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<b>PRIORITY:</b>	Normal
<b>DATE:</b>	March 15, 2011
<b>TITLE:</b>	Revised Ventilation Instructions
<b>ECO REFERENCE:</b>	N/A
<b>PRODUCT(S) AFFECTED:</b>	Excite / EzView / StreetSmart
<b>SUMMARY:</b>	Adaptive LED displays are designed to cool by natural convection rather than by mechanical means. This TechMemo clarifies Adaptive's recommendations for mounting displays with respect to proper air circulation.

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## Introduction

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Adaptive's Excite, EzView and StreetSmart displays require obstruction-free space for adequate air ventilation between solid mounting surfaces and the top, bottom, and sides of the sign. This is required for all wall, monument, and pole mounted signs.

Always take into consideration other neighboring heat sources such as backlit signs, lighting sources, etc. and supplement ventilation outlets as needed. Note: Shading the back of the sign will enhance thermal performance.

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Due to continuing product innovation, specifications in this manual are subject to change without notice.

## Ventilation Basics

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### How does the sign cool itself?

Since these LED displays are completely enclosed and, in most situations, require no forced air ventilation, they rely on natural convection to cool their internal electronic components. The top and back surfaces of the display act as heat sinks to cool the inside case temperatures. Internal fans mix the air inside the case, bringing it all to a more uniform temperature.

Excite, EzView, and StreetSmart displays are enclosed to keep out contaminants and prevent corrosion and dirt buildup, which adversely affects the sign's performance and interferes with its ability to cool itself.

### What is natural convection?

Natural convection is a type of heat transportation. In natural convection, air surrounding a heat source receives heat, becomes less dense, and rises. The surrounding cooler air then moves to replace it. This cooler air is then heated and rises, and the process continues, forming a convection current.

### How does Adaptive define "obstruction-free space" and why is so important?

Because proper air circulation is key to the optimal performance and longevity of your Adaptive LED display, we recommend that there be a certain amount of open area on all sides of your display. "Bricking in" or otherwise enclosing the case may cause overheating and other failures that will not be covered by your warranty. If louvers or air duct covers are used, the "obstruction free space" of the louver / air duct cover must be calculated to ensure that it meets the Adaptive requirement.

### For every installation, provide adequate ventilation or the sign warranty may be void:

- DO NOT mount air ducts (vents) directly to the LED display or its substructure.
- DO NOT modify the display case or its substructure for ventilation purposes. The superstructure design MUST incorporate adequate ventilation.
- Provide a minimum clearance of one inch above and below the display, and six inches behind the display.
- For EMCs under seven feet in height, provide 3.5 square inches of obstruction-free ventilation space for every square foot of your display face. For EMCs over seven feet high, provide seven square inches of ventilation space,
- Ventilation air ducts MUST be evenly spaced across the top and bottom of the display to help maintain consistent air flow around it.
- Adaptive recommends that displays installed in a monument structure incorporate outdoor-rated fans to draw in cool air through the lower air ducts. The sign will cool more efficiently when fans are used to draw in cool air rather than force out hot air.

