D. SYSTEM WARRANTY REQUIREMENTS:

		Extensive Greening Shallow Assembly		Simple Intensive Greening Medium Assembly		Intensive Greening Deep Assembly	
Approximate weight of above membrane material *[1]		15 pounds per square foot (73 Kg/m^2)		<25 pounds per square foot (122 Kg/m^2)		>25 pounds per square foot (122 Kg/m^2)	
Growth Media		**Required** <4" (10 cm) of Depth		**Required** 4" (10 cm) to 8" (20 cm) of Depth		**Required** >8" (20 cm) of Depth	
Moisture Retention Mat		**Required**		Optional		Optional	
Protection Fabric		Optional		Optional		**Required** 16 oz/yd^2	
Drainage Media		Optional		Optional		Required	
Drainage Board		**Required**		**Required**		Optional	
Protection Fabric		**Required**		Optional		**Required** 16 oz/yd^2	
		10- 15 year	20 year				
		12 oz/yd^2	16 oz/yd^2				
Root Barrier		Optional		**Required**		**Required**	
Protection Fabric		Optional		**Required** 16 oz/yd^2		Optional	
Extruded Polystyrene		Optional		Optional		**Required** Minimum 2" (5 cm)	
Membrane	Warranty Period	10- 15 year	20 year	10- 15 year	20 year	10- 15 year	20 year
	EPDM	60 mil RubberGard Non-reinforced EPDM	90 mil Platinum	60 mil RubberGard MAX Reinforced EPDM	90 mil Platinum	90 mil Platinum	90 mil Platinum
	TPO	60 mil UltraPly	80 mil UltraPly	60 mil UltraPly	80 mil UltraPly	80 mil UltraPly	80 mil UltraPly
Protection Board		**Required**		**Required**		**Required**	
Insulation		Optional		Optional		Optional	
Substrate		See Section 1.05					

1 Typical wet soil weighs approximately100 lbs per cubic foot (1,597 kg per cubic meter). Some mixes of growth media consisting of various types of lightweight growing media such as layers of lightweight substrate made up of sand, pumice, and compost can weigh only 60 lbs/sf (292.6 kg per square meter) when fully saturated. It is the design professionals responsibility to determine the actual weight of the system and to perform a thorough analysis of the roof structure.

1.12 PRODUCTS

A. INSULATION (OPTIONAL, INSTALLED BETWEEN PROTECTION BOARD AND STRUCTURAL DECK):

1. Firestone ISO 300 1.0"(25.4 mm) minimum thickness
2. Firestone ISO 95+ (flat or tapered) 1.0"(25.4 mm) minimum thickness
3. Firestone Composite Insulation 1.5"(38.1 mm) minimum thickness
4. DensDeck 1/4" (6.3 mm) minimum thickness.

B. PROTECTION BOARD (REQUIRED):

1. DensDeck Prime ½"(12.7mm) minimum thickness
2. Firestone HailGard 1 ½"(38.1 mm) minimum thickness

C. MEMBRANE

		Extensive Greening Shallow Assembly		Simple Intensive Greening Medium Assembly		Intensive Greening Deep Assembly	
	Warranty Period	10- 15 year	20 year	10- 15 year	20 year	10- 15 year	20 year
Membrane	EPDM	60 mil RubberGard Non-reinforced EPDM	90 mil Platinum	60 mil RubberGard MAX Reinforced EPDM	90 mil Platinum	90 mil Platinum	90 mil Platinum
	UltraPly TPO	60 mil UltraPly	80 mil UltraPly	60 mil UltraPly	80 mil UltraPly	80 mil UltraPly	80 mil UltraPly

D. EXTRUDED POLYSTYRENE:

1. Extruded Polystyrene Insulation – Dow Roofmate or Foamular 404/604, a minimum 40/60-psi compressive strength, moisture resistant, closed cell polystyrene foam insulation with drainage channels along board edges to promote drainage at the membrane level. Installed directly over the roof membrane in Intensive Greening (deep) garden assemblies. Available in 2' x 8' board sizes with a thickness of 1" to 4".

E. PROTECTION FABRIC:

1. Polypropylene non-woven needle punched fabric, stabilized to resist soil chemicals, mildew, and insects and is non-biodegradable.

Property	Test	Units	Typical Value	
			12 oz/yd^2 (285 gram/m^2)	16 oz/yd^2 (380 gram/m^2)
Puncture Resistance	ASTM D 4833	Lbs (kN)	130 (.58)	235 (1.05)
Mullen Burst	ASTM D 3786	Psi (kPa)	400 (2,756)	750 (5,167)
Elongation	ASTM D 4682	%	50	50
Thickness	ASTM 5199	Mils (mm)	90 (2.3)	150 (3.8)

F. ROOT BARRIER:

1. Used in Intensive Greening (deep) and Simple Intensive Greening (medium depth) Roof Garden Systems.

a) 40 mil non-reinforced geomembrane: A non-reinforced polypropylene sheet specifically formulated for use in below grade applications to resist root growth and soil bacteria. Adjoining sheets are heat welded.

Property	Test Method	Typical Value
Thickness		15 mils
Weight		1.1 oz/ft^2
Color		Red
Tensile Strength	ASTM D 882	1,628 psi
Elongation	ASTM D 882	77%
Cracking or Delamination (@ 20 ^{o} F)	ASTM E 154-12	Passes
Puncture Resistance	ASTM E 154-10	124.4 lbs
Perm Rating	ASTM E 96	.008
Classification A, B, C	ASTM E1745	Exceeds Class A