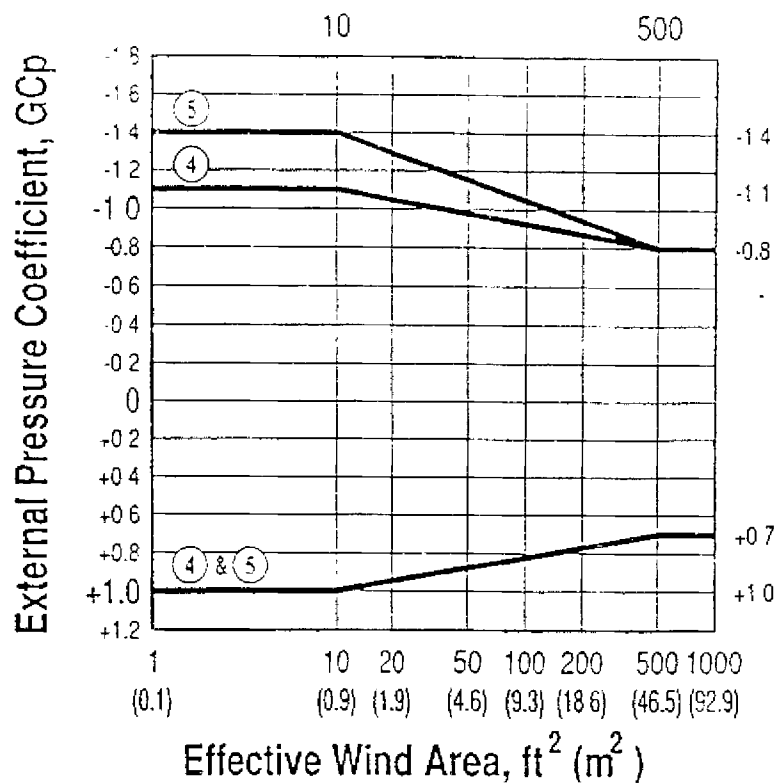
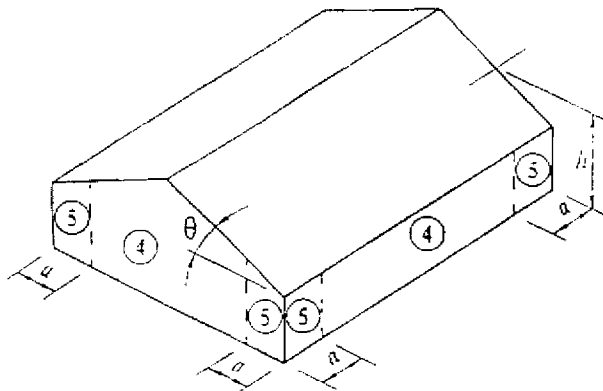


Roof Angle θ (degrees)	CASE A							
	Building Surface							
	1	2	3	4	1E	2E	3E	4E
0-5	0.40	-0.69	-0.37	-0.29	0.61	-1.07	-0.53	-0.43
20	0.53	-0.69	-0.48	-0.43	0.80	-1.07	-0.69	-0.64
30-45	0.56	0.21	-0.43	-0.37	0.69	0.27	-0.53	-0.48
90	0.56	0.56	-0.37	-0.37	0.69	0.69	-0.48	-0.48

Roof Angle θ (degrees)	CASE B											
	Building Surface											
	1	2	3	4	5	6	1E	2E	3E	4E	5E	6E
0-90	-0.45	-0.69	-0.37	-0.45	0.40	-0.29	-0.48	-1.07	-0.53	-0.48	0.61	-0.43

Notes:

