

Roof Garden System

PART I - GENERAL

1.01 DESCRIPTION

The Carlisle Roof Garden System incorporates an adhered membrane waterproofing system with a Roof Garden Assemblies installed above.

The waterproofing system utilizes one of Carlisle's adhered roofing assemblies; EPDM, TPO, PVC, FleeceBACK or AFX products installed over a structural deck or tapered insulation and cover board.

Above the waterproofing system is utilizing various components including Root Barrier, Polystyrene Insulation, MiraDRAIN G4 Drainage Composite, Carlisle Engineered Growth Media and Carlisle Vegetation. These components are installed above the membrane dependant on desired planting schedule, allowable loads and the climatic region of the project.

As an alternative to the traditional, planted-in-place Roof Garden system, Carlisle offers the modular Green Grid tray system, which incorporates a protection fabric and pre-planted modules over the adhered waterproofing system.

1.02 Roof Garden Definition

Ultra-Extensive Roof Garden System

Roof Garden System (growth media depth 2.5" to 4") is ideally suited for areas likely to receive little maintenance. Recommended plants include sedums, herbs and grasses. The anticipated weight above the membrane assembly is generally between 4.8 and 6 pounds per square foot, per inch of system depth, in a saturated state.

1.03 DESIGN GUIDELINES

The Roof Garden Waterproofing assemblies will incorporate a minimum 60-mil thick Sure-Seal EPDM. Membrane will be adhered with appropriate adhesive to tapered insulation with an acceptable cover board. To facilitate drainage, a minimum roof slope of 1/4" in 12" must be provided at the waterproofing membrane level.

1.04 QUALITY ASSURANCE

- A. This Roof Garden Waterproofing System must be installed by a Carlisle Authorized Roofing Applicator in compliance with shop drawings as approved by Carlisle. There must be no deviations made from Carlisle's specifications or the approved shop drawings without the **PRIOR APPROVAL** of Carlisle.
- B. A **pre-installation meeting** should be coordinated by the specifier and attended by the roofing applicator, membrane manufacturer's representative and other trades working on the roof system both before and after membrane installation. The purpose of this meeting is to discuss the necessity of ensuring proper membrane protection during all phases of installation and to review other applicable requirements or unusual field conditions.
- C. Upon request by the Authorized Applicator, an inspection will be conducted by a Field Service Representative of Carlisle to ascertain that the membrane roofing system has been installed according to Carlisle's specifications and details. This **inspection** shall be coordinated **prior to installing the "above membrane roof garden components"** so access to the membrane is not impaired.
- D. Flood testing or other leak detection means is **required** to check the waterproof integrity of the membrane prior to installing any above membrane components.
- E. An in-progress inspection may be scheduled after the initial inspection (after the membrane installation is completed) to ensure proper protection procedures are being followed to prevent possible damage to the membrane during the installation of Roof Garden components.

Note: The roofing applicator must notify Carlisle at least 3 weeks in advance of the applicable inspection dates for coordination purposes.

1.05 SUBMITTALS

- A. To ensure compliance with Carlisle's warranty requirements, **all projects should be forwarded to Carlisle for review** prior to installation.
- B. A dimensioned layout of all field splices shall be included along with the project submittals (shop drawing and Request for Warranty).
- C. For all projects, prior to project inspection by Carlisle, a final shop drawing must be approved by Carlisle.

1.06 WARRANTY

- A. **10, 15 or 20-year** System Warranty is available for a charge on commercial buildings and applies only to **products manufactured or marketed by Carlisle SynTec Incorporated**. The membrane system is defined as membrane, flashings, adhesives, sealants and other Carlisle brand products utilized in this installation..

When Carlisle Roof Garden components are specified and installed, for a nominal charge, a 10, 15 or 20-year Overburden Warranty can be added. The warranty covers all Carlisle Roof Garden components above the membrane limited to the protection fabric, polystyrene, drainage products, moisture retention mat, growth media, and Carlisle Roof Garden Plants. In the event of a leak, Carlisle is responsible for overburden removal, roof repair, and replacement of the overburden.

If a 20-year **No Dollar Limit** warranty including overburden is desired, a Sustainable Roofing Alliance Consultant must be utilized on the project during the design and construction phases. The SRA consultant shall be on site to monitor the installation.

B. Access for warranty service

If a 10, 15 or 20-year Overburden Warranty is not obtained or if the owner chooses to use overburden by others, it shall be the owner's responsibility to expose the waterproofing membrane assembly in the event warranty service or investigation is necessary.

- C. The formation or presence of mold or fungi in a building is dependent upon a broad range of factors including, but not limited to, the presence of spores and nutrient sources, moisture, temperatures, climatic conditions, relative humidity, and heating/ventilating systems and their maintenance and operating capabilities. These factors are beyond the control of Carlisle and Carlisle shall not be responsible for any claims, repairs, restoration or damages relating to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in any building or in the air, land, or water serving the building.

1.07 JOB CONDITIONS

Material Safety Data Sheets (MSDS) must be on location at all times during transportation, storage, and application of materials. The applicator shall follow all safety regulation as recommended by OSHA and other agencies having jurisdiction.