## Ventilation Requirements Chart: Excite

<b>VENTILATION REQUIREMENTS FOR EXCITE SIGNS UP TO 7' IN HEIGHT</b> Use 3.5 square inches of ventilation for every 1 square foot of the display face. 7 square inches is equivalent to a 3" air duct.								
Rows	Columns	Case Height (Inches)	Case Width (Inches)	Case (Sq. Inches)	Case (Sq. Feet)	Total Ventilation* (Sq. Inches)	Inlet Ventilation* (Sq. Inches)	Outlet Ventilation* (Sq. Inches)
<b>Excite 16MM displays</b>								
32	96	20.2	60.5	1,222.1	8.49	29.70	14.85	14.85
32	112	20.2	70.6	1,426.1	9.90	34.66	17.33	17.33
32	128	20.2	80.7	1,630.1	11.32	39.62	19.81	19.81
32	144	20.2	90.8	1,834.2	12.74	44.58	22.29	22.29
32	160	20.2	100.8	2,036.2	14.14	49.49	24.75	24.75
32	176	20.2	110.9	2,240.2	15.56	54.45	27.22	27.22
48	96	30.3	60.5	1,833.2	12.73	44.56	22.28	22.28
48	112	30.3	70.6	2,139.2	14.86	51.99	26.00	26.00
48	128	30.3	80.7	2,445.2	16.98	59.43	29.72	29.72
48	144	30.3	90.8	2,751.2	19.11	66.87	33.44	33.44
48	160	30.3	100.8	3,054.2	21.21	74.24	37.12	37.12
48	176	30.3	110.9	3,360.3	23.34	81.67	40.84	40.84
64	96	40.4	60.5	2,444.2	16.97	59.41	29.70	29.70
64	112	40.4	70.6	2,852.2	19.81	69.33	34.66	34.66
64	128	40.4	80.7	3,260.3	22.64	79.24	39.62	39.62
64	144	40.4	90.8	3,668.3	25.47	89.16	44.58	44.58
64	160	40.4	100.8	4,072.3	28.28	98.98	49.49	49.49
64	176	40.4	110.9	4,480.4	31.11	108.90	54.45	54.45
<b>Excite 20MM displays</b>								
16	80	13	63.4	824.2	5.72	20.03	10.02	10.02
16	96	13	76.0	988.0	6.86	24.01	12.01	12.01
16	112	13	88.6	1,151.8	8.00	28.00	14.00	14.00
16	128	13	101.2	1,315.6	9.14	31.98	15.99	15.99
16	144	13	113.8	1,479.4	10.27	35.96	17.98	17.98
16	160	13	126.4	1,643.2	11.41	39.94	19.97	19.97
16	176	13	139.0	1,807.0	12.55	43.92	21.96	21.96
32	80	25.6	63.4	1,623.0	11.27	39.45	19.72	19.72
32	96	25.6	76.0	1,945.6	13.51	47.29	23.64	23.64
32	112	25.6	88.6	2,268.2	15.75	55.13	27.56	27.56
32	128	25.6	101.2	2,590.7	17.99	62.97	31.48	31.48
32	144	25.6	113.8	2,913.3	20.23	70.81	35.40	35.40
32	160	25.6	126.4	3,235.8	22.47	78.65	39.32	39.32
32	176	25.6	139.0	3,558.4	24.71	86.49	43.24	43.24
48	80	38.2	63.4	2,421.9	16.82	58.87	29.43	29.43
48	96	38.2	76.0	2,903.2	20.16	70.56	35.28	35.28
48	112	38.2	88.6	3,384.5	23.50	82.26	41.13	41.13
48	128	38.2	101.2	3,865.8	26.85	93.96	46.98	46.98
48	144	38.2	113.8	4,347.2	30.19	105.66	52.83	52.83
48	160	38.2	126.4	4,828.5	33.53	117.36	58.68	58.68
48	176	38.2	139.0	5,309.8	36.87	129.06	64.53	64.53
<b>Excite 23MM displays</b>								
16	96	14.9	87.4	1,302.3	9.04	31.65	15.83	15.83
16	112	14.9	101.9	1,518.3	10.54	36.90	18.45	18.45
16	128	14.9	116.3	1,732.9	12.03	42.12	21.06	21.06
16	144	14.9	130.8	1,948.9	13.53	47.37	23.68	23.68
16	160	14.9	145.3	2,165.0	15.03	52.62	26.31	26.31
16	176	14.9	159.8	2,381.0	16.53	57.87	28.94	28.94
32	96	29.4	87.4	2,569.6	17.84	62.45	31.23	31.23
32	112	29.4	101.9	2,995.9	20.80	72.82	36.41	36.41
32	128	29.4	116.3	3,419.2	23.74	83.11	41.55	41.55
32	144	29.4	130.8	3,845.5	26.71	93.47	46.73	46.73
32	160	29.4	145.3	4,271.8	29.67	103.83	51.91	51.91
32	176	29.4	159.8	4,698.1	32.63	114.19	57.10	57.10
48	96	43.9	87.4	3,836.9	26.64	93.26	46.63	46.63
48	112	43.9	101.9	4,473.4	31.07	108.73	54.36	54.36
48	128	43.9	116.3	5,105.6	35.46	124.09	62.05	62.05
48	144	43.9	130.8	5,742.1	39.88	139.57	69.78	69.78
48	160	43.9	145.3	6,378.7	44.30	155.04	77.52	77.52
48	176	43.9	159.8	7,015.2	48.72	170.51	85.25	85.25

\*Ventilation is defined as obstruction free space

## Ventilation Requirements Chart: EzView

<b>VENTILATION REQUIREMENTS FOR EZVIEW SIGNS UP TO 7' IN HEIGHT</b> Use 3.5 square inches of ventilation for every 1 square foot of the display face. 7 square inches is equivalent to a 3" air duct.								
Rows	Columns	Case Height (Inches)	Case Width (Inches)	Case (Sq. Inches)	Case (Sq. Feet)	Total Ventilation* (Sq. Inches)	Inlet Ventilation* (Sq. Inches)	Outlet Ventilation* (Sq. Inches)
<b>EzView 20MM displays</b>								
16	80	13	63.4	824.2	5.72	20.03	10.02	10.02
16	96	13	76.0	988.0	6.86	24.01	12.01	12.01
16	112	13	88.6	1,151.8	8.00	28.00	14.00	14.00
16	128	13	101.2	1,315.6	9.14	31.98	15.99	15.99
16	144	13	113.8	1,479.4	10.27	35.96	17.98	17.98
16	160	13	126.4	1,643.2	11.41	39.94	19.97	19.97
16	176	13	139.0	1,807.0	12.55	43.92	21.96	21.96
32	80	25.6	63.4	1,623.0	11.27	39.45	19.72	19.72
32	96	25.6	76.0	1,945.6	13.51	47.29	23.64	23.64
32	112	25.6	88.6	2,268.2	15.75	55.13	27.56	27.56
32	128	25.6	101.2	2,590.7	17.99	62.97	31.48	31.48
32	144	25.6	113.8	2,913.3	20.23	70.81	35.40	35.40
32	160	25.6	126.4	3,235.8	22.47	78.65	39.32	39.32
32	176	25.6	139.0	3,558.4	24.71	86.49	43.24	43.24
48	80	38.2	63.4	2,421.9	16.82	58.87	29.43	29.43
48	96	38.2	76.0	2,903.2	20.16	70.56	35.28	35.28
48	112	38.2	88.6	3,384.5	23.50	82.26	41.13	41.13
48	128	38.2	101.2	3,865.8	26.85	93.96	46.98	46.98
48	144	38.2	113.8	4,347.2	30.19	105.66	52.83	52.83
48	160	38.2	126.4	4,828.5	33.53	117.36	58.68	58.68
48	176	38.2	139.0	5,309.8	36.87	129.06	64.53	64.53
<b>EzView 23MM displays</b>								
16	96	14.9	87.4	1,302.3	9.04	31.65	15.83	15.83
16	112	14.9	101.9	1,518.3	10.54	36.90	18.45	18.45
16	128	14.9	116.3	1,732.9	12.03	42.12	21.06	21.06
16	144	14.9	130.8	1,948.9	13.53	47.37	23.68	23.68
16	160	14.9	145.3	2,165.0	15.03	52.62	26.31	26.31
16	176	14.9	159.8	2,381.0	16.53	57.87	28.94	28.94
32	96	29.4	87.4	2,569.6	17.84	62.45	31.23	31.23
32	112	29.4	101.9	2,995.9	20.80	72.82	36.41	36.41
32	128	29.4	116.3	3,419.2	23.74	83.11	41.55	41.55
32	144	29.4	130.8	3,845.5	26.71	93.47	46.73	46.73
32	160	29.4	145.3	4,271.8	29.67	103.83	51.91	51.91
32	176	29.4	159.8	4,698.1	32.63	114.19	57.10	57.10
48	96	43.9	87.4	3,836.9	26.64	93.26	46.63	46.63
48	112	43.9	101.9	4,473.4	31.07	108.73	54.36	54.36
48	128	43.9	116.3	5,105.6	35.46	124.09	62.05	62.05
48	144	43.9	130.8	5,742.1	39.88	139.57	69.78	69.78
48	160	43.9	145.3	6,378.7	44.30	155.04	77.52	77.52
48	176	43.9	159.8	7,015.2	48.72	170.51	85.25	85.25