1. Case A and Case B are required as two separate loading conditions to generate the wind actions, including torsion, to be resisted by the main wind-force resisting system.
2. To obtain the critical wind actions, the building shall be rotated in 90° degree increments so that each corner in turn becomes the windward corner while the loading patterns in the sketches remain fixed. For the design of structural systems providing lateral resistance in the direction parallel to the ridge line, Case A shall be based on $\theta = 0^\circ$.
3. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
4. For Case A loading the following restrictions apply:
 - a. The roof pressure coefficient GC_{pf} , when negative in Zone 2, shall be applied in Zone 2 for a distance from the edge of roof equal to 0.5 times the horizontal dimensions of the building measured perpendicular to the eave line or $2.5h$, whichever is less; the remainder of Zone 2 extending to the ridge line shall use the pressure coefficient GC_{pf} for Zone 3.
 - b. Except for moment-resisting frames, the total horizontal shear shall not be less than that determined by neglecting wind forces on roof surfaces.
5. Combinations of external and internal pressures (see Table 6-7) shall be evaluated as required to obtain the most severe loadings.
6. For values of θ other than those shown, linear interpolation is permitted.
7. Notation:
 - a: 10 percent of least horizontal dimension or $0.4h$, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (1 m)
 - h: Mean roof height, in feet (meters), except that eave height shall be used for $\theta \leq 10^\circ$.
 - θ : Angle of plane of roof from horizontal, in degrees.



Notes:

1. Vertical scale denotes GC_p to be used with q_s .
2. Horizontal scale denotes effective wind area, in square feet (square meters).
3. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively
4. Each component shall be designed for maximum positive and negative pressures.
5. Values of GC_p for walls shall be reduced by 10% when $\theta \leq 10^\circ$.
6. Notation:
 - a. 10 percent of least horizontal dimension or $0.4h$, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (1 m).
 - h: Mean roof height, in feet (meters), except that eave height shall be used for $\theta \leq 10^\circ$.
 - θ : Angle of plane of roof from horizontal, in degrees.

Components and Cladding

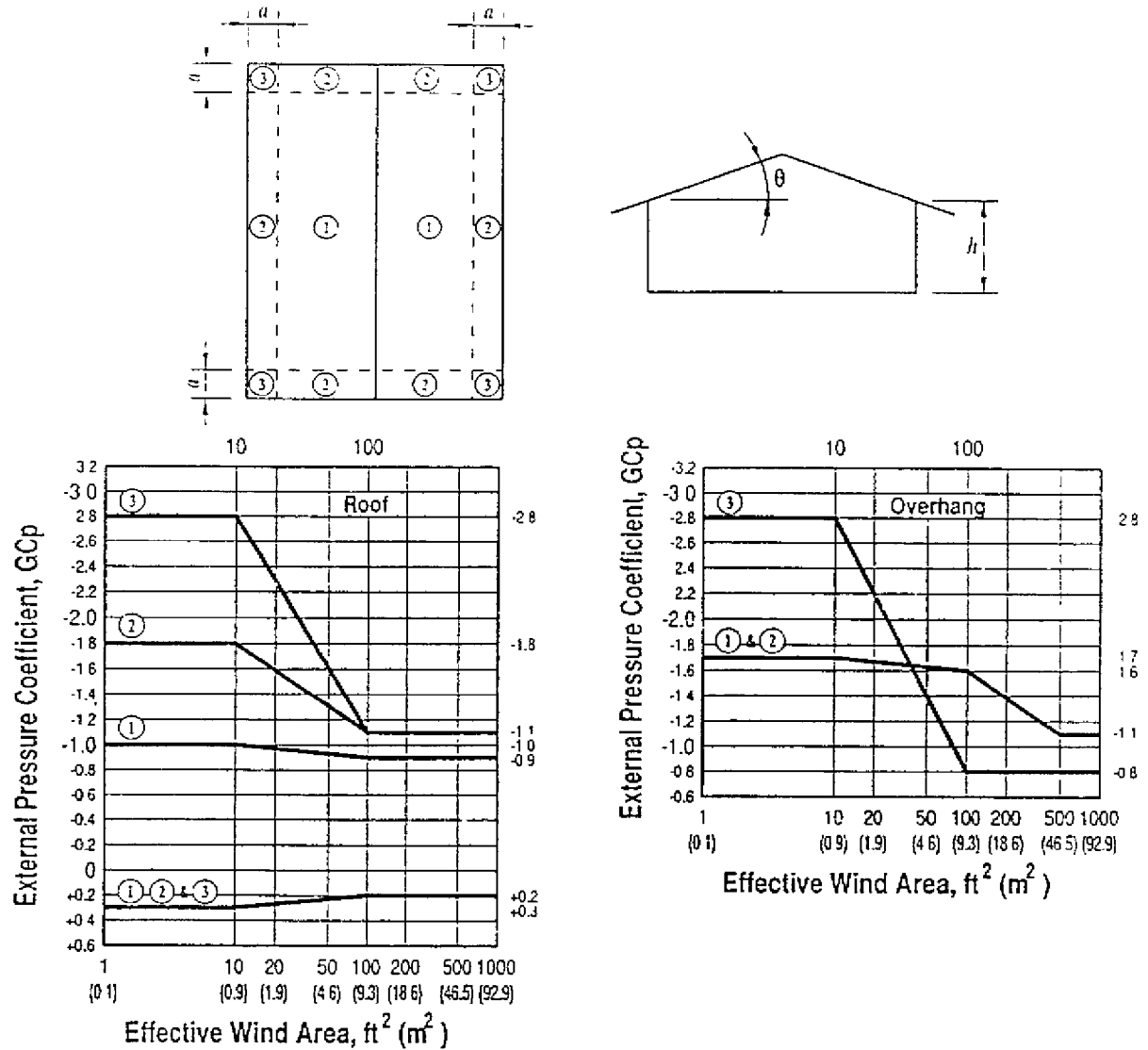
$h \leq 60$ ft.