- A. Coordination between various trades is essential to avoid unnecessary rooftop traffic over sections of the roof and to prevent damage to the membrane. Heavily traveled areas must be protected by placing temporary protection courses to prevent damage to the membrane.
- B. The use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly should be investigated by the specifier. Consult the latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association) for specific information.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the job site in the original, unopened containers labeled with the manufacturer's name, brand name and installation instructions.
- B. Job site storage temperatures in excess of 90° F (32° C) may affect shelf life of curable materials (i.e., sealants, cleaners, primers, adhesives, SecurTAPE, Pourable Sealer, Pressure-Sensitive Flashing and uncured flashing).
- C. When liquid adhesives and sealants are exposed to lower temperatures, restore to a minimum of 60° F

(16° C) before use. Do not store containers with opened lids due to loss of solvent that will occur from flash off.

- D. Sure-Seal and Sure-Weld FleeceBACK and AFX Membrane, when specified, should be stored in its original plastic wrap or be covered to protect from moisture. Any moisture absorbed by the fleece backing must be removed by using a wet-vac system, prior to membrane application.
- E. Membranes that have been exposed to the elements for approximately 7 days must be prepared with Weathered Membrane Cleaner prior to hot air welding. Refer to Carlisle's Sure-Weld Specifications, Part II, Application, for applicable requirements.
- F. Insulation, Dens Deck Prime, Securock, and base sheets, when specified, must be stored so they are kept dry and are protected from the elements. Store insulation, Dens Deck Prime, and Securock on a skid and completely cover with a breathable material such as tarp or canvas. If the insulation is lightweight, it should be weighted to prevent possible wind damage.
- G. Carlisle Engineered Growth Media should be stored under cover whenever possible to avoid direct sunlight exposure to the SuperSacks in which the material is delivered and excessive moisture absorption. Care should be taken not to damage the packaging to avoid leakage when hoisted to the rooftop.
- H. Carlisle Roof Garden Plants, when specified, should be planted promptly after delivery to the jobsite. Sedum cuttings should be used within 12 hours of arrival. Plugs should be unpacked immediately upon arrival and planted within three (3) days. Vegetated Sedum Tiles and Mats should be unpacked and installed within 36 hours. Unused plugs and tiles should be stored in an outdoor location with access to at least four (4) hours per day of direct sunlight.

PART II - PRODUCTS

2.01 GENERAL

The components of this roofing system are to be products of Carlisle. The installation, performance or integrity of products by others is not the responsibility of Carlisle and is expressly disclaimed by the Carlisle Warranty.

2.02 MEMBRANE

Sure-Seal[□] (black) EPDM, Sure-Seal[□] AFX-Plus, FleeceBACK[□] EPDM or Sure-Weld[□] TPO membrane can be used with this system. Refer to Paragraph 1.03, Design Guidelines for required membrane thickness that is dependent upon the type of Roof Garden and warranty selected. For membrane physical properties, refer to the appropriate Carlisle Technical Data Bulletins or Product Data Sheets.

2.03 RELATED CARLISLE MATERIALS FOR WATERPROOFING

A. Sure-Seal Products

Sure-Seal Bonding Adhesive, Low VOC Bonding Adhesive, FAST Adhesive, Cold Applied Adhesive, AquaBASE 120 Adhesive, SecurTAPE, HP-250 Primer, Low VOC EPDM Primer, Splicing Cement, In-Seam Sealant™, Lap Sealant, Universal Single-Ply Sealant, Weathered Membrane Cleaner, Cured EPDM Flashing, Cured Cover Strip, Pressure-Sensitive Overlayment Strip, Elastoform Flashing, Termination Bars, Fasteners/Plates Water Cut-Off Mastic, Pourable Sealer, Walkway Pads/Rolls, Pre-Molded Pipe Seals, and Pressure-Sensitive Inside/Outside Corners are used depending on the waterproofing assembly.

B. Sure-Weld Products

Sure-Weld Flashing, Sure-Weld Bonding Adhesive, Low VOC Bonding Adhesive, FAST Adhesive, Cold Applied Adhesive, AquaBASE 120 Adhesive, Cut-Edge Sealant, Water Cut-Off Mastic, Universal Single-Ply Sealant, TPO Molded Pocket Sealant, Weathered Membrane Cleaner, Pressure-Sensitive Cover Strip, Coated Metal, Heat Weldable Walkway Rolls, Pre-Molded Accessories, TPO Primer, Low VOC TPO Primer, Termination Bars, and Fasteners/Plates are used depending on the waterproofing assembly.

C. Sure-Flex Products

Sure-Flex PVC Bonding Adhesive, Sure-Flex PVC non-reinforced Flashing, Sure-Flex PVC "T" Joint Cover, Sure-Flex PVC Cut-Edge Sealant, Water Cut-Off Mastic, Universal Single-Ply Sealant, PVC One-Part Pourable Sealer, Foil Grip Aluminum Tape, PVC Membrane Cleaner, Sure-Flex PVC Coated Metal, Sure-

Flex PVC Heat Weldable Walkway Rolls, Sure-Flex PVC Inside/Outside Corners and Sure-Flex Pre-Molded accessories are used depending on the waterproofing assembly.

- D. Other Carlisle products, such as insulation and edgings/copings, are also required when such components are to be included as part of the System Warranty.