\*Ventilation is defined as obstruction free space

## Ventilation Requirements Chart: StreetSmart

<b>VENTILATION REQUIREMENTS FOR STREETSMART SIGNS UP TO 7' IN HEIGHT</b> Use 3.5 square inches of ventilation for every 1 square foot of the display face. 7 square inches is equivalent to a 3" air duct.								
Rows	Columns	Case Height (Inches)	Case Width (Inches)	Case (Sq. Inches)	Case (Sq. Feet)	Total Ventilation* (Sq. Inches)	Inlet Ventilation* (Sq. Inches)	Outlet Ventilation* (Sq. Inches)
<b>StreetSmart 17MM displays</b>								
16	96	11.5	66.6	765.9	5.32	18.62	9.31	9.31
16	128	11.5	88.6	1,018.9	7.08	24.76	12.38	12.38
16	160	11.5	110.7	1,273.1	8.84	30.94	15.47	15.47
16	192	11.5	132.7	1,526.1	10.60	37.09	18.55	18.55
32	96	22.5	66.6	1,498.5	10.41	36.42	18.21	18.21
32	128	22.5	88.6	1,993.5	13.84	48.45	24.23	24.23
32	160	22.5	110.7	2,490.8	17.30	60.54	30.27	30.27
32	192	22.5	132.7	2,985.8	20.73	72.57	36.29	36.29
48	96	33.5	66.6	2,231.1	15.49	54.23	27.11	27.11
48	112	33.5	88.6	2,968.1	20.61	72.14	36.07	36.07
48	128	33.5	110.7	3,708.5	25.75	90.14	45.07	45.07
48	144	33.5	132.7	4,445.5	30.87	108.05	54.02	54.02
<b>StreetSmart 35MM displays</b>								
8	48	11.5	66.6	765.9	5.32	18.62	9.31	9.31
8	64	11.5	88.6	1,018.9	7.08	24.76	12.38	12.38
8	96	11.5	132.7	1,526.1	10.60	37.09	18.55	18.55
8	112	11.5	154.8	1,780.2	12.36	43.27	21.63	21.63
16	48	22.5	66.6	1,498.5	10.41	36.42	18.21	18.21
16	64	22.5	88.6	1,993.5	13.84	48.45	24.23	24.23
16	96	22.5	132.7	2,985.8	20.73	72.57	36.29	36.29
16	112	22.5	154.8	3,483.0	24.19	84.66	42.33	42.33
24	48	33.5	66.6	2,231.1	15.49	54.23	27.11	27.11
24	64	33.5	88.6	2,968.1	20.61	72.14	36.07	36.07
24	96	33.5	132.7	4,445.5	30.87	108.05	54.02	54.02
24	112	33.5	154.8	5,185.8	36.01	126.04	63.02	63.02
32	48	44.5	66.6	2,963.7	20.58	72.03	36.02	36.02
32	64	44.5	88.6	3,942.7	27.38	95.83	47.91	47.91
32	96	44.5	132.7	5,905.2	41.01	143.53	71.76	71.76
32	112	44.5	154.8	6,888.6	47.84	167.43	83.72	83.72

