



**QUALITY ROOF DECKS FOR
NEW CONSTRUCTION
AND
REROOFING APPLICATIONS**



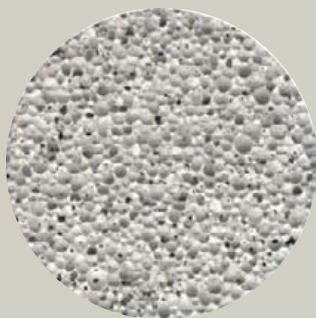
Slope-to-Drain

Lightweight

High R-Value

**Superior to
Insulation Board**

Low Cost



ELASTIZELL

**COMPOSITE INSULATING
ROOF DECK SYSTEMS**

THE ELASTIZELL ADVANTAGE

OUR BASIC PRODUCT

Elastizell is 100% Portland Cement containing no water absorbing expanded fillers. Elastizell requires only one-fourth the mix water of these concretes. A common misconception is that all insulating concretes have high water content. Elastizell does not! Elastizell obtains its workability not from excessive water, but from discrete air cells.

Elastizell Roof Decks are:

- ▶ Permanent
- ▶ Insulative
- ▶ Nailable
- ▶ Approved
- ▶ Economical
- ▶ Moisture Resistant
- ▶ Strong
- ▶ Non-combustible
- ▶ Compatible with Roofing
- ▶ Dimensionally Stable
- ▶ Resistant to Wind Uplift

Elastizell Composite Insulating Roof Decks are superior to rigid board systems. In the past, roofing systems utilized rigid board insulation because its low cost seemed to outweigh its many disadvantages. Now, economical Elastizell Roof Decks have many advantages over rigid board systems. Elastizell Roof Decks solve roofing problems! They have performed in the marketplace for over 30 years. When compared to insulation board systems, Elastizell Roof Decks are superior in every way!

Architects and Consultants have become increasingly aware of the many difficulties inherent with insulation board roof decks.

DIFFICULTIES INHERENT WITH INSULATION BOARD

	RIGID INSULATION BOARD	ELASTIZELL ROOF DECKS
ReRoofability	Difficult since insulation must be removed, disposed, and replaced	Simply replace the membrane
Slope-to-Drain	Positive slope & drainage is difficult and often impossible	Cast slope-to-drain
Life Cost	High cost when materials, labor and maintenance costs are added	Low cost with minimum maintenance required
Moisture Absorbance and Transfer	Absorbs and transfers moisture during roofing failures - must replace insulation	No moisture absorbing components
Installation Over Metal Deck	Especially during inclement weather, water collecting under insulation is a serious problem	Flutes are filled with slurry preventing water collection.
Fasteners	<ul style="list-style-type: none"> • Board may creep if not fastened properly • Fastener corrosion • Not holding to thin metal sections 	Accepts fasteners

ELASTIZELL ADVANTAGES OVER INSULATION BOARD

Customized Slope-to-Drain

The purpose of a roof system is to protect the interior of a building from the outside environment. Proper slope-to-drain eliminates ponding which is the cause of membrane aging leading to roof leaks. Tapered insulation is only effective on simple drainage patterns with few penetrations.

The Elastizell Composite Insulating Roof Deck System provides positive drainage in new construction and reroofing applications. The insulation system is cast with a positive slope to correct and adjust field differences which always occur between drawings and actual rooftop conditions.

Few roof decks have regular drainage patterns or built-in slopes for positive drainage. Elastizell achieves positive drainage by combining a stair-stepped, EPS insulation board with custom sloping of the Elastizell. Standard rigid board cannot do this and tapered board systems are costly and inefficient.

Low Cost

An Elastizell Composite System is less costly than rigid insulation board. EPS insulation is bonded to the substrate. Once the Elastizell Roof Deck is cast, installation of the membrane is continuous and fast.

Wind Uplift

Elastizell Roof Decks perform as an air retarder providing excellent wind uplift performance. Elastizell bonds the EPS board to the structural deck, filling depressions and deck flutes.