2.04 CARLISLE ROOF GARDEN COMPONENTS

- A. **MiraDRAIN G4 Drainage Composite** consists of a high impact polystyrene core with “cups” and high-flow overflow drains. A non-woven 100% post-consumer recycled polyester combination filter fabric and green moisture retention mat is bonded to the retention side of the molded core to prevent passage of particles into the water reservoirs. Designed to filter and retain water in all Roof Gardens while allowing excess water to quickly reach the drainage system. Drainage composite is 1.21” thick and holds up to 0.32” of rainfall (0.2 Gallons) per square foot. Packaged in 4' x 50' rolls weighing 70 pounds.

- B. **Carlisle Engineered Growth Media** – A lightweight FLL-approved growth media used for roof garden applications. Applied at the specified depth on Carlisle Roof Garden assemblies.

Depth: **3 ¼”**

Bulk Media Blend: **Lightweight Extensive**

Bulk Density (dry weight): **35.8 lbs/ft³**

Bulk Density (saturated weight): **57.5 lbs/ft³**

Total Pore Volume: **78.0 Vol%**

Maximum Water Holding Capacity: **37.0 Vol%**

Air-Filled Porosity (at max. WHC): **41.0 Vol%**

Water Permeability: **0.48 cm/s**

Water Permeability: **11.4 in/min.**

pH: **7.4**

Soluble Salts (water, 1:10, m:v): **0.4 mmhos/cm**

Soluble Salts (water, 1:10, m:v): **1.3 g (KC1)/L**

Organic Matter Content: **7.0 mass %**

C. Carlisle Roof Garden Plants

Vegetated Sedum Mats – Carlisle’s Vegetated Sedum Mats are available in 21.25 or 25 square foot rolls. Mats enable full vegetative coverage on the day of installation with the fastest possible installation time. Carlisle’s Vegetated Sedum Mats weigh approximately 5.5 pounds per square foot in a saturated state and are planted with seven to nine varieties of sedum. **Refer to Roof Garden Attachment V for more information.**

D. Polystyrene Insulation (available from Carlisle)

Insulfoam DB is a minimum 40 psi compressive strength, moisture resistant, closed cell expanded polystyrene with ¼” x ¼” drainage channels every 2” O.C. Installed directly over the roof membrane in Intensive (deep) garden assemblies. Available in 4”x 4” and 4” x 8” board sizes with a thickness of 1” to 40”. Readily available in custom lengths and widths.

- E. **Carlisle Aluminum Roof Garden Edge** – a 0.080” thick extruded aluminum edge used to separate roof garden assemblies from adjacent walkways or perimeter stone ballast. The edging comes in 10” lengths and 4” high with a 3” flange or 8” high with a 6” flange. Additional heights are available from Carlisle.
- F. **Carlisle Aluminum Roof Garden Drain Box** – a 0.125” thick extruded aluminum drain box that is 12” x 12” with a welded 4-1/2” flange to keep the drain areas clear of stone ballast or growth media. The drain box is available in 4” or 8” heights. Drainage holes are pre-punched around the sides. Access to the drain is provided by a removable lid. Custom sized Drain Boxes are available from Carlisle.

- G. **Carlisle Modified Base Sheet** – A tough, glass fiber, reinforced, SBS-modified asphalt, base sheet (nominal 39" wide by 50" long) that meets or exceeds the requirements for ASTM D 6163 Type I, Grade S for SBS-modified bituminous sheet materials. The Carlisle Modified Base Sheet is used directly under AFX-Plus Membrane.

PART III EXECUTION

3.01 GENERAL

When feasible, begin the application at the highest point of the highest roof level and work to the lowest point to prevent moisture infiltration and minimize construction traffic on completed sections. This will include completion of all flashings and terminations.

3.02 ROOF DECK CRITERIA

Proper decking shall be provided by the building owner. The building owner or its designated representative must ensure that the building structure is investigated by a registered engineer to assure its ability to withstand the total weight of the specified roofing system, as well as construction loads and live loads, in accordance with all applicable codes. The specifier must also designate the maximum allowable weight and location for material loading and storage on the roof.

3.03 SUBSTRATE REQUIREMENTS

The substrate must be dry, relatively smooth and free of protrusions, debris, sharp edges or foreign materials and must be free of accumulated water, ice and snow. Cracks or voids in the substrate greater than 1/4" (6 mm) must be filled with a suitable material.

3.04 WATERPROOFING INSTALLATION

Before beginning installation, refer to the applicable Material Safety Data Sheets, OSHA safety requirements, and Technical or Product Data Bulletins for cautions and warnings.

A. Insulation Attachment

1. Base layer of insulation can be mechanically attached with acceptable Carlisle Fasteners and Insulation Plates, Refer to applicable Adhered Application section for acceptable decks and the Carlisle Fasteners.
2. Fastening density is determined from insulation type and thickness. Refer to appropriate insulation attachment details in Sure-Seal/Sure-White Adhered Application Details, Sure-Weld Adhered Application Details or the Sure-Flex Specification.
3. As an alternate to mechanically attaching the base layer of insulation, Carlisle FAST Adhesive can be used. Refer to Sure-Seal/Sure-White Adhered Application – Attachment III, Sure-Weld Adhered Application – Attachment IV, or the Sure-Flex Adhered Specification Section 602116, paragraph 3.04.
4. Top layer of insulation must be an acceptable cover board adhered with FAST Adhesive. Refer to Sure-Seal/Sure-White Adhered Application – Attachment III or Sure-Weld Adhered Application – Attachment IV for application procedure. Cover boards shall be minimum ½-inch thick Dens-Deck Prime or Securock.