Figure 6-5B

External Pressure Coefficients, GC_p

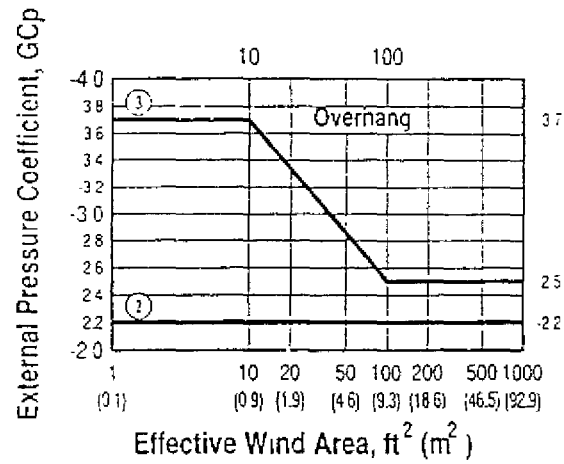
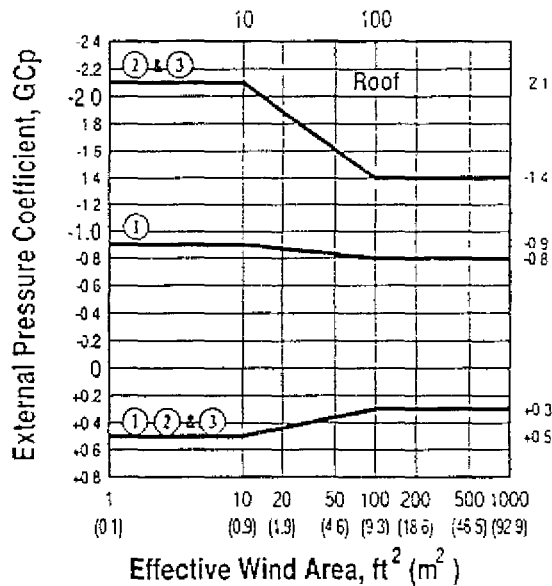
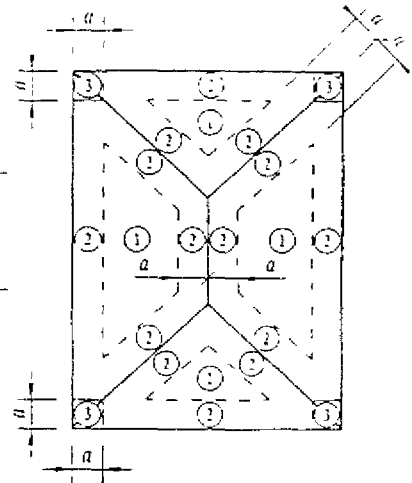
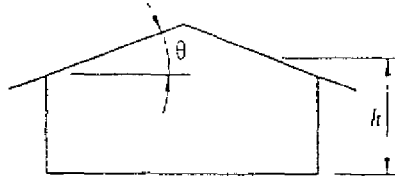
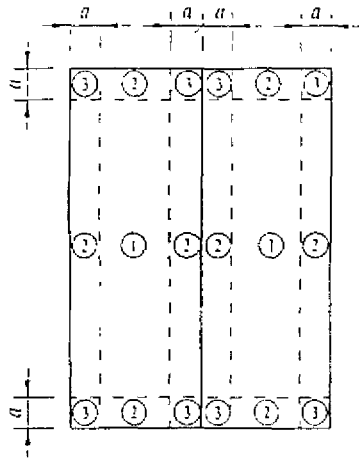
Enclosed, Partially Enclosed Buildings