Elastizell Roof Decks have UL, FM and Miami-Dade County wind uplift ratings. See Page 7 for listings.

Integral System

The Elastizell Composite System encapsulates EPS board within the system. EPS board is bonded to the deck in new construction or to the existing roof membrane in reroofing applications. Elastizell bonds the EPS to the deck and completely fills depressions and deck flutes which are not filled with insulation board systems. Elastizell encapsulates EPS insulation for resistance to uplift, fire and seismic forces. Cast-in-place Elastizell sandwiches the EPS insulation board to the deck creating an integral system. Deck penetrations do not weaken the system and stress-causing joints directly under the roofing membrane are eliminated.

Permanent Insulation

An Elastizell Roof Deck is permanent insulation which performs better than rigid insulation. Rigid insulation acts like a sponge, soaking up moisture and reducing its insulation value. Once a roof leaks over rigid board, the wet insulation must be replaced. This is not the case with Elastizell and encapsulated EPS insulation. With an Elastizell Roof Deck, only the membrane is replaced.

Elastizell fills the flutes of metal deck systems so that air infiltration is eliminated. Elastizell Roof Decks have neither the joint problems nor the thermal drift characteristics associated with rigid board insulation.

Fasteners

Mechanically attached insulation board systems have extensive and confusing fastening requirements.

Re-Roofability

No roof system lasts forever. When a membrane fails over insulation board, the entire system must be torn off and replaced exposing the building's interior. Rigid insulation board is damaged by water. An Elastizell Composite System is not damaged by water. Encapsulated EPS board is completely protected with an Elastizell Composite System - only the roofing membrane need be replaced.

Heat Sink

Elastizell and EPS board provide a heat sink beneath the roofing membrane moderating temperature changes which cause thermal shock twice daily - heat from the sun and cooling at nighttime or by rain.

Insulation board next to and under the roofing membrane cannot absorb this heat, resulting in greater thermal shock eventually causing fatigue and splits in the membrane.

Fire Rated

Elastizell Roof Decks have many fire ratings. Elastizell is non-combustible and does not require fireproofing of the underside of the steel deck or the addition of a separate thermal barrier necessary with rigid board systems. Since the flutes are filled, this fire channel is eliminated.

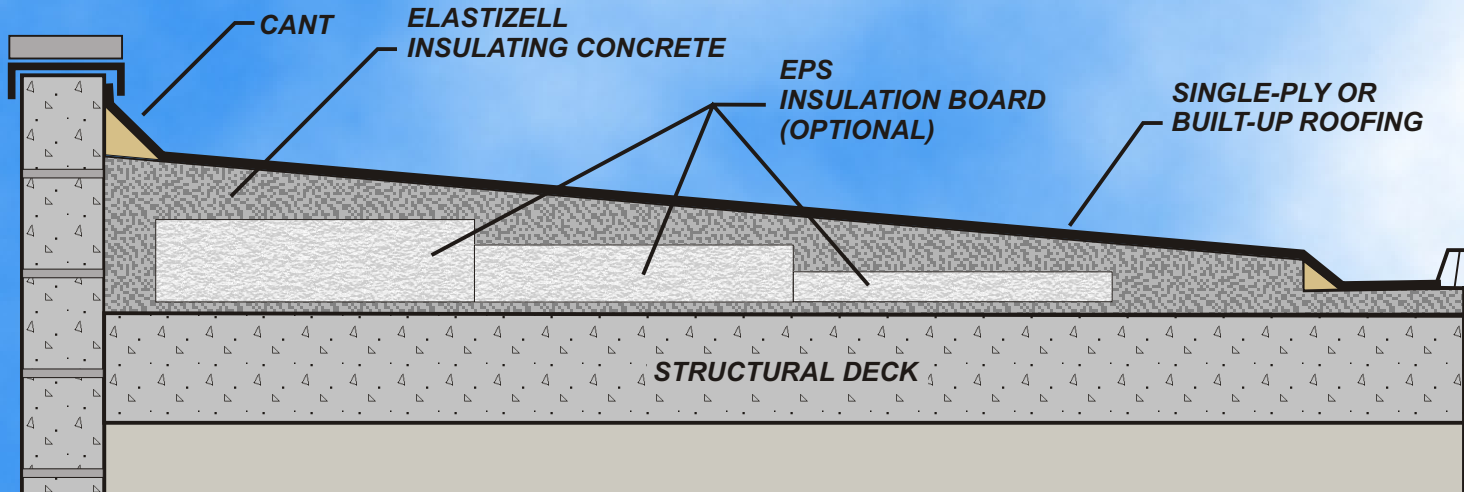
Elastizell Roof Decks have numerous UL fire ratings. See Page 5 for listings.