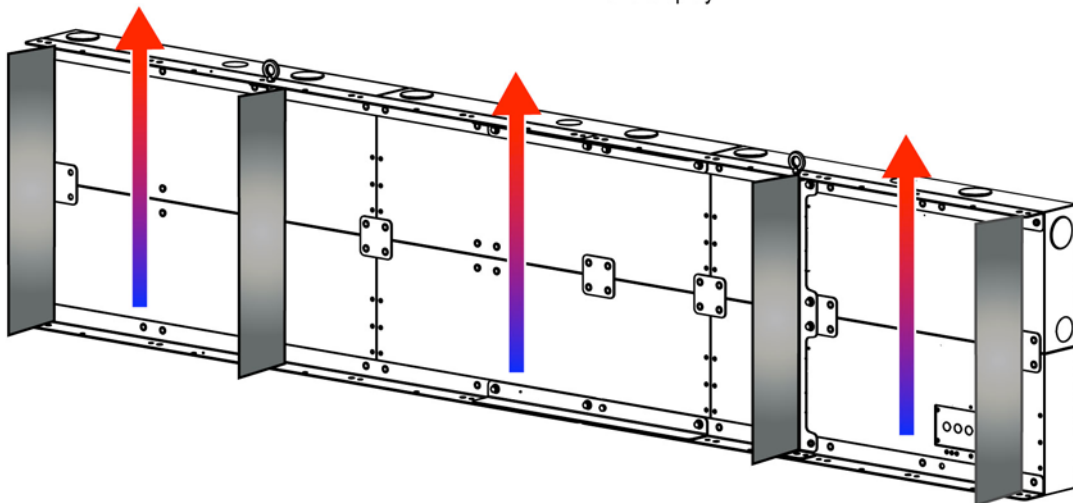
\*Ventilation is defined as obstruction free space

## Recommended Mounting Brackets

### Mounting the Display: Method A

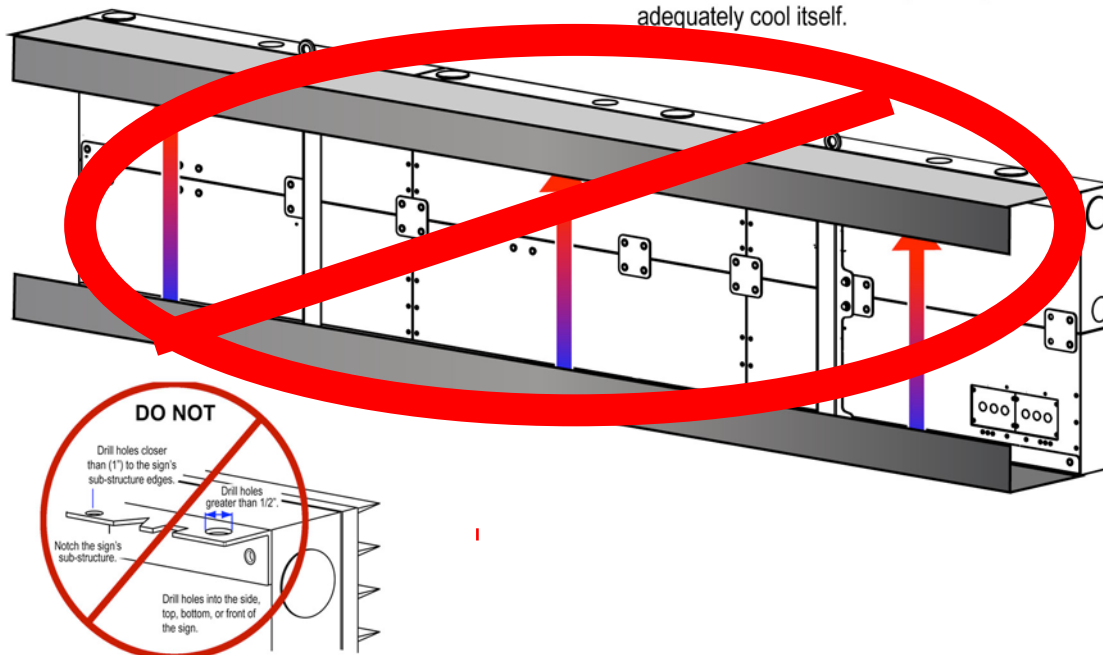
• RECOMMENDED

- Stronger, more stable mounting
- Better suited for cooling requirements for this display.