Gable Roofs $\theta \leq 10^\circ$



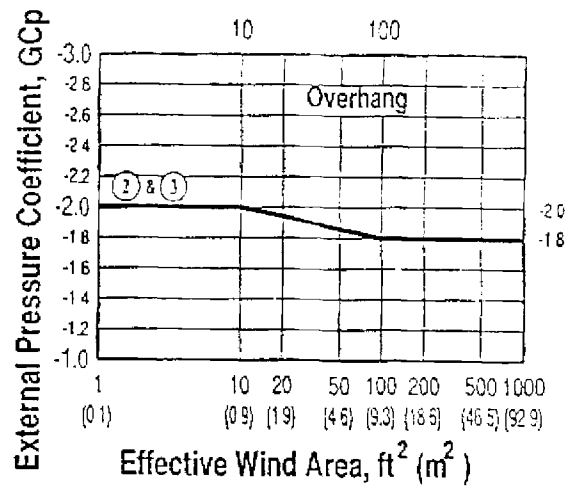
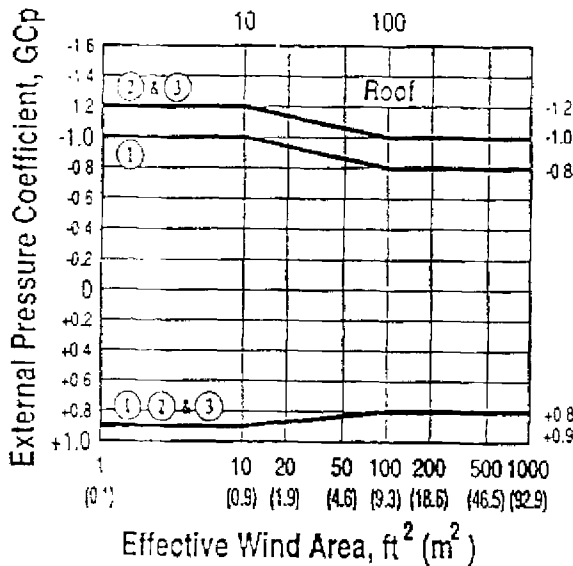
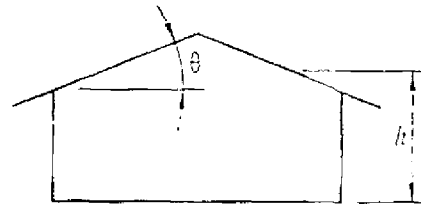
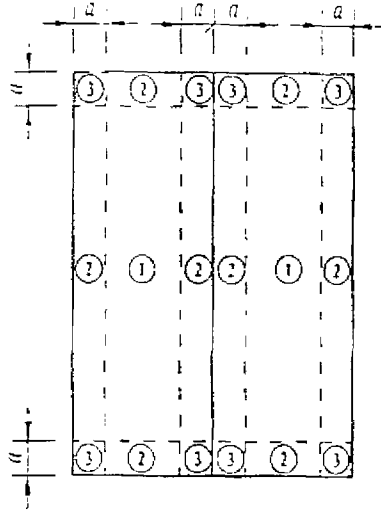
Notes:

1. Vertical scale denotes GC_p to be used with q_h .
2. Horizontal scale denotes effective wind area, in square feet (square meters).
3. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
4. Each component shall be designed for maximum positive and negative pressures.
5. If a parapet equal to or higher than 3 ft (1m) is provided around the perimeter of the roof with $\theta \leq 10^\circ$, Zone 3 shall be treated as Zone 2.
6. Values of GC_p for roof overhangs include pressure contributions from both upper and lower surfaces.
7. Notation:
 - a: 10 percent of least horizontal dimension or $0.4h$, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (1 m).
 - h: Eave height shall be used for $\theta \leq 10^\circ$.
 - θ : Angle of plane of roof from horizontal, in degrees.