Low Weight

System weights as low as 7 psf.

Over Precast
or Structural
Concrete

Elastizell is an excellent composite insulation system over precast and cast-in-place concrete. Since bottom-side venting provisions are difficult, perimeter venting should be considered at the flashing/counter flashing detail.



DESIGNED AND TESTED TO MEET THE HIGHEST INDUSTRY STANDARDS

For more than 40 years, the Elastizell Corporation of America has researched, developed, tested, improved and perfected the Elastizell Composite Insulating Roof Deck System.

ACCEPTED BY THE EXPERTS AND THE INDUSTRY

Elastizell systems have numerous wind uplift, fire and seismic ratings. Major roofing manufacturers accept Elastizell Composite Insulating Roof Deck Systems with their warranted membranes.

THE BASIC SYSTEMS

Elastizell Composite Insulation can be placed over precast or cast-in-place concrete, and galvanized steel decking. In both of these systems, the EPS insulation board increases R-values and reduces dead load. System weights as low as 7 psf.

EPS INSULATION BOARD

When combined with EPS, Elastizell Roof Decks have advantages over other roofing systems:

- ▶ A solid base for roofing membranes
- ▶ Reduced dead weight
- ▶ Slope-to-drain capability
- ▶ Fire, seismic and wind uplift ratings

ROOFING

Roofing may begin when the roof deck can withstand foot traffic which is from one to two days after the deck is cast. The Elastizell deck should not be left exposed for longer than five to seven days -- especially in dry climates. The presence of cracking is not detrimental to the roofing system.

THE ROOFING BASE SHEET

The roofing base sheet is attached with an approved base sheet fastener to the Elastizell Roof Deck in a pattern recommended by the roofing manufacturer. Fastener pullout values increase with the age of the roof deck. Typical nail withdraw is 40 pounds.

PERIMETER VENTING

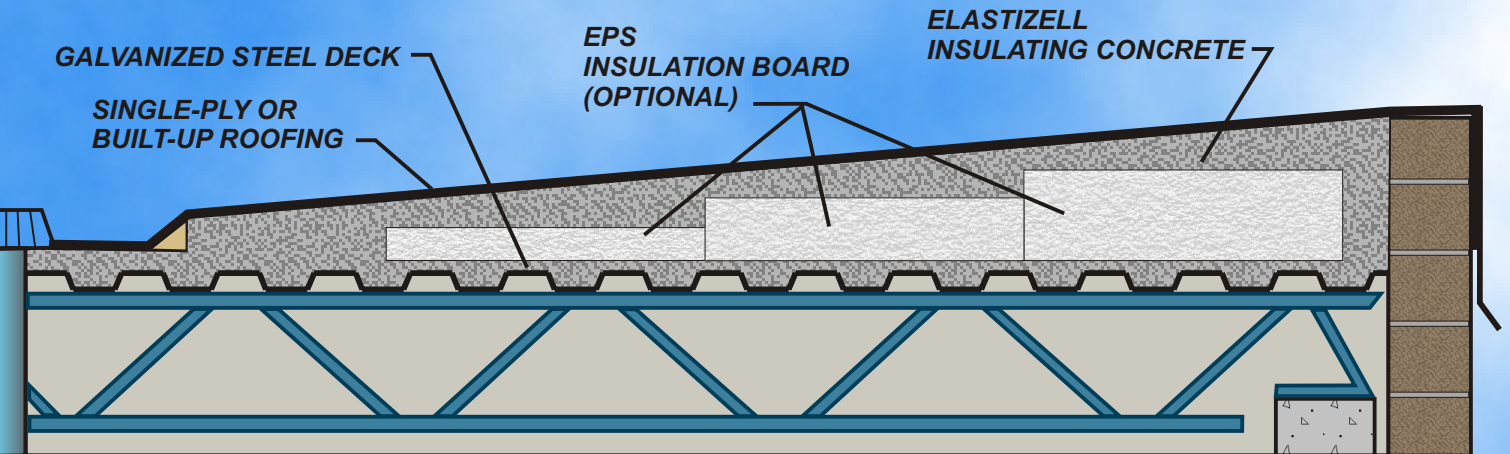
Perimeter venting at the flashing/counter flashing detail should be a part of the roof system although it is not necessary in low humidity regions. Special bottom-side venting provisions are not normally required unless local practice includes it.