B. Membrane Installation

1. FleeceBACK Membranes either Sure-Seal EPDM or Sure-Weld TPO may be adhered with the appropriate adhesive directly over sloped structural concrete or wood roof decks. Direct application over cellular or perlite lightweight insulating concrete substrate may also be specified (contact Carlisle for acceptable lightweight insulating concretes).
2. Follow Carlisle's applicable Adhered Roofing System Specifications for insulation types, surface preparation procedures, membrane positioning, and adhesive application requirements.

C. Membrane Splicing

1. Refer to appropriate splicing procedures published in Sure-Seal EPDM or Sure-Weld TPO Adhered Application Specification.
2. **In addition to the standard splice procedure all field splices shall be overlaid with the appropriate 6" EPDM or TPO Pressure-Sensitive Cover Strip.**
3. Prior to Pressure-Sensitive Cover Strip application, the splice area must be primed with Sure-Seal HP-250 or Low VOC EPDM or Low VOC TPO Primer.

D. Flashing

1. Walls, curbs, skylights and all other penetrations through the membrane must be flashed in accordance with Carlisle's published specifications/details for the applicable membrane specified.
2. Flashing heights shall be greater in height than the specified depth of the Roof Garden assembly (Drainage composite, growth media, etc.).
3. Vertical field splices at walls, curbs, etc., must be overlaid in the same fashion as the field splices.

E. Roof Drains

1. Roof garden drains should be covered with Carlisle Aluminum Drain Box or a perforated drain box by others with removable lid for inspection purposes. 1-1/2" nominal diameter rounded river washed gravel is applied around the drain box a minimum 18" to promote drainage.
2. A standard cast iron compression ring clamping with 1-1/2" nominal diameter rounded river washed gravel applied around the drain sump area (minimum 18" in width) for drainage.

3.05 ROOF GARDEN INSTALLATION

A. Prior to installation of Roof Garden Components

1. Limit foot traffic over completed waterproofing system. Heavily traveled areas (staging areas, corridors used to transport roof garden components) must be protected using 1/2" thick plywood or other sheathing.
2. Perform a Flood Test to ensure the watertight integrity of the waterproofing system. Testing should take place after the membrane and flashings have been in place a minimum of 24 hours. Plug drains and provide necessary barriers to contain water.
3. "Flood Test" the membrane surface with water for 48 hours at a minimum depth of 2". Inspect for leaks and repair membrane if damage to waterproofing assembly is found. Retest after repairs have been made.
4. Sweep the surface of the membrane to remove all debris and loose or foreign material.

B. Ultra-Extensive Roof Garden Installation

1. MiraDrain G4 Drainage Composite

- a. Unroll the drainage composite and flip over so green or white moisture retention mat is facing upwards.
- b. Place drainage composite directly over the waterproofing membrane with the built-in overlapping flap facing the direction of the slope.
- c. Position additional drainage composite rolls next to each other with green moisture retention mat butted against the long side. Once in place, flip 6" retention mat flap over the first drainage composite. For runs of MiraDRAIN G4 exceeding 50 feet in length, peel back both fabrics approximately 3" on the adjacent ends of the rolls and insert two rows of the MiraDRAIN "cups" into the cups of the abutting roll. This locks the MiraDRAIN rolls together and does not allow for passage of growth media directly onto the waterproofing membrane.
- d. Continue with placement of drainage component until the designated roof garden area is covered.

2. Carlisle Engineered Growth Media

- a. Hoist growth media in SuperSacks by crane to the roof area that is receiving the Roof Garden.
- b. Distribution of the Carlisle Engineered Growth Media shall be directly over the MiraDRAIN G4 Drainage Composite from SuperSacks that are lowered by crane 2" to 4" above the drainage composite.
- c. Slit the bottom of the sack with a knife or other cutting device to dispense the growth media directly over the drainage composite or into wheelbarrows for transportation to hard to access areas.

Caution: Location points for distribution of growth media must not overload the structural capacity of building.

- d. Coverage rate per sack for a shallow assembly is approximately 150 square feet for a 4" depth.

Caution: Care must be taken when distribution of Carlisle Growth Media is during windy conditions to limit potential scouring of media. If growth media is not used on the day of arrival, product should be stored under a trap or other opaque cover to prevent direct exposure to sunlight and moisture.

Note: As an alternative to super sacks, growth media may be purchased in bulk and blown to the roof using a blower truck. For information please contact Carlisle.

3. Carlisle Roof Garden Vegetated Mats

- a. Lift the 48" x 75" mats from the pallets and unroll the mats directly over the growth media.
- b. Unroll Vegetated Mats adjacent to each other with edges butted together to within ¼".
- c. Continue with placement of vegetated mats until the designated roof garden area is covered.
- d. Water the Roof Garden assembly by hand or sprinkler(s) until the system is saturated.

C. After installation of Roof Garden Components

1. Irrigate the Roof Garden with a lawn sprinkler, hand sprayer, or with a designed irrigation system until saturation to the point of runoff.
2. Refer to **Roof Garden Attachment VI** for maintenance schedule.