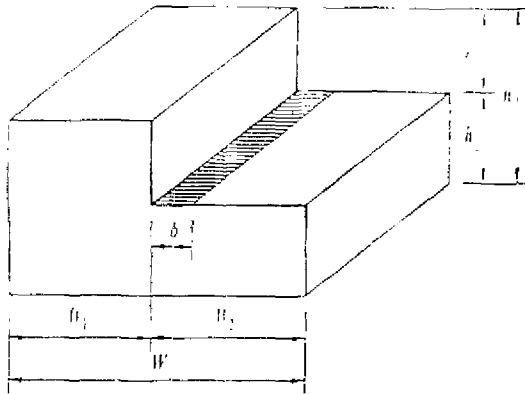
Notes:

1. Vertical scale denotes GC_p to be used with q_w .
2. Horizontal scale denotes effective wind area, in square feet (square meters).
3. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
4. Each component shall be designed for maximum positive and negative pressures.
5. Values of GC_p for roof overhangs include pressure contributions from both upper and lower surfaces.
6. For hipped roofs with $10^\circ < \theta \leq 30^\circ$, edge/ridge strips and pressure coefficients for ridges of gabled roofs shall apply on each hip.
7. Notation:
 - a: 10 percent of least horizontal dimension or $0.4h$, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (1 m).
 - h: Mean roof height, in feet (meters).
 - θ : Angle of plane of roof from horizontal, in degrees



Notes:

1. Vertical scale denotes GC_p to be used with q_h .
2. Horizontal scale denotes effective wind area, in square feet (square meters).
3. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
4. Each component shall be designed for maximum positive and negative pressures.
5. Values of GC_p for roof overhangs include pressure contributions from both upper and lower surfaces.
6. Notation:
 - a: 10 percent of least horizontal dimension or $0.4h$, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (1 m).
 - h: Mean roof height, in feet (meters).
 - θ : Angle of plane of roof from horizontal, in degrees.



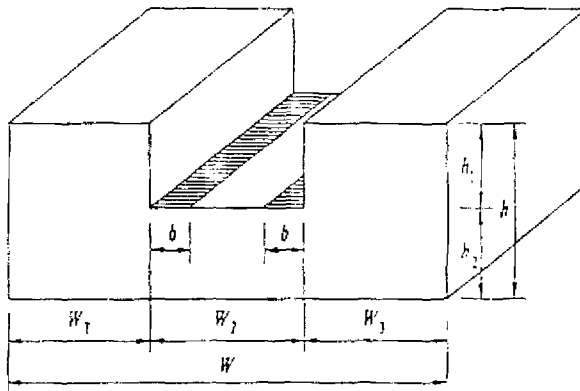
$$h_1 \geq 10 \text{ ft (3 m)}$$

$$b = 1.5 h_1$$

$$b < 100 \text{ ft (30.5 m)}$$

$$\frac{h_1}{h} = 0.3 \text{ to } 0.7$$

$$\frac{W_1}{W} = 0.25 \text{ to } 0.75$$



Notes:

1. On the lower level of flat, stepped roofs shown in Fig. 6-5C, the zone designations and pressure coefficients shown in Fig. 6-5B ($\theta \leq 10^\circ$) shall apply, except that at the roof-upper wall intersection(s), Zone 3 shall be treated as Zone 2 and Zone 2 shall be treated as Zone 1. Positive values of GC_p equal to those for walls in Fig. 6-5A shall apply on the cross-hatched areas shown in Fig. 6-5C.
2. Notation:
 - b : $1.5h_1$ in Fig. 6-5C, but not greater than 100 ft (30.5 m).
 - h : Mean roof height, in feet (meters).
 - h_1 : h_1 or h_2 in Fig. 6-5C; $h = h_1 + h_2$; $h_1 \geq 10$ ft (3.1 m); $h_1/h = 0.3$ to 0.7 .
 - W : Building width in Fig. 6-5C.
 - W_1 : W_1 or W_2 or W_3 in Fig. 6-5C. $W = W_1 + W_2$ or $W_1 + W_2 + W_3$; $W_1/W = 0.25$ to 0.75 .
 - θ : Angle of plane of roof from horizontal, in degrees.