FOR SINGLE-PLY ROOFING

For single-ply roofing consult the manufacturer for specific recommendations. Modified bitumens may be torched or mopped to a nailed base sheet.

Over Galvanized Steel Decks

Elastizell does not require the slotted steel decks demanded by wet aggregate concretes. Elastizell may be cast over either slotted or non-slotted steel decks according to local conditions. Specify Elastizell over G-60 or G-90 galvanized steel centering since painted steel deck is unsuitable for the direct application of any concrete.



NEW CONSTRUCTION

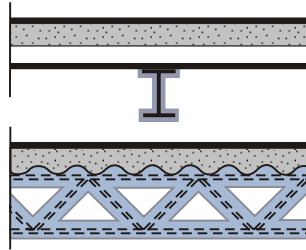
ELASTIZELL UL FIRE-RATED SYSTEMS



UL Rated

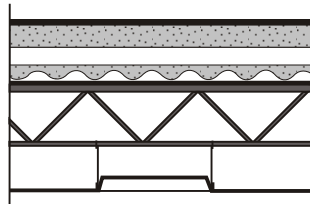
Unprotected Steel Deck

- ▶ Built-up or single-ply roofing
- ▶ Elastizell Composite Insulating Roof Deck System
- ▶ EPS insulation board (optional)
- ▶ Exposed steel deck
- ▶ Sprayed beam or joist



Protected Steel Deck

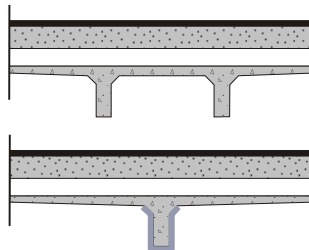
- ▶ Built-up or single-ply roofing
- ▶ Elastizell Composite Insulating Roof Deck System
- ▶ EPS insulation board (optional)
- ▶ Steel deck over bar joists
- ▶ Suspended ceiling



Armstrong Ceilings
Other Tile Ceilings
Plaster Ceiling
Gypsum Board Ceiling

Precast Concrete Deck

- ▶ Built-up or single-ply roofing
- ▶ Elastizell Composite Insulating Roof Deck System
- ▶ EPS insulation board (optional)
- ▶ Precast single or double Tees



Exposed
Sprayed Fireproofing

Structural Concrete & Protected Steel Deck

Structural Concrete & Unprotected Steel Deck

Hollow Core Concrete Deck (PCA Studies)

P902, P903, P907, P908, P919, P920, P921, P922, P923, P924, P925, P926, P927, P928, P929, P930

P215, P216, P231, P251
P214, P241, P246, P255, P261, P264
P405, P406, P407, P410, P411
P501, P503, P509, P511, P512, P514, P520