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CCW MiraDRAIN HC is a registered Trademark of Carlisle Coatings and Waterproofing
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Roof Garden "Attachment V" Carlisle Vegetated Sedum Mats

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A. Vegetated Sedum Mats – Carlisle's Vegetated Sedum Mats are well suited for high slope applications and are pre-grown with a large variety of sedums. Each mat is available in 21.25 – 25 square foot rolls weighing approximately 80 pounds. Vegetated coverage after installation is 85% or greater. Vegetated Sedum Mats can be specified for US Hardening Zones 3 through 8. For Hardening Zones 9 and 10, please contact Carlisle for guidance. For US Hardening Zone Map refer to Roof Garden Attachment III.

B. Sedum Mat Varieties

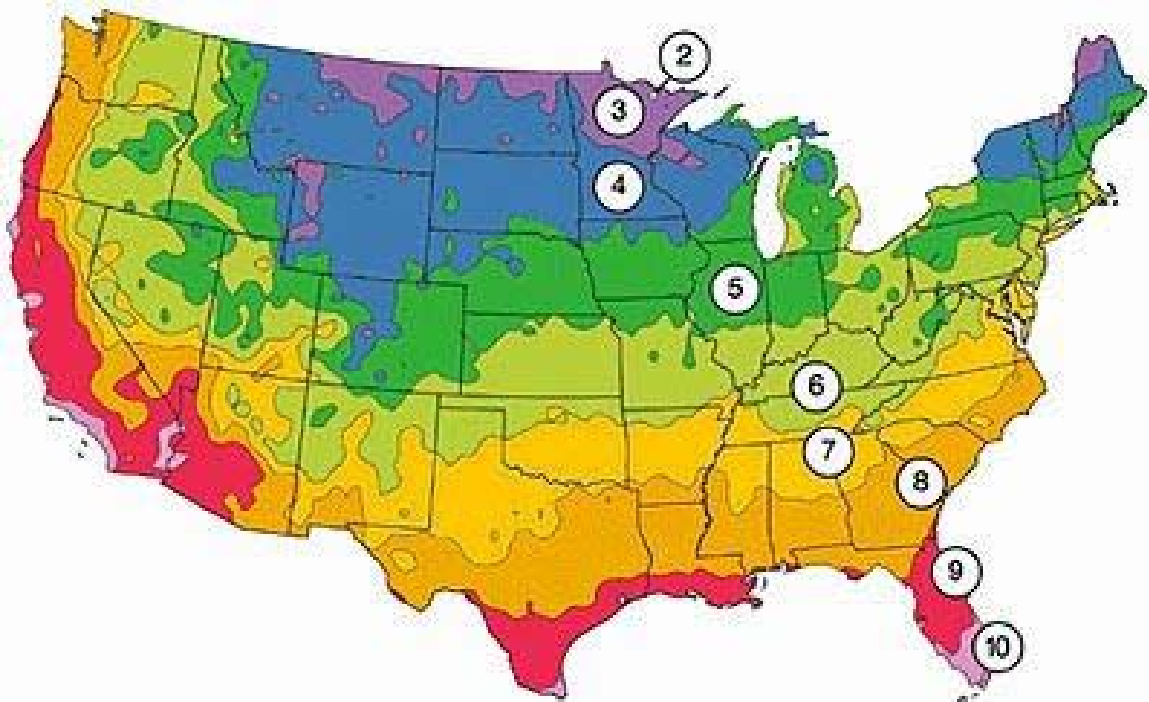
Carlisle's Vegetated Sedum Mats are planted with a minimum of 7 different varieties of sedum to achieve a mix of colors and textures. Sedum varieties consist of:

- Sedum Acre
- Sedum Album
- Sedum Ellacombianum
- Sedum Kamtschaticum
- Sedum Pulchellum
- Sedum Reflexum „Blue Spruce“
- Sedum Spurium „Fuldaglut“
- Sedum Spurium „Dragons Blood“
- Sedum Spurium „John Creech“
- Sedum Spurium „Red Carpet“
- Sedum Spurium „Tricolor“
- Sedum Sexangular



C. Installation - Remove the Sedum Mats from the pallets with care. Simply place the Sedum Mats over a minimum 2.5" of Carlisle Growth Media, leaving 1/8"-1/4" gap between the Mats. Water the Roof Garden assembly to the point of system saturation and water begins to leave the assembly.

Plant Varieties by Hardening Zones



United States Hardening Zones 2 through 10

Zone 2

- *Arenaria Montana*
- *Cerastium tomentosum*
- *Saponaria ocymoides*
- *Thymus praecox* 'Purple Carpet'
- *Veronica liwanensis*

Zone 3

- | | |
|---|--|
| <ul style="list-style-type: none"> • <i>Achillea</i> 'Appleblossom' • <i>Achillea millefolium</i> 'Summer Pastels' • <i>Achillea millefolium</i> 'Summer Wine' • <i>Achillea</i> 'Moonshine' • <i>Achillea</i> 'Paprika' • <i>Achillea</i> 'Terra Cotta' • <i>Arenaria montana</i> • <i>Armeria maritima</i> 'Alba' • <i>Artemisia stelleriana</i> 'Silver Brocade' • <i>Aurnia saxatilis</i> 'Gold Dust' • <i>Cerastium tomentosum</i> • <i>Phlox subulata</i> 'Candystripe' • <i>Phlox subulata</i> 'Crimson Beauty' • <i>Phlox subulata</i> 'Drummons Pink' • <i>Phlox subulata</i> 'Emerald Blue' • <i>Phlox subulata</i> 'Fort Hill' • <i>Phlox subulata</i> 'Red Wing' | <ul style="list-style-type: none"> • <i>Phlox subulata</i> 'White Delight' • <i>Saponaria ocymoides</i> • <i>Scabiosa columbaria</i> 'Pink Mist' • <i>Sedum acre</i> „Gold Moss“ • <i>Sedum album</i> „Coral Carpet“ • <i>Sedum hispanicum</i> „Purple Form“ • <i>Sedum kamtschaticum</i> • <i>Sedum kamtschaticum</i> „W. Gold“ • <i>Sedum sieboldii</i> • <i>Sedum spurium</i> „Fuldaglut“ • <i>Sedum spurium</i> „John Creech“ • <i>Sedum spurium</i> „Red Carpet“ • <i>Sedum spurium</i> „Tricolor“ • <i>Thymus praecox</i> 'Purple Carpet' • <i>Thymus pseudolanuginosus</i> 'Wooly Thyme' • <i>Veronica liwanensis</i> |
|---|--|