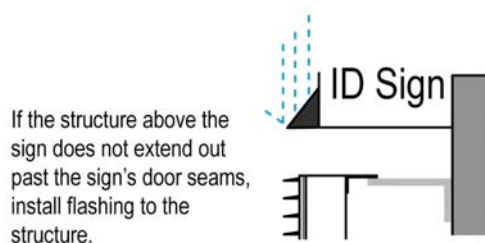
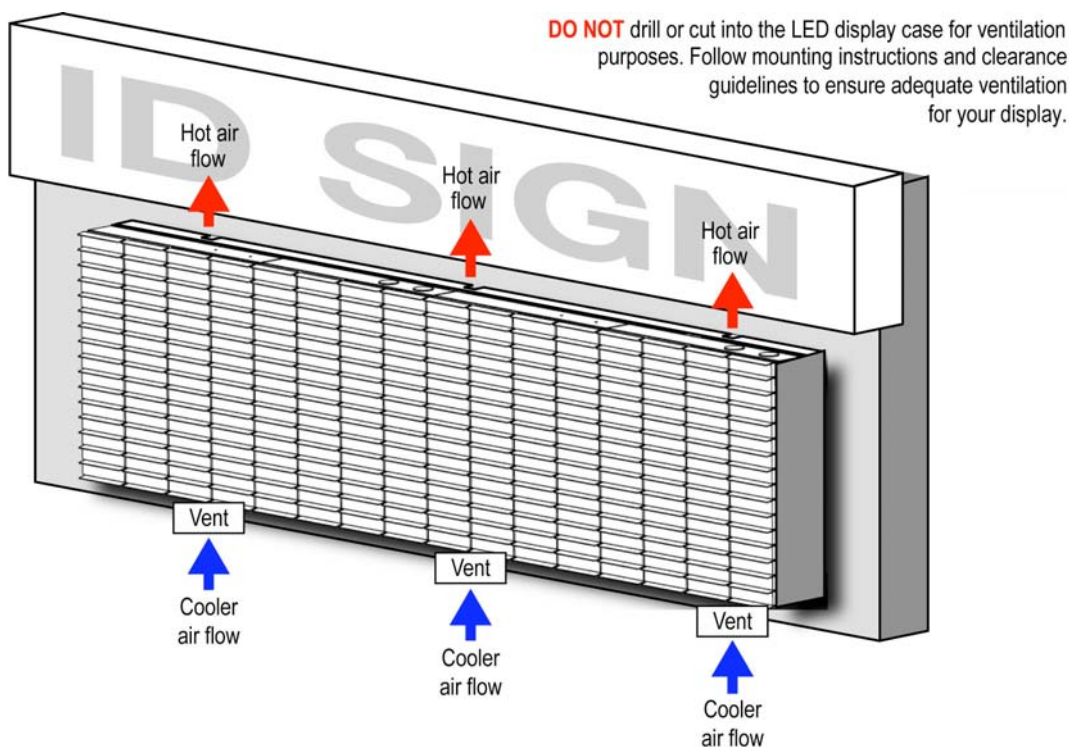
### Mounting the Display: Method B

- This mounting method is not recommended, as the horizontal brackets can block air flow and interfere with the display's ability to adequately cool itself.



## Wall Mounting

Displays require obstruction-free space for adequate air ventilation between solid mounting surfaces and the top and bottom surfaces.



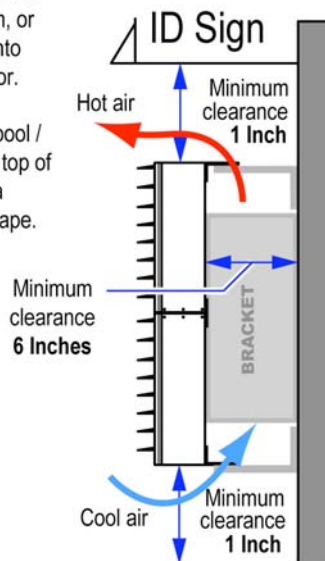
**DO NOT** allow water from the above ID Sign, fascia trim, or flashing to drip directly onto the seams of the sign door.

**DO NOT** allow water to pool / gather underneath or on top of the sign. Always create a pathway for water to escape.

### Air Duct / Ventilation installation for wall-mounted signs

- Provide 3.5 square inches\* of ventilation (obstruction-free space) for every 1 square foot of sign per face. Consult the Ventilation Requirements Table.
- Ventilation air ducts **MUST** be installed across the top and bottom of the sign at evenly spaced intervals.
- Evenly spaced vents help maintain a consistent air flow around the sign.

\*Use 7 square inches if sign height exceeds 7 feet.

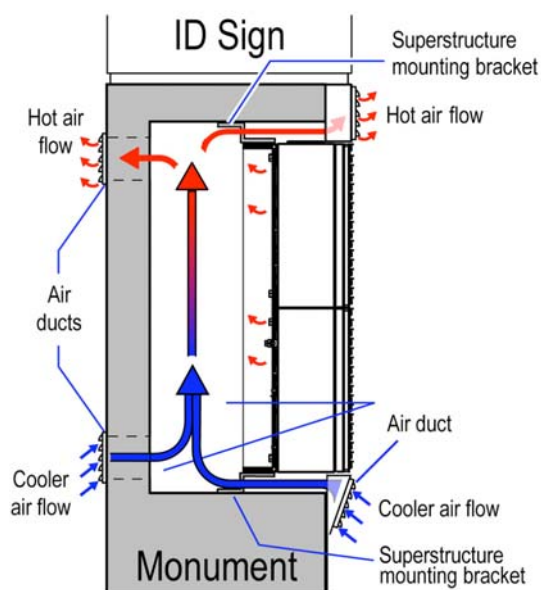




## Monument Installation / Single-Sided Enclosure

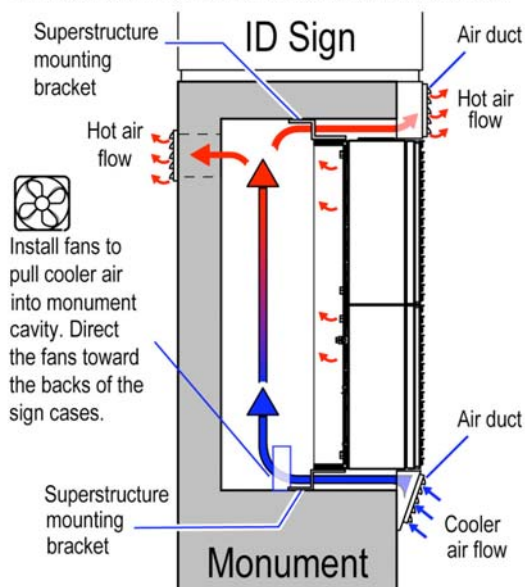
If there is an obstruction on the outside of the display (as in a monument-style installation), care must be taken to assure that it is able to cool. Air ducts must be used in the monument to allow air to flow behind the sign and to help hot air escape.

