



IRS Midwest Service Center - Kansas City, MO (R-24, 558,000 sf)

QUALITY ROOF DECKS FOR
NEW CONSTRUCTION
AND
REROOFING APPLICATIONS

www.Elastizell.com

Slope-to-Drain
Lightweight
High R-Value
Superior to
Insulation Board
Low Cost



ELASTIZELL
COMPOSITE INSULATING
ROOF DECK SYSTEMS

THE ELASTIZELL ADVANTAGE

Elastizell Roof Decks are:

- ▶ Permanent ▶ Approved ▶ Easily Re-roofable ▶ Compatible with Roofing
- ▶ Insulative ▶ Economical ▶ Dimensionally Stable ▶ Positive Slope-to-Drain
- ▶ Strong ▶ Non-Combustible ▶ Resistant to Wind Uplift ▶ Air Barrier Improves R-Value

Elastizell Composite Insulating Roof Decks are superior to rigid board systems. In the past, roofing systems utilized rigid board insulation because its apparent low cost seemed to outweigh its many disadvantages. 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 50 years. When compared to insulation board systems, Elastizell Roof Decks are superior in every way! We've been green for 50 years!

Architects and Consultants have become increasingly aware of the many difficulties inherent with insulation board roof decks. Rigid insulation does not actually provide their claimed LTTR-values and their thermal bridging in steel deck systems and product shrinkage results in an additional loss of system R-value - as much as a 30% reduction.

PROBLEMS INHERENT WITH INSULATION BOARD

	RIGID INSULATION BOARD	ELASTIZELL ROOF DECKS
ReRoofability	Expensive since insulation must be removed, disposed, and replaced	Simply replace the membrane
Slope-to-Drain over a Level Substrate	Expensive as positive slope & drainage is difficult and time consuming	Simple, positive slope-to-drain
Life Cost	Expensive when materials, labor and maintenance costs are added	Low cost with minimum maintenance required
Installation Over Metal Deck	Fasteners are a thermal bridge that reduces R-Value of system	Flutes are filled and perimeters are sealed with slurry (air barrier).
Insulation Reduction	Board shrinkage and thermal drift reduce R-Value of system over 30%.	Metal fasteners do not penetrate insulation so no thermal bridge

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 6 for web links.

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 an extensive number of fasteners that result in thermal breaches reducing the system's R-value up to 30%.

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 - i.e. faster construction. The flutes are filled, eliminating the fire channel.

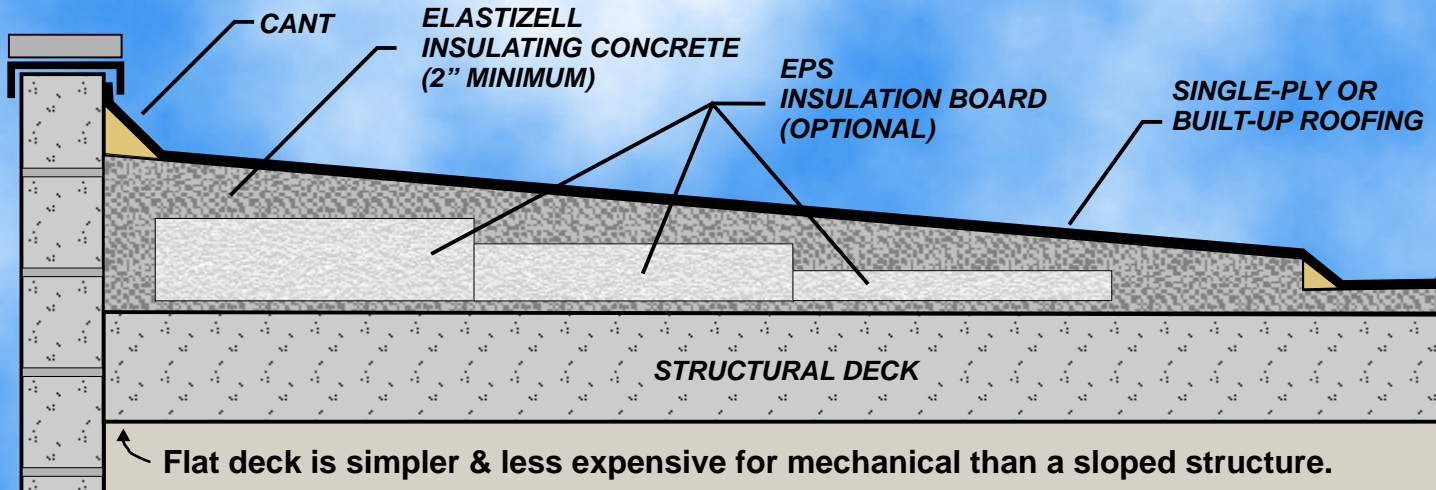
Elastizell Roof Decks have numerous UL fire ratings listed on Page 5.