P905, P910, P913, P916
P708, P737, P810, P812

D708, D750, D755, D759, D768, D775, D832
D902, D916, D919, D922, D923, D925, D927, D929

PHYSICAL PROPERTIES

	Air Dry Density		Oven Dry Density		Cast Density		28-Day Minimum Compressive Strength		R-value (per inch)*
	(pcf)	kg/m ³	(pcf)	kg/m ³	(pcf)	kg/m ³	(psi)	MPa	
RANGE IA	21-27	336-432	16-20	256-320	26-34	416-545	40	0.28	1.80
RANGE IB			20-24	320-384			80	0.55	1.58
RANGE IIA	27-32	432-513	24-28	384-448	34-42	545-673	160	1.10	1.34
RANGE IIB			28-32	448-513			200	1.38	1.20
RANGE IIIA	32-40	513-641	32-38	513-609	42-50	673-801	250	1.72	1.00
RANGE IIIB			38-44	609-705			300	2.07	0.86

NOTE: Thermal conductivity is based on the minimum dry density measured at a mean temperature of 75°F per ASTM C518.

* Convert R-Values (°F·ft²·h/Btu·in) to Kelvin meter per watt (°K·m/W) multiply by 6.929

R-VALUES FOR VARIOUS MATERIALS*

Consult specific manufacturer's literature

1/2" plywood	0.62	1" fiberboard	2.78
3/4" plywood	0.93	3/4" plaster	0.15
1/2" gypsum board	0.45	1" poured perlited gypsum	0.87
5/8" gypsum board	0.56	1" perlite board	2.78
1/2" acoustical tile	1.25	air space (heat flow up-winter)	0.94
3/4" acoustical tile	1.89	air space-winter-reflective surface	1.90
2" polystyrene board	8.33	air space (heat flow down-summer)	1.23
1-1/2" polystyrene board	6.25	air space-summer-reflective surface	3.74
1" polystyrene board	4.17	1" Foamglass insulation	2.63
1" urethane - sprayed on, 3 pcf	7.14	15/16" Fiberglas® Roof insulation	3.70
		1-5/16" Fiberglas® Roof insulation	5.26

Sources: ASHRAE Handbook of Fundamentals and manufacturer's values.

SEISMIC DATA

Elastizell and steel decking meet Seismic Zone 4 requirements. (Reference ICBO Report No. 3081)

These seismic shear values are based on:

1. Steel deck need not be web slotted.
2. Deck welding pattern of 3-3 in each corrugation.
3. When required, Keydeck Mesh Style 2160-2-1619.
4. Minimum 2" thick, 200 psi Elastizell.
5. EPS with six-3" diameter holes per 2' by 4' board.

Diaphragm Shear Values (lbs./lin. ft.)

For 2" ELASTIZELL Insulating Concrete Over High Tensile Corrugated Steel Deck And From 1" to 4" of EPS Insulation Board

Base Metal Thickness and (Deck Gauge)	Allowable Diaphragm Shear		F
	Mesh	No Mesh	
.018" (26 ga)	570	---	4.5
.020" (26 ga)	630	---	4.5
.024" (24 ga)	750	460	4.5
.030" (22 ga)	930	640	4.5
.036" (20 ga)	1030	790	4.5

GUIDES and APPROVALS

Underwriters Laboratories:

Wind Uplift Class 90 - Construction Nos. 155 & 480
Fire Ratings - Multiple listings (see previous page)

Factory Mutual Approval Guide

Non-combustible & Class I Roof Deck Construction

ICBO

Report Nos. 1381 and 3081

Federal Construction Guide Specification

Section 03501 - May, 1975, Insulating Concrete Roof Decks

Corps of Engineers Guide Specification

CEGS-03501 - June, 1988

Southern Building Code Congress International

Evaluation Report No. 9963

California State Fire Marshall

Listing 1060-510:2

City and County of San Francisco

General Approval 121 E2.4

City of Los Angeles

Research Report No. 23982

Army Corps of Engineers

September, 1970, CE 204 - Class F

Miami-Dade County (Florida)