### Natural Convection

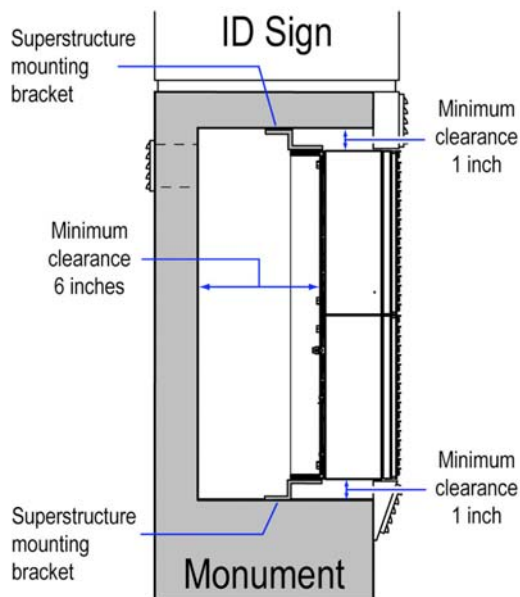


### Forced Convection

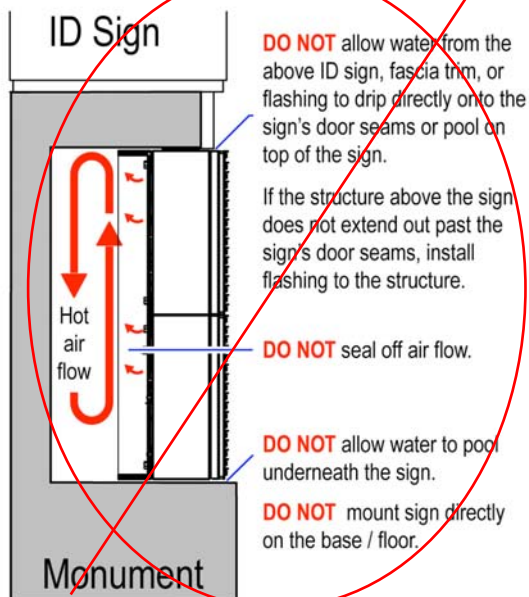
• RECOMMENDED FOR HIGH-TEMPERATURE ENVIRONMENTS



### Clearance requirements



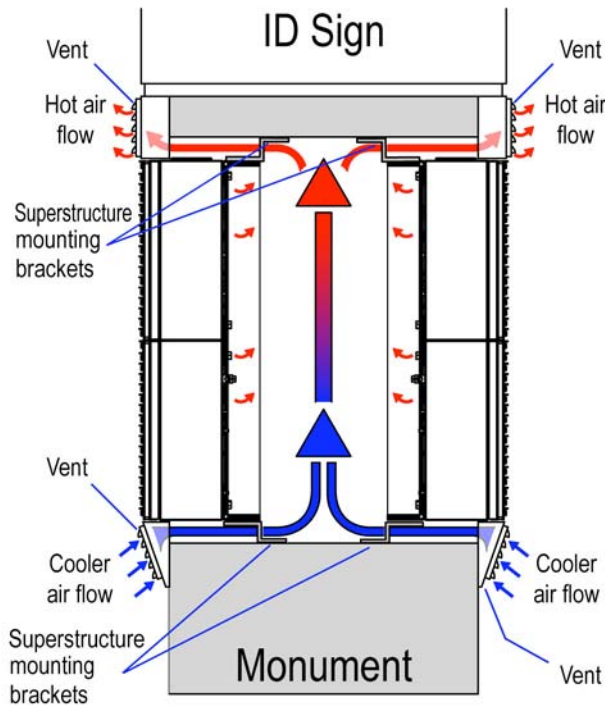
### FAILURE TO FOLLOW THESE GUIDELINES MAY VOID WARRANTY





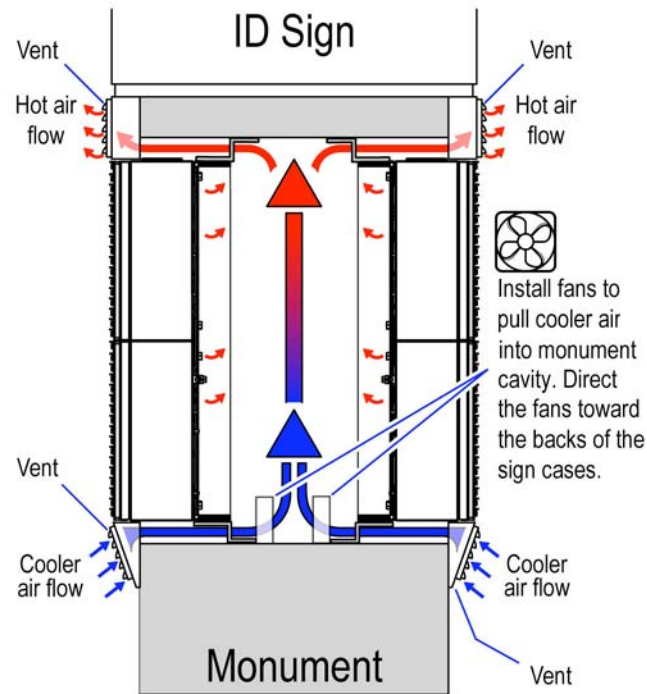
# Monument Installation / Double-Sided Enclosure