Zone 4

- | | |
|---|---|
| <ul style="list-style-type: none"> • <i>Achillea</i> 'Appleblossom' • <i>Achillea millefolium</i> 'Summer Pastels' • <i>Achillea millefolium</i> 'Summer Wine' | <ul style="list-style-type: none"> • <i>Achillea</i> 'Moonshine' • <i>Achillea</i> 'Paprika' • <i>Achillea</i> 'Terra Cotta' |
|---|---|

Plant Varieties Cont.

- *Achillea x lewisii* 'King Edward'
- *Arenaria montana*
- *Armeria maritima* 'Alba'
- *Armeria maritima* 'Splendens'
- *Artemisia stelleriana* 'Silver Brocade'
- *Aurinia saxatilis* 'Gold Dust'
- *Aurinia saxatilis* 'Summit'
- *Cerastium tomentosum*
- *Dianthus deltooides* 'Brilliant'
- *Dianthus* 'Spangled Star'
- *Phlox subulata* 'Candystripe'
- *Phlox subulata* 'Crimson Beauty'
- *Phlox subulata* 'Drummons Pink'
- *Phlox subulata* 'Emerald Blue'
- *Phlox subulata* 'Fort Hill'
- *Phlox subulata* 'Red Wing'
- *Phlox subulata* 'White Delight'
- *Potentilla nepalensis* 'Miss Wilmot'
- *Saponaria ocymoides*
- *Scabiosa columbaria* 'Pink Mist'
- *Sedum acre* „Gold Moss“

Zone 5

- *Achillea* 'Appleblossom'
- *Achillea x lewisii* 'King Edward'
- *Achillea millefolium* 'Summer Pastels'
- *Achillea millefolium* 'Summer Wine'
- *Achillea* 'Moonshine'
- *Achillea* 'Paprika'
- *Achillea* 'Terra Cotta'
- *Arenaria montana*
- *Armeria maritima* 'Alba'
- *Armeria maritima* 'Dusseldorfer Stolz'
- *Armeria maritima* 'Splendens'
- *Artemisia stelleriana* 'Silver Brocade'
- *Aurinia saxatilis* 'Gold Dust'
- *Aurinia saxatilis* 'Summit'
- *Cerastium tomentosum*
- *Delosperma nubigenum*
- *Dianthus deltooides* 'Brilliant'
- *Dianthus* 'Spangled Star'
- *Lavandula angustifolia* 'Hidcote'
- *Phlox subulata* 'Candystripe'
- *Phlox subulata* 'Crimson Beauty'
- *Phlox subulata* 'Drummons Pink'
- *Phlox subulata* 'Emerald Blue'
- *Phlox subulata* 'Fort Hill'
- *Phlox subulata* 'Red Wing'
- *Phlox subulata* 'White Delight'

- *Sedum album* „Coral Carpet“
- *Sedum hispanicum* „Purple Form“
- *Sedum kamtschaticum*
- *Sedum kamtschaticum* „W. Gold“
- *Sedum kamtschaticum* k. *variegatum*
- *Sedum rupestre* „Angelina“
- *Sedum sexangular*
- *Sedum sieboldii*
- *Sedum spurium* „Fuldaglut“
- *Sedum spurium* „John Creech“
- *Sedum spurium* „Red Carpet“
- *Sedum spurium* „Tricolor“
- *Sempervivum* 'Black'
- *Sempervivum* 'Cobweb Buttons'
- *Thymus praecox* 'Bressingham'
- *Thymus praecox* 'Purple Carpet'
- *Thymus pseudolanuginosus* 'Woolly Thyme'
- *Thymus serpyllum* 'Albus' ('Album')
- *Thymus serpyllum* 'Coccineum'
- *Thymus serpyllum* 'Elfin'
- *Veronica liwanensis*

- *Potentilla nepalensis* 'Miss Wilmot'
- *Saponaria ocymoides*
- *Scabiosa columbaria* 'Pink Mist'
- *Sedum acre* „Gold Moss“
- *Sedum album* „Coral Carpet“
- *Sedum hispanicum* „Purple Form“
- *Sedum kamtschaticum*
- *Sedum kamtschaticum* k. *variegatum*
- *Sedum kamtschaticum* „W. Gold“
- *Sedum rupestre* „Angelina“
- *Sedum sexangular*
- *Sedum sieboldii*
- *Sedum spurium* „Fuldaglut“
- *Sedum spurium* „John Creech“
- *Sedum spurium* „Red Carpet“
- *Sedum spurium* „Tricolor“
- *Sempervivum* 'Black'
- *Sempervivum* 'Cobweb Buttons'
- *Thymus praecox* 'Bressingham'
- *Thymus praecox* 'Purple Carpet'
- *Thymus pseudolanuginosus* 'Woolly Thyme'
- *Thymus serpyllum* 'Albus' ('Album')
- *Thymus serpyllum* 'Coccineum'
- *Thymus serpyllum* 'Elfin'
- *Veronica liwanensis*

Plant Varieties Cont.

