



## **GenFlex EZ TPO Design Guide**

GenFlex EZ TPO Membrane  
GenFlex EZ Fleece Backed TPO Membrane  
GenFlex EZ TPO Peel & Stick™ Membrane  
GenFlex EZFlex Peel & Stick TPO Membrane  
GenFlex EZ TPO Plus Membrane

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## 1.01 GENERAL DESIGN CRITERIA

### A. Applicability

- Parameters of this manual outline the minimum requirements for the GenFlex Roofing System Warranty. Those systems may include GenFlex EZ TPO, GenFlex EZ Fleece Backed TPO, GenFlex EZ TPO Plus and GenFlex EZ TPO Peel & Stick membrane systems. Reference to GenFlex Application Guides, Product Data Sheets (PDS) and other published information is necessary to ensure that the completed roofing system is installed in compliance with GenFlex requirements. Local codes and insurance requirements may require specific enhancements.
- Warranties of 5 – 20 years, 2" hail coverage, and wind warranties more than 55 MPH, may require special consideration or enhancement regarding fasteners, insulation, membrane gauge and securement, some of which can be found in this manual and in the additional GenFlex technical documents. If a proposed installation falls outside this specification, contact GenFlex Technical Services for additional information.
- Statements in this guide are provided in good faith with the expectation that a design professional will be consulted prior to any job decisions being made. Not all proposed systems may qualify for warranty.
- GenFlex roofing systems may or may not be applicable, without special consideration, if subject to local, regional or national building code requirements or testing agency restrictions.
  - a) It is the building owner's or the design professional's responsibility to consult with the controlling code agency official(s) to determine the specific requirements of each project and each system.
  - b) Contact a GenFlex Regional Technical Coordinator at 1-800-443-4272 when local codes conflict with GenFlex recommendations.



**Certain situations may arise where GenFlex specifications and/or roofing requirements cannot be applied. It may not be possible for GenFlex to issue the desired warranty for projects that deviate from current GenFlex requirements and standards, unless a written deviation request for approval has been received, reviewed and approved by a GenFlex Regional Technical Coordinator prior to application of the proposed system.**

The following conditions require special consideration and may not be warrantable. Contact your