



Standard Calculation for Retention Value

The retention value for a total roof garden system is determined by the sum of each component's maximum water retention value. Please see Carlisle's specifications and product data sheets for more information.

Example: Traditional layered 4 inch system

Water holding capacity of Carlisle MiraDrain G4 Drainage Composite: 0.24 gal/ft²

Calculation for water holding capacity of growth media:

Bulk Density dry weight = 45-55 lb/ft³

Bulk density saturated weight = 74-80 lb/ft³

Therefore:

Low limit: $74 - 45 = 29 \text{ lbs/ft}^3 = 9.66 \text{ lbs. of water at 4" deep}$

Upper limit: $80 - 55 = 25 \text{ lbs/ft}^3 = 8.33 \text{ lbs. of water at 4" deep}$

Finally, divide the upper and lower limits by 8.34, the weight of water per gallon, to get gal/ft²

Total water holding capacity of growth media: 1.0 - 1.15 gal/ft²

Total for roof garden system = 1.24 - 1.39 gal/ft²

WHY CARLISLE SYNTEC SYSTEMS ROOF GARDENS?



Suitable green roof systems for stormwater management



Green roof solutions including layered systems and pre-grown trays, for both extensive and intensive designs



Single-source warranty held by Carlisle for the roofing and overburden systems



EXPERIENCE THE CARLISLE DIFFERENCE

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ROOF GARDEN Roofing Systems



Stormwater Management Guide

Carlisle SynTec Systems

offers project-specific stormwater management assistance and calculations to help your project demonstrate return on investment for a green roof. Utilizing a green roof for stormwater retention may allow the project to downsize or even eliminate other costly stormwater treatment mechanisms, such as underground detention tanks. Green roofs also allow buildings to meet codes and regulations for stormwater management. Green infrastructure manages rainfall to improve placemaking and community livability, while enhancing the local environment and reducing site development costs.

Top 5 Markets in North America*



*For additional cities, please contact your local Carlisle representative.

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Toronto, ON

Requirement

The Green Roof Bylaw requires new building permit applicants to include a green roof, only exempt if they have less than 2,000m² of Gross Floor Area. The required coverage area is dependent on the size of the development and ranges from 20% to 60%.

Incentives and Rebates

The City of Toronto offers the Eco-Roof Incentive Program to developers installing green and cool roofs on buildings not subject to the Green Roof Bylaw. Developers can receive \$75 per square meter of green roof installed, up to \$100,000.

http://www.toronto.ca/livegreen/greenbusiness_greenroofs_eco-roof.htm

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New York, NY

Requirement

At least 50% of eligible roof space must be covered by the green roof with at least 80% of which must be covered by live plants such as sedum or equally drought-resistant and hardy plant species.

Incentives and Rebates

The City of New York and New York State passed legislation in 2008 to provide a one-year tax abatement of \$4.50 per square foot (up to \$100,000 or the building's tax liability, whichever is less), available through 2018.

<http://www.nyc.gov/html/gbee/html/incentives/roof.shtml>

The New York City Department of Environmental Protection offers a grant program for private property owners in combined sewer areas of New York City. The minimum requirement is to manage 1" of stormwater runoff from the contributing impervious area. If selected, DEP will provide funds for the design and construction of the green infrastructure system.

http://www.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_grant_program.shtml

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Chicago, IL

Requirement

All regulated developments employ volume control measures to limit the total amount of stormwater discharged, requiring to capture ½" of runoff from all impervious surfaces, or for developments not discharging directly to water or a municipal storm sewer, achieve a 15% reduction in impervious surfaces from existing conditions.

Incentives and Rebates

The city of Chicago offers a Floor Area Ratio (FAR) Bonus for developments including green roofs that cover 50% or 2,000 sq/ft of the roof area. The program is listed under the city code as "17-4-1015 Green Roofs".

Resources

Stormwater management ordinance manual:
<https://www.cityofchicago.org/content/dam/city/depts/water/general/Engineering/SewerConstStormReq/2016StormwaterManual.pdf>

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Philadelphia, PA

Requirement

The City of Philadelphia, through the Philadelphia Water Department (PWD) and Philadelphia Industrial Development Corporation (PIDC), has created the Stormwater Management Incentives Program (SMIP) and the Greened Acre Retrofit Program (GARP) to reduce the price for qualified non-residential PWD customers and contractors to design and install stormwater best management practices. SMIP provides grants directly to non-residential property owners who want to construct stormwater retrofit projects. GARP provides funding to companies or project aggregators who are able to develop a stormwater management plan for large-scale projects across multiple properties that total at least 10 acres in project size located in Philadelphia's combined sewer service area only.

<http://www.phila.gov/water/wu/stormwater/Pages/Grants.aspx>

Incentives and Rebates

The City of Philadelphia provides a 50% rebate to businesses for the costs incurred to construct a green roof, to a maximum of \$100,000. This credit may be applied to Business Privilege Tax Liability. To qualify, the green roof must cover 50% of the building's rooftop or 75% of "eligible rooftop space".