Zone 6

- *Achillea* 'Appleblossom'
- *Achillea x lewisii* 'King Edward'
- *Achillea millefolium* 'Summer Pastels'
- *Achillea millefolium* 'Summer Wine'
- *Achillea* 'Moonshine'
- *Achillea* 'Paprika'
- *Achillea* 'Terra Cotta'
- *Agastache* 'Blue Fortune'
- *Arenaria montana*
- *Armeria maritima* 'Alba'
- *Armeria maritima* 'Dusseldorfer Stolz'
- *Armeria maritima* 'Splendens'
- *Artemisia stelleriana* 'Silver Brocade'
- *Aurinia saxatilis* 'Gold Dust'
- *Aurinia saxatilis* 'Summit'
- *Cerastium tomentosum*
- *Delosperma cooperi*
- *Delosperma nubigenum*
- *Dianthus deltoides* 'Brilliant'
- *Dianthus* 'Spangled Star'
- *Lavandula angustifolia* 'Hidcote'
- *Phlox subulata* 'Candystripe'
- *Phlox subulata* 'Crimson Beauty'
- *Phlox subulata* 'Drummons Pink'
- *Phlox subulata* 'Emerald Blue'
- *Phlox subulata* 'Fort Hill'
- *Phlox subulata* 'Red Wing'
- *Phlox subulata* 'White Delight'
- *Potentilla nepalensis* 'Miss Wilmot'
- *Saponaria ocymoides*
- *Scabiosa columbaria* 'Pink Mist'
- *Sedum acre* „Gold Moss“
- *Sedum album* „Coral Carpet“
- *Sedum hispanicum* „Purple Form“
- *Sedum kamtschaticum*
- *Sedum kamtschaticum* k. varigatum
- *Sedum kamtschaticum* „W. Gold“
- *Sedum reflexum* „Blue Spruce“
- *Sedum rupestre* „Angelina“
- *Sedum sexangular*
- *Sedum sieboldii*
- *Sedum spurium* „Fuldaglut“
- *Sedum spurium* „John Creech“
- *Sedum spurium* „Red Carpet“
- *Sedum spurium* „Tricolor“
- *Sempervivum* 'Black'
- *Sempervivum* 'Cobweb Buttons'
- *Thymus praecox* 'Bressingham'
- *Thymus praecox* 'Purple Carpet'
- *Thymus pseudolanuginosus* 'Wooly Thyme'
- *Thymus serpyllum* 'Albus' ('Album')
- *Thymus serpyllum* 'Coccineum'
- *Thymus serpyllum* 'Elfin'
- *Veronica liwanensis*

Zone 7

- *Achillea* 'Appleblossom'
- *Achillea x lewisii* 'King Edward'
- *Achillea millefolium* 'Summer Pastels'
- *Achillea millefolium* 'Summer Wine'
- *Achillea* 'Moonshine'
- *Achillea* 'Paprika'
- *Achillea* 'Terra Cotta'
- *Agastache* 'Blue Fortune'
- *Arenaria montana*
- *Armeria maritima* 'Alba'
- *Armeria maritima* 'Dusseldorfer Stolz'
- *Armeria maritima* 'Splendens'
- *Artemisia stelleriana* 'Silver Brocade'
- *Aurinia saxatilis* 'Gold Dust'
- *Aurinia saxatilis* 'Summit'
- *Cerastium tomentosum*
- *Delosperma cooperi*
- *Delosperma nubigenum*
- *Dianthus deltoides* 'Brilliant'
- *Dianthus* 'Spangled Star'
- *Lavandula angustifolia* 'Hidcote'
- *Phlox subulata* 'Candystripe'
- *Phlox subulata* 'Crimson Beauty'
- *Phlox subulata* 'Drummons Pink'
- *Phlox subulata* 'Emerald Blue'
- *Phlox subulata* 'Fort Hill'
- *Phlox subulata* 'Red Wing'
- *Phlox subulata* 'White Delight'
- *Potentilla nepalensis* 'Miss Wilmot'
- *Saponaria ocymoides*
- *Scabiosa columbaria* 'Pink Mist'
- *Sedum acre* „Gold Moss“
- *Sedum album* „Coral Carpet“
- *Sedum hispanicum* „Purple Form“
- *Sedum kamtschaticum*
- *Sedum kamtschaticum* k. varigatum
- *Sedum kamtschaticum* „W. Gold“
- *Sedum reflexum* „Blue Spruce“

Plant Varieties Cont.