## Natural Convection

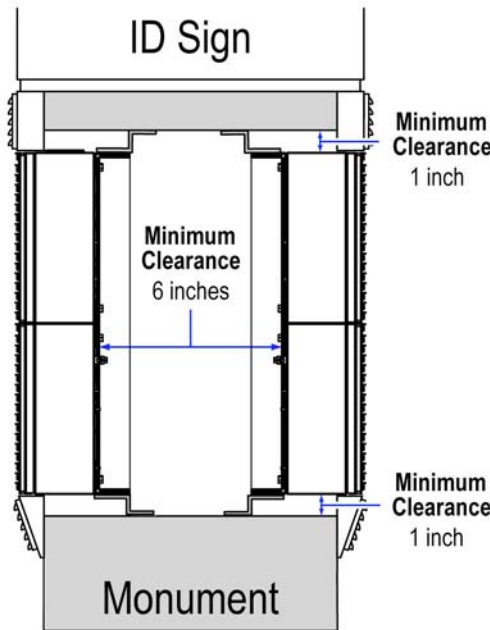


## Forced Convection

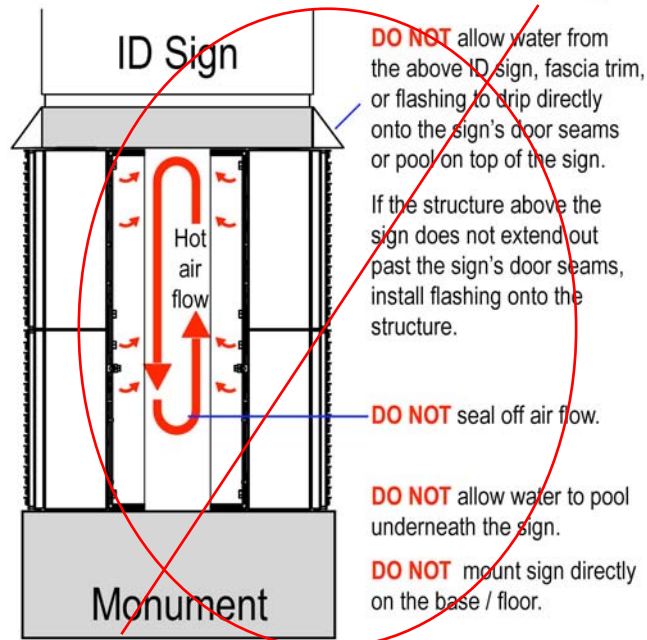
• RECOMMENDED FOR HIGH-TEMPERATURE ENVIRONMENTS



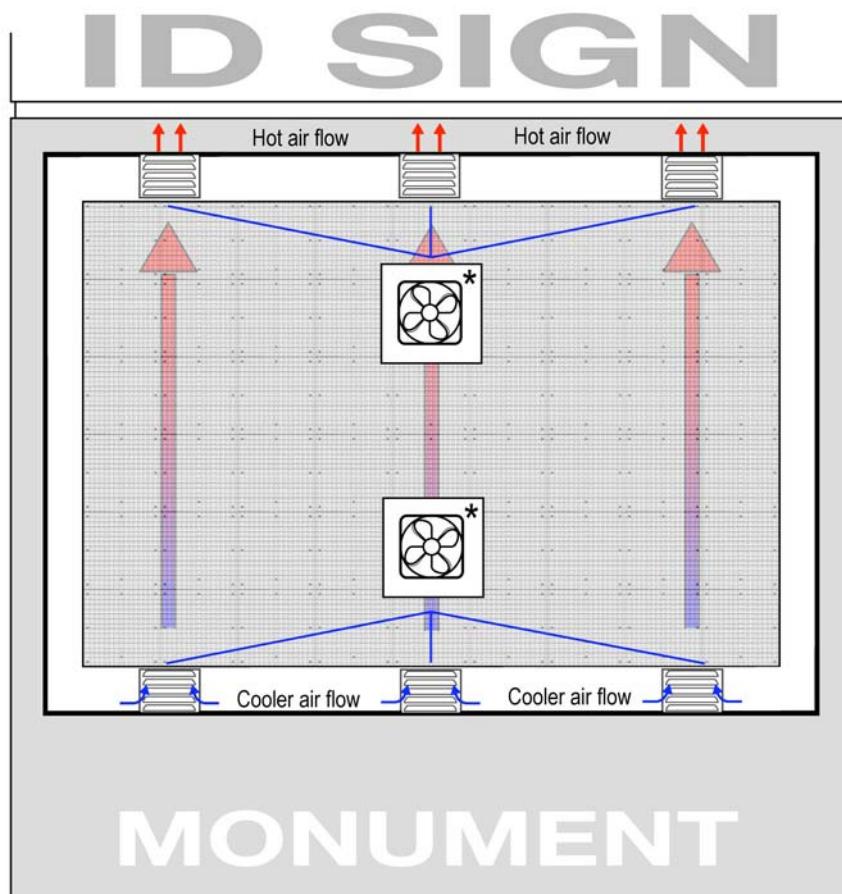
## Clearance requirements



## FAILURE TO FOLLOW THESE GUIDELINES MAY VOID WARRANTY



## Monument Installation / View from the front



Provisions for adequate air circulation and ventilation, especially the ability of hot air to rise and escape from the unit, must be incorporated into the design of the sign structure.

