Zoning Resolution

THE CITY OF NEW YORK
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CITY PLANNING COMMISSION
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81-276 - Modification of score for reflectivity

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LAST AMENDED
2/2/2011

Where #zoning lots# have utilized the #daylight evaluation chart# but a street score along one frontage is less than 66 percent or the overall score is less than 75 percent, a modest improvement in either the street score or the overall score of a #zoning lot# within a #building# which reflects more light than a medium gray or glass #building# may be obtained by scoring the relative reflectivity of the #building's# surface.

The use of reflectivity is optional and not necessary if a passing score can be obtained under Section 81-274 (Rules for determining the daylight evaluation score). Reflectivity scoring permits greater design flexibility for a light-colored #building# than a dark one.

Because the greatest reflectivity comes from the upper portions of #buildings#, the value of reflected light is credited against the amount of daylight blocked by the portions of the #building# above an elevation angle of 70 degrees from the #center line of the street#.

Reflectivity has two components: the reflectance of the surface material and the orientation of the material to the sun.

(a) Reflectance

Reflectance values of materials will be determined by the Department of Buildings after the submission of samples of proposed surface materials by the applicant.

(1) Mixed reflectance

A #building# of several surface materials will have a reflectance value determined by

multiplying each material's reflectance value by its percentage of the total wall surface and adding the products. For example, a #building# that is 60 percent limestone and 40 percent clear glass would have a reflectance of .60 x .45 (the reflectance of limestone) plus .40 x .15 (the reflectance of clear glass) or an overall reflectance of .33.

(2) Relative reflectance

In order to be included in the reflectivity score of a #zoning lot#, the material of the #building# must reflect more light than a medium gray or glass #building#. The reflectance value of a medium gray or glass #building# in Midtown is .15 so that the #building# with an overall reflectance of .33, given in the example in paragraph (a)(1) of this Section, would be increasing the expected reflectance by .33 minus .15 which equals .18.

Examples of potential reflectance values for different types of surface finishes are shown on the following chart.

REFLECTANCE VALUES - EXAMPLES OF BUILDING MATERIALS

White plaster or paint or glaze	.80 to .90
Aluminum paint	.55
Green paint	.50
Red paint	.26

Light gray paint	.25
Flat black paint	.06
Polished aluminum, stainless steel	.85
Polished light marble	.40 to .50
Light granite, limestone	.45
Copper, brass lead	.60 to .80
Smooth concrete	.45+
Rough concrete	.40
Asbestos cement	.31
Light buff brick	.48

Dark buff brick	.40
Light red brick	.45
Dark red glazed brick	.30
Dark red brick	.12
Slate	.11
Wood	.22+
Glass: double glazing with reflective coating*	
Solarcool(r) bronze or gray	.35 to .36
Solarban(r) clear	.36 to .44
Solarban(r) bronze	.18

Solarban(r) gray	.14
Glass: tinted double glazing	
Gray	.08
Bronze	.09
Solex(r) (green or blue)	.12
Glass: clear double glazing	.15
Glass: clear single glazing	.08

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* Reflectance varies according to which layer the reflective coating is placed on, but can be precisely determined for each position

Sources:

Anderson, Bruce. Solar Energy: Fundamentals in Building Design. (McGraw Hill,

New York 1977).

Callendar, John Hancock. Time Saver Standards: A Handbook of Architectural Design. (McGraw Hill, New York, 4th Edition, 1964).

PPG Industries, Inc., Architectural Glass Products (G702). PPG, Pittsburgh, PA., 1977.

(b) Facade orientation

Orientation of the facade of the #building# is the second component required for measurement of reflectivity. Because reflectivity varies according to the orientation of the facade, the orientation value for a particular surface from the chart below is multiplied by the reflectance of the surface to ascertain the amount of daylight reflectivity.

The orientation values are shown on the following reflectivity chart. Orientation angles shall be rounded to the nearest 22.5 degrees.

Orientation based on True North		Orientation Value
North:	0^{o}	.09
	22.5^{o}	.15
	45.0^{o}	.22

	67.5°	.40
East:	90.0°	.57
	112.5°	.72
	135.0°	.87
	157.5°	.93
South:	180.0°	1.00
	157.5°	.93
	135.0°	.87
	112.5°	.72
West:	90.0°	.57

	67.5^{o}	.40
	45.0^{o}	.22
	22.5^{o}	.15

(c) Reflectivity Score

In order to obtain the reflectivity score for each view of the #building#, first count the daylight squares and subsquares which are blocked by the #building# on the #daylight evaluation chart# above an elevation angle of 70 degrees. This number shall be calculated separately for every orientation of each facade and multiplied by the relative reflectance of that portion of the #building# and the orientation value.

Reflectance = (% material A x reflectance material A) + (% material B x reflectance material B)

Relative reflectance (RR) = reflectance minus .15

Reflectivity score = RR x facade orientation value x daylight squares blocked above 70^{o}.

The reflectivity scores for the several orientations are then added together to give the reflectivity score for that view of the #building# as a whole from the #vantage point# represented on the #daylight evaluation chart#.

The reflectivity score is added to the daylight remaining after accounting for daylight blockage

as calculated in paragraph (f) of Section 81-274

The sum is then calculated as a percentage of the available daylight squares calculated in paragraph (e) of Section 81-274 to give the adjusted daylight score for the #zoning lot# from the #vantage point# represented on the #daylight evaluation chart#.

The adjusted street score along a particular #vantage street# is obtained by calculating the mean average of the adjusted daylight scores from all #vantage points# along the #vantage street#.

The adjusted overall score for the #zoning lot# is obtained by calculating the average of the adjusted street scores weighted by the lengths of their respective #vantage street# frontages.

(d) Limits on adjusted scores

(1) Adjusted street score

The adjusted street score shall not be more than six percentage points higher than the street score not adjusted for reflectivity.

If reflectivity scoring is used to bring the adjusted overall score for the #zoning lot# above 75 percent (the passing overall score), the street score for each #street# frontage without adjustment for reflectivity shall be not less than 66 percent.

(2) Adjusted overall score

The adjusted overall score shall not be more than six percentage points higher than the overall score not adjusted for reflectivity.

If the reflectivity scores for any single #street# frontage are used to bring the adjusted

street score for that frontage above 66 percent (the passing score for a single #street# frontage), the overall score of the #zoning lot# without adjustment for reflectivity shall be not less than 75 percent.