Product Approval No: 00-0815.04

BEFORE

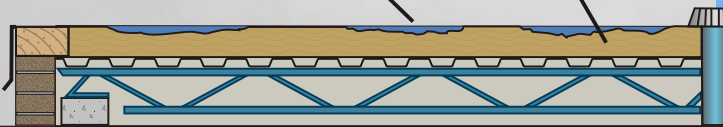
THE PROBLEM

Ponded water on roof decks leads to membrane and insulation deterioration. Membrane leaks and wet insulation significantly reduce the thermal insulation values.

Note: Two inches of ponded water adds 10 psf dead load.

ORIGINAL BUILT-UP ROOFING AND INSULATION

PONDED WATER



AFTER

THE SOLUTION

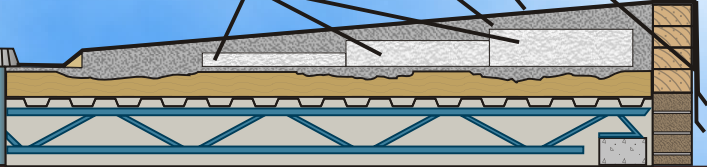
Elastizell's slope-to-drain system corrects drainage problems. The addition of stair-stepped EPS sandwiche within the Elastizell provides increased thermal insulation and a permanent and solid base for the final roofing membrane.

NEW FASCIA OVERLAPS EXISTING FASCIA

NEW ROOFING MEMBRANE

ELASTIZELL INSULATING CONCRETE

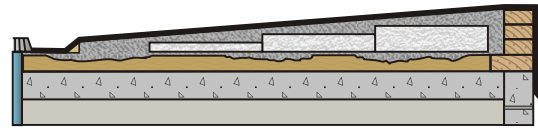
EPS INSULATION BOARD (OPTIONAL)



REROOFING

Elastizell solves reroofing problems because of its many advantages. It's superiority over insulation board is evidenced by the fact that Elastizell Roof Decks are an economical and permanent insulation solution for the building.

ALSO FOR CONCRETE DECK APPLICATIONS!



WIND UPLIFT

UL Ratings

Class 90 - Construction No. 155 - Fire Classified New Construction over Steel Deck with BUR or Modified Bitumen

Class 90 - Construction No. 480 - Fire Classified Reroofing applications over:

- Existing Steel Deck & Lightweight Concrete
- Existing Structural Concrete Deck
- Temporary Membrane over both Existing Steel & Lightweight Concrete and Structural Concrete Deck

FM Ratings

FM Class 1-60, 1-90, 1-120 & 1-150

for mechanically attached base sheets with mopped BUR or one-ply Modified Bitumen either mopped or torched over Steel Decks, Concrete Decks & Recovered Concrete Decks

for fully adhered roofing membranes over Steel Decks, Concrete Decks & Recovered Concrete Decks

Class 1-120

FM Class 1-180 to 1-540

for fully adhered roofing membranes over Concrete Decks & Recovered Concrete Decks

Miami-Dade County Ratings

Substructure	Maximum Design Pressure (Uplift Pressure) / 2
Steel Decking (New) (spans 5'-0" to 6'-3")	45 psf to 112.5 psf
Structural Concrete Deck (New)	205 psf to 240 psf
Structural Concrete Deck (Reroof with existing asphaltic BUR roofcover)	112 psf to 342 psf

FM Pull Tests of Elastizell over Structural Concrete

225+ psf	BUR cover with slurried EPS board and Elastizell topping
480+ psf	Slurried EPS board and Elastizell topping
480+ psf	Elastizell topping only

Note: Samples did not fail - Limits of testing equipment exceeded

Part One: General

1.1 Description of work: Provide an insulating concrete roof deck system as shown on the drawings and as needed for a complete and proper installation.