- Sedum rupestre „Angelina“
- Sedum sexangular
- Sedum sieboldii
- Sedum spurium „Fuldaglut“
- Sedum spurium „John Creech“
- Sedum spurium „Red Carpet“
- Sedum spurium „Tricolor“
- Sempervivum 'Black'

Zone 8

- Achillea 'Appleblossom'
- Achillea x lewisii 'King Edward'
- Achillea millefolium 'Summer Pastels'
- Achillea millefolium 'Summer Wine'
- Achillea 'Moonshine'
- Achillea 'Paprika'
- Achillea 'Terra Cotta'
- Agastache 'Blue Fortune'
- Armeria maritima 'Alba'
- Armeria maritima 'Dusseldorfer Stolz'
- Armeria maritima 'Splendens'
- Artemisia stelleriana 'Silver Brocade'
- Aurinia saxatilis 'Gold Dust'
- Aurinia saxatilis 'Summit'
- Delosperma cooperi
- Delosperma nubigenum
- Dianthus deltoides 'Brilliant'
- Dianthus 'Spangled Star'
- Lavandula angustifolia 'Hidcote'
- Sedum acre „Gold Moss“
- Sedum album „Coral Carpet“
- Sedum hispanicum „Purple Form“

Zone 9

- Achillea millefolium 'Summer Pastels'
- Achillea millefolium 'Summer Wine'
- Achillea 'Moonshine'
- Achillea 'Paprika'
- Achillea 'Terra Cotta'
- Agastache 'Blue Fortune'
- Armeria maritima 'Dusseldorfer Stolz'
- Armeria maritima 'Splendens'
- Artemisia stelleriana 'Silver Brocade'
- Delosperma cooperi
- Delosperma nubigenum
- Dianthus deltoides 'Brilliant'
- Dianthus 'Spangled Star'
- Sedum kamtschaticum k. varigatum
- Sedum reflexum „Blue Spruce“
- Sedum sieboldii
- Sempervivum 'Black'

- Sempervivum 'Cobweb Buttons'
- Thymus praecox 'Bressingham'
- Thymus praecox 'Purple Carpet'
- Thymus pseudolanuginosus 'Woolly Thyme'
- Thymus serpyllum 'Albus' ('Album')
- Thymus serpyllum 'Coccineum'
- Thymus serpyllum 'Elfin'
- Veronica liwanensis

- Sedum kamtschaticum
- Sedum kamtschaticum k. varigatum
- Sedum kamtschaticum „W. Gold“
- Sedum reflexum „Blue Spruce“
- Sedum rupestre „Angelina“
- Sedum sexangular
- Sedum sieboldii
- Sedum spurium „Fuldaglut“
- Sedum spurium „John Creech“
- Sedum spurium „Red Carpet“
- Sedum spurium „Tricolor“
- Sempervivum 'Black'
- Sempervivum 'Cobweb Buttons'
- Thymus praecox 'Bressingham'
- Thymus praecox 'Purple Carpet'
- Thymus pseudolanuginosus 'Woolly Thyme'
- Thymus serpyllum 'Albus' ('Album')
- Thymus serpyllum 'Coccineum'
- Thymus serpyllum 'Elfin'
- Veronica liwanensis

Zone 10 – Please contact Carlisle for plants suitable to Zone 10.

Roof Garden "Attachment VI" Roof Garden Maintenance

November 2011

Immediately After Planting

1. Water/irrigate the roof to the point of run-off.
2. Inspect drains for any foreign debris that may hinder their performance.

Irrigation Requirements

1. Water the system two to three times a week in the mid-morning for at least the first month.
2. During extremely hot, dry, drought type conditions, regularly check your Roof Garden system for signs of stress. If the plants seem to be thirsty where they are wilted, you must irrigate the system. During these times, irrigation should be done twice a week in the morning or evenings.
3. If the Roof Garden was installed in an area that receives less than 35 inches of rainfall per year, a permanent irrigation system is required.

First Season

1. One month after planting, all weeds and non-specified plant material must be pulled from the growth media and removed from the rooftop. A minimum of two weed removal events should occur during the first season. Little to no weeding should be necessary.
2. During weed removal events, all drains must be inspected. If Carlisle Roof Garden Drain Boxes are utilized, remove the four Phillips head screws on the lid and remove to visually inspect the drain internals.
3. After the local trees have dropped their leaves, a final Autumn inspection must be performed. All debris must be removed from the Roof Garden and drains must be given a final inspection for the season.

Second Season

1. If in USDA climate 7 or above, a Spring fertilizer application may be given. Granular **organic** fertilizer can be used at the full rate recommended on the packaging. Petrochemical-based time-release fertilizer (Osmocote, Miracle-Gro, etc.) can be used at **half** the rate recommended on the packaging. Organic fertilization will result in a lower water requirement for the plants. On all-sedum roofs, fertilization should not be needed.
2. A mid-Spring weed removal and drain inspection event must occur. A total of two weed removal and drain inspection events should occur during the second season
3. If Carlisle's Sedum Mats are used, neither watering nor weeding should be required.
4. After the local trees have dropped their leaves, a final Autumn inspection must be performed. All debris must be removed from the Roof Garden and drains must be given a final inspection for the season.

Third season

1. A Spring fertilizer application may be given, if needed.
2. One weed removal event must occur, in the mid-Spring
3. During the Autumn maintenance event, all foreign debris must be removed from the roof

If possible, monitor your Carlisle Roof Garden by visual examination at least once a month to make sure that the plants appear healthy. Should your roof garden experience any health-related issues, contact Carlisle SynTec Inc. for support. Once established, your Carlisle Roof Garden should provide you with decades of beautiful and trouble-free service.