Figure 6-6

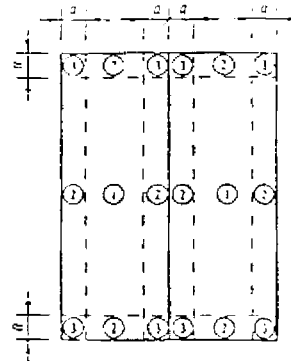
External Pressure Coefficients, GC_p

Enclosed, Partially Enclosed Buildings

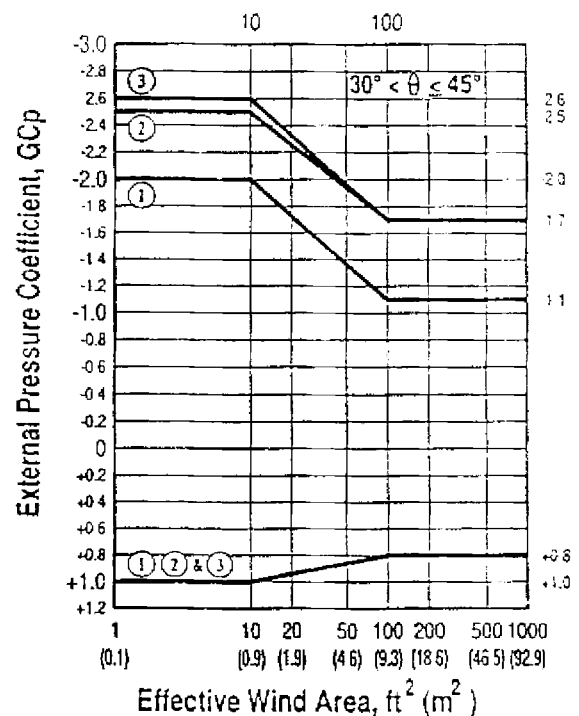
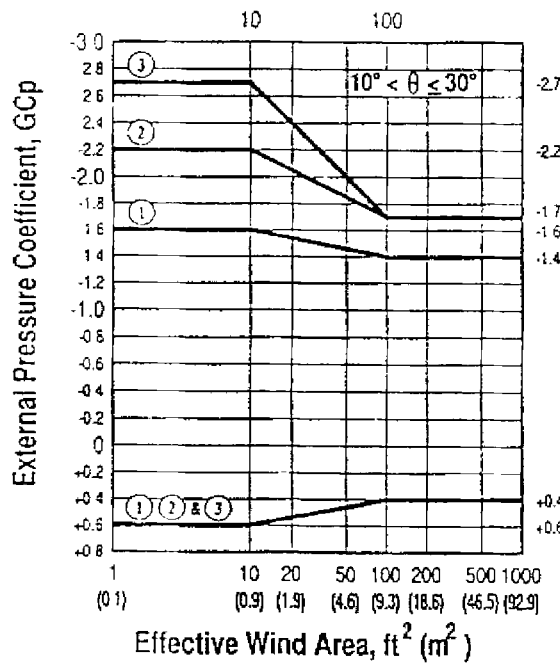
Multispan Gable Roofs



ELEVATION OF BUILDING
(2 or More Spans)