**DO NOT** drill or cut into the LED display case for ventilation purposes.

**DO NOT** rely on side vents to cool the unit. Top and bottom vents must be included for adequate air circulation.

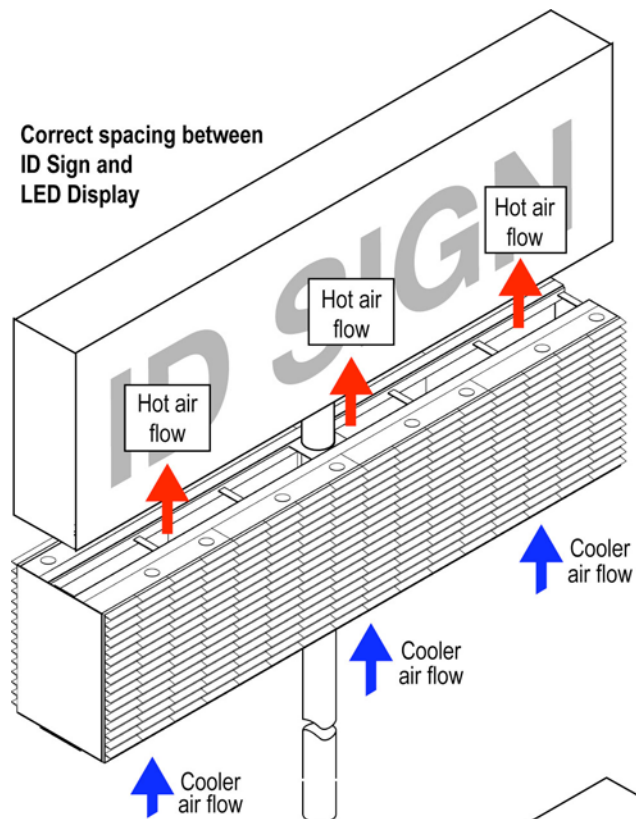
\* Installations in high-temperature climates may require the addition of fans to pull cooler air into the monument cavity and distribute this cooler air evenly across the back surface of the LED display cases.

### Air Duct / Ventilation installation for monument (enclosed) signs

- Provide 3.5 square inches\* of ventilation (obstruction-free space) for every 1 square foot of sign per face. Consult the Ventilation Requirements Table.
- Ventilation air ducts **MUST** be installed across the top and bottom of the sign at evenly spaced intervals.
- Evenly spaced vents help maintain a consistent air flow around the sign.

\* Use 7 square inches if sign height exceeds 7 feet.

## Pole-Mounted Installation



**DO NOT** allow water to pool / gather underneath or on top of the sign. Always create a pathway for water to escape.

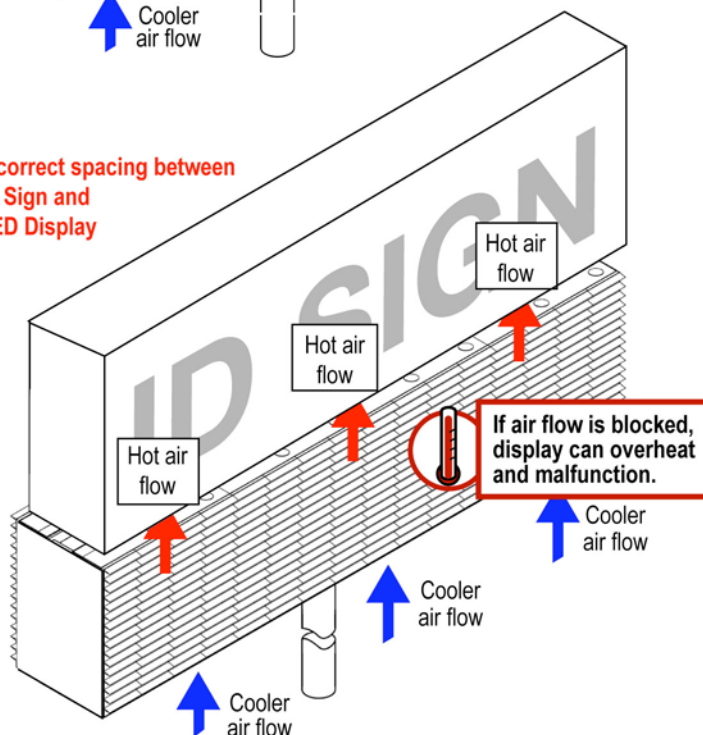
**DO NOT** drill or cut into the LED display case for ventilation purposes.

If the structure above the sign does not extend out past the sign's door seams, install flashing to the structure.

Provide a minimum clearance of 1 inch above and below the sign, and 6 inches behind the sign.

**DO NOT** allow water from the above ID sign, fascia trim, or flashing to drip directly onto the LED display's door seams.

**Incorrect spacing between ID Sign and LED Display**



### Air Duct / Ventilation installation for pole mounted signs

- Provide 3.5 square inches\* of ventilation (obstruction-free space) for every 1 square foot of sign per face. Consult the Ventilation Requirements Table.
- Ventilation air ducts **MUST** be installed across the top and bottom of the sign at evenly spaced intervals.
- Evenly spaced vents help maintain a consistent air flow around the sign.

\*Use 7 square inches if sign height exceeds 7 feet.