1.2 Applicator qualification: The Applicator shall be approved by the Manufacturer - Elastizell Corporation of America.

1.3 Certification: When required and upon completion a certificate from the Manufacturer and co-signed by the Applicator states that the materials and installation methods follow current practices.

1.4 Product data: Prior to start of the work of this Section, present installation procedures, and submittals, as required, for fire ratings and wind uplift data for this application.

Part Two: Products

2.1 Insulating concrete is a slurry of cement, water, and Elastizell to produce an insulating concrete of a specific density range. Concentrate shall comply with ASTM C869 when tested in accordance with ASTM C796.

2.2 Cement: Portland cement shall comply with ASTM C150, C595 or C1157.

2.3 Admixtures: Admixtures for water reducing and set acceleration may be used if approved by the Manufacturer.

2.4 Water: Use potable water.

2.5 Aggregate: For hybrid mixtures, the expanded aggregate shall comply with ASTM C332.

2.6 Physical properties shall meet the following criteria:
RANGE II: Cast density of 34-42 pcf, minimum compressive strength of 160 psi, for a nailed base sheet roofing membrane.
RANGE III: Cast density of 42-50 pcf, minimum compressive strength of 250 psi, for a fully adhered roofing membrane.

2.7 Insulation Board: When included, a minimum 1.0 pcf EPS insulation board shall conform to ASTM C578, in thickness shown on the drawings as required (up to 12" thick). EPS board shall have a minimum 6-3" diameter bond holes for each 8 square feet of board. The board is placed in a bond coat and topped with a minimum 2" of Elastizell concrete. EPS board should be held back 3+" from the perimeter of the roof deck and all rooftop units. The EPS board may be stair-stepped or of constant thickness.

2.8 Expansion joints are necessary when there are expansion joints in the structural system and per NRCA recommendations.

2.9 Reinforcement: Elastizell concrete may contain Zell-Crete Fibers (3/4" long) in minimum quantities of 1#/cubic yard in lieu of Keydeck mesh requirements.

Part Three: Execution

3.1 Inspection: Prior to starting work, any unsatisfactory conditions of related trades shall be corrected by others.

3.2 Installation: Install the insulating concrete roof deck system in accordance with current practices to insure proper drainage, the required insulation value, and the published fire and uplift ratings.

3.2.1 Preparation: General Contractor shall clear the deck of all standing water, dirt, debris, ice, etc. Prepare the roof grades prior to placing the insulating concrete roof deck system.

3.2.2 Mixing and placing: Insulating concrete is mixed in approved equipment and pumped into place. EPS bond coats, double casting, and two-density casting are acceptable methods of installation.

3.2.3 Finishing: Insulating concrete shall be screeded to the proper thickness and slope with a surface free of ridges and sharp projections prior to installation of the roofing membrane.

3.2.4 Weather: Insulating concrete roof decks may be placed when temperatures are 32°F and rising. If colder temperatures are anticipated, the Applicator shall take suitable precautions for the installation of an acceptable deck. The roofing membrane application must be coordinated with the insulating concrete installation to avoid prolonged exposure of the roof deck.

3.2.5 Testing: Check the cast density at the point of placement and adjust the mix to obtain the required cast density. A minimum 4 test specimens (3"x6" cylinders) shall be sampled at the point of placement daily or for each 100 cubic yards of material placed. Protect samples from damage and temperature extremes and test according to ASTM C796. Elastizell concrete samples shall not be oven-dried prior to compressive testing. Testing shall be conducted and reported by the Manufacturer.

3.3 Completion: Begin roofing when the insulating concrete roof deck can withstand construction traffic. This is usually 1 to 2 days after the deck has been placed. The roof deck should not be left exposed for longer than 5 to 7 days. The Applicator cannot be responsible for moisture (rain) entering the roof deck after the deck is cast and finished. The general contractor and roofing contractor are responsible for removing excess water (rain) in the system. Consult the roofing manufacturers for their recommended nailing pattern for attaching the base sheet to the insulating concrete roof deck system.