Low Weight

System weights as low as 8 to 9 psf for most R-values.

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 50 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 8 to 9 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
- ▶ Permanent LTTR

ROOFING

Roofing may begin when the roof deck can withstand foot traffic which is from two to three 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 crazing or 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 withdrawal 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

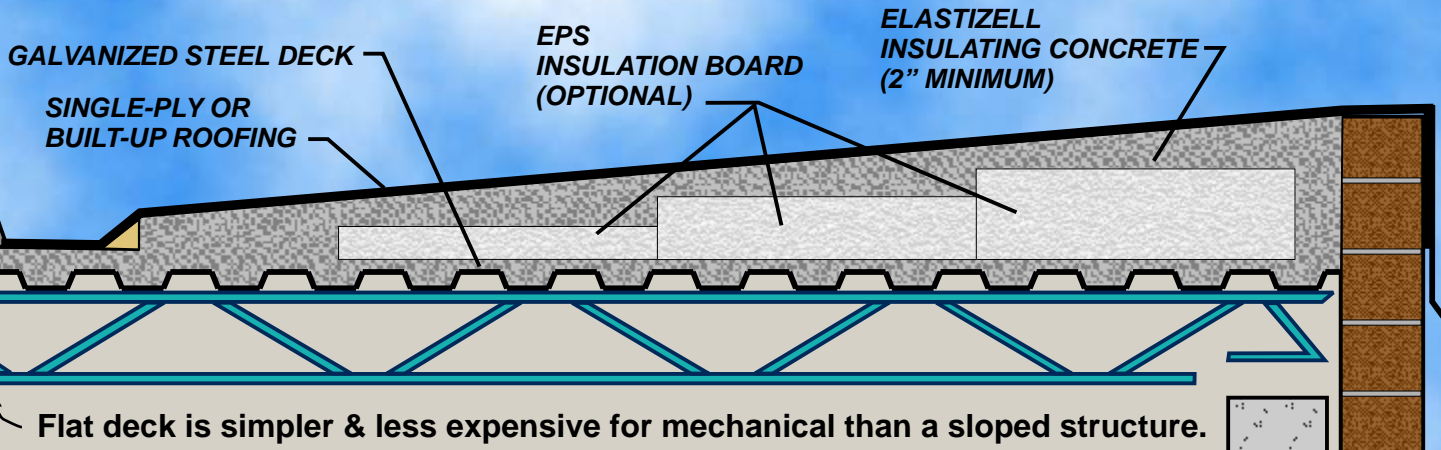
For single-ply roofing consult the manufacturer for specific recommendations. Modified bitumens may be torched or mopped to a nailed base sheet.

FULLY ADHERED MEMBRANES

Singly Ply membranes are either plain or fleece-back and are adhered to the Elastizell Roof Deck by a roofing membrane designated adhesive.

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.



Flat deck is simpler & less expensive for mechanical than a sloped structure.

NEW CONSTRUCTION

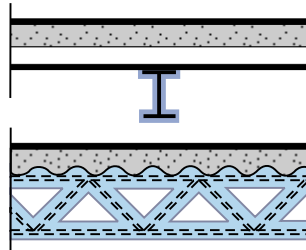
ELASTIZELL UL FIRE-RATED SYSTEMS



UL Rated

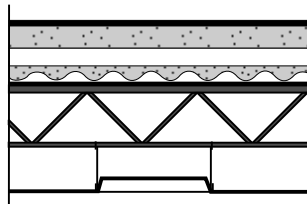
Unprotected Steel Deck

- ▶ 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

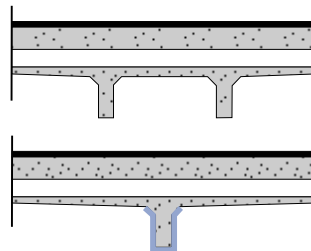
Other Tile Ceilings

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, P925, P926, P927, P928, P929, P930, P936, P937

P215, P216, P231, P251
P214, P241, P246, P255, P261, P264

P405, P406, P407, P410, P411

P501, P503, P509, P511, P513, 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

	Cast Density (pcf)	Air Dry Density (pcf)	28 day Minimum Compressive Strength (psi)	R-value (per inch*)	Average Weight (psf)
RANGE II	34 - 42	26 - 34	160 - 250	1.20 - 1.34	~ 6.9
RANGE III	42 - 48	34 - 40	250 - 350	0.86 - 1.00	~ 8.2

NOTES: R-Value is based on the minimum dry density measured at a mean temperature of 75°F per ASTM C518.
Average Weight is 2- 3/4" at average dry density.

Typical R-Values & Loads over 1-1/2" 22 gauge steel deck

Average Thicknesses		Range II Elastizell		Range III Elastizell	
Elastizell	EPS	Nailed Base & Mod Bit or BUR		Fully Adhered Single-Ply	
2.75"	0"	R ~ 3.3	6.9 psf	R ~ 2.8	8.2 psf
2.75"	4"	R ~ 19.3	7.2 psf	R ~ 18.8	8.5 psf
2.75"	7"	R ~ 31.3	7.5 psf	R ~ 30.8	8.8 psf

Notes: This data is a general guideline only, and not for a specific project.
Roof Deck System weight is for the Elastizell & EPS only (EPS = 1.0 pcf, R4/inch).
Average membrane Dead Loads should be confirmed by specific manufacturer
BUR = ~2.0 psf, Mod Bit = ~ 1.0 psf, Single Ply = ~ 0.5 psf

GUIDES and APPROVALS

Underwriters Laboratories:

Wind Uplift Class 90 - Construction No. 155
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

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)

NOA No. 08-0331.03

(Expiration: 08/28/2013)

Web links for specific system information

Uplift - FM Global's RoofNav: www.RoofNav.com

Uplift - Miami-Dade County, FL:

<http://www.miamidade.gov/buildingcode/library/productcontrol/noa/08033103.pdf>

Uplift - Florida Building Code (FBC): www.floridabuilding.org/pr/pr_app_srch.aspx

Seismic - ICBO ER 3081: http://www.icc-es.org/reports/pdf_files/UBC/3081.pdf

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 sandwiched within the Elastizell provides increased thermal insulation and a permanent and solid base for the final roofing membrane.

NEW FASCIA OVERLAPS EXISTING FASCIA

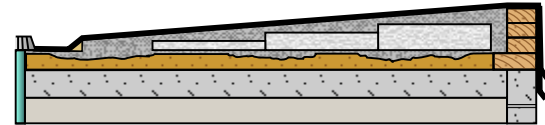
NEW ROOFING MEMBRANE

ELASTIZELL INSULATING CONCRETE
EPS INSULATION BOARD (OPTIONAL)



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!



REROOFING



SUSTAINABILITY: Reducing Environmental Impact

Elastizell Insulating Concrete Roof Decks are accepted as a "Green" product by BuildingGreen Inc., publishers of *Environmental Building News*, *Green Building Advisor*, and *GreenSpec*. This is because Elastizell Roof Decks reduce energy load requirements and facilitate renovations by resloping and increasing R-values. Elastizell Roof Decks are a durable, sustainable, and low-maintenance system. Elastizell Insulating Concrete Roof Decks are listed in the GreenSpec Directory.

Elastizell Insulating Concrete Roof Decks help reduce overall energy consumption by providing permanent insulation that does not suffer from the thermal drift characteristics associated with rigid board insulation. Elastizell Insulating Concrete combined with EPS insulation board provides a heat sink beneath the roofing membrane. This reduces thermal shock from solar heat and then cooling at night or by rain. The reduction of thermal shock lengthens the life of the roofing membrane.

When re-roofing over rigid insulation board, the insulation must be replaced. **This is not the case with the Elastizell Insulating Concrete System since only the roofing membrane is replaced.**

Elastizell and LEED

Elastizell Insulating Concrete Roof Decks have been used on many LEED approved projects. Elastizell Insulating Concrete Roof Decks may assist with the following LEED points (LEED-NC Green Building Rating System for New Construction and Major Renovation Version 2.2 - October 2005):

Materials & Resources:

MR Credits 1.1 and 1.2: Consider reuse of existing, previously occupied buildings, including structure, envelope, and elements. Maintain 75% of existing walls, floors & roof (Maintain 95% for MR Credit 1.2). **(1 or 2 points possible)**

MR Credits 3.1 and 3.2: Use salvaged, refurbished, or reused material, products, and furnishings for at least 5% (10% for Credit 3.2) of building materials. **(1 or 2 points possible)**

MR Credits 4.1 and 4.2: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (for MR Credit 4.1, 20% for MR Credit 4.2) of the total value of materials on the project (based on cost). **(1 or 2 points possible)**

MR Credits 5.1 and 5.2: Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured within 500 miles of the project site for a minimum of 10% (for MR Credit 5.1, 20% for MR Credit 5.2) of the total materials value (based on cost). **(1 or 2 points possible)**

Energy & Atmosphere:

EA Prerequisite 2: Design the building to comply with ASHRAE/IESNA Standard 90.1-1999 (without amendments) or the local energy code, whichever is more stringent. **(Required)**

EA Credit 1: Reduce design energy cost compared to the energy cost budget for energy systems regulated by ASHRAE/IESNA Standard 90.1-1999 (without amendment), as demonstrated by a whole building simulation using the Energy Cost Budget Method. **(1-10 points possible, depending on improvement in proposed building performance rating over baseline building performance rating).**

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 Applicator states that the materials and installation methods follow current practices.
- 1.4 Product data: Prior to start of the work, 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 preformed foam 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.
- 2.3 Water: Use potable water.
- 2.4 Aggregate: For hybrid mixtures, the expanded mineral aggregate shall comply with ASTM C332, Group I.
- 2.5 Manufacturer approved admixtures for water reducing and set acceleration may be used.
- 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 42-48 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 Type I, in thickness shown on the drawings. EPS board shall have bond holes equal to approximately 3% of the board area. The board is placed in a bond coat and topped with a minimum 2" of Elastizell concrete. 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. Control joint filler is not necessary at vertical protrusions.
- 2.9 Reinforcement: Keydeck Mesh Style No. 2160-2-1619 may be required for some fire rated systems over steel deck. Elastizell insulating concrete may contain Zell-Crete Fibers in the mixture, as required, in some instances.

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
 - 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: Screed the insulating concrete to the proper thickness and slope. The surface shall be 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 (heated water, etc.) for the installation of an acceptable deck. Coordinate the roofing membrane application 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. Compressive test samples shall not be oven-dried prior to testing. Manufacturer shall conduct and report test results.
- 3.3 Completion: Roofing Membrane installation may begin 2 to 3 days after the roof deck is cast. This facilitates curing and reduces drying shrinkage. Protect the insulating concrete roof deck from construction traffic. The roof deck should not be left exposed for longer than 5 to 7 days. The Applicator cannot be responsible for rain (moisture) entering the roof deck after the deck is cast and finished. The general contractor and roofing contractor are responsible for removing excess water in the system. Consult the roofing membrane manufacturer for their recommended nailing pattern or adhesive for securing the roofing membrane to the roof deck system.

ELASTIZELL CORPORATION OF AMERICA

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