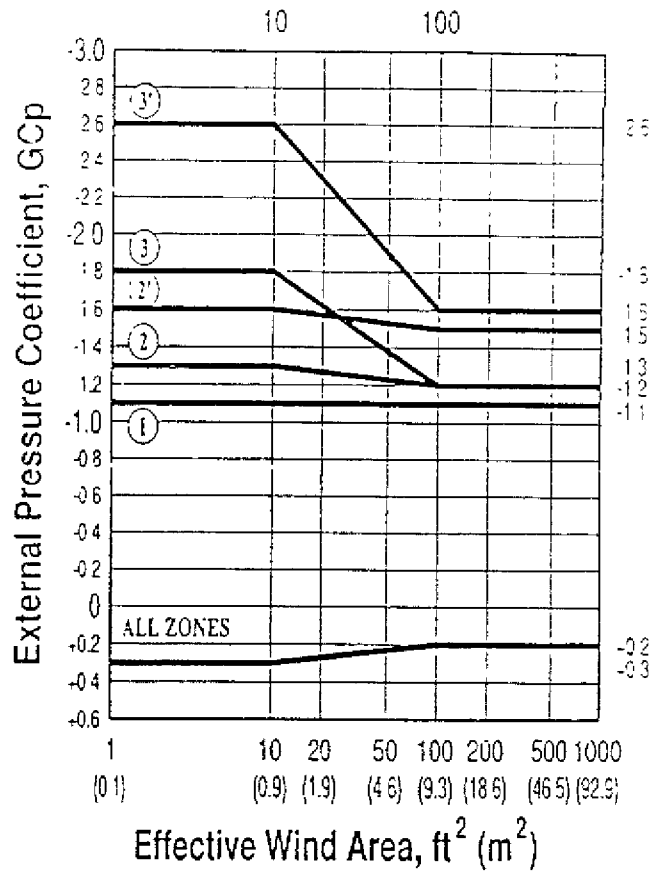
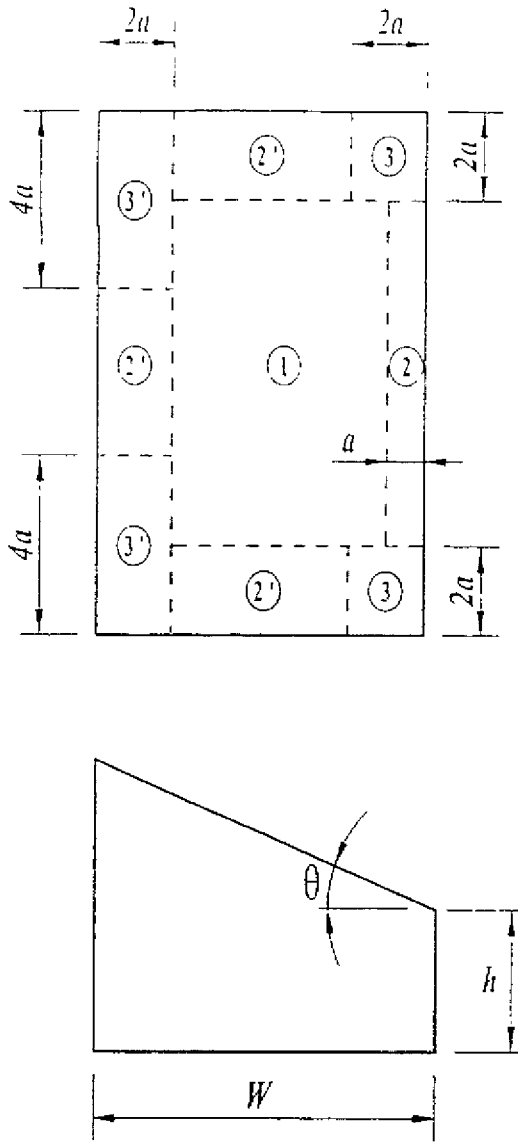


PLAN AND ELEVATION OF
A SINGLE SPAN MODULE



Notes:

1. Vertical scale denotes GC_p to be used with q_h .
2. Horizontal scale denotes effective wind area A , in square feet (square meters).
3. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively
4. Each component shall be designed for maximum positive and negative pressures.
5. For $\theta \leq 10^\circ$, values of GC_p from Fig. 6-5B shall be used.
6. Notation:
 - a: 10 percent of least horizontal dimension of a single-span module or $0.4h$, whichever is smaller, but not less than either 4 percent of least horizontal dimension of a single-span module or 3 ft (1 m).
 - h: Mean roof height, in feet (meters).
 - W: Building module width, in feet (meters).
 - θ : Angle of plane of roof from horizontal, in degrees.



Notes:

1. Vertical scale denotes GC_p to be used with q_h .
2. Horizontal scale denotes effective wind area A , in square feet (square meters).
3. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively
4. Each component shall be designed for maximum positive and negative pressures.
5. For $\theta \leq 3^\circ$, values of GC_p from Fig. 6-5B shall be used.
6. Notation:
 - a : 10 percent of least horizontal dimension or $0.4h$, whichever is smaller, but not less than either 4 percent of least horizontal dimension or 3 ft (1 m).
 - h : Eave height shall be used for $\theta \leq 10^\circ$.
 - W : Building width, in feet (meters)
 - θ : Angle of plane of roof from horizontal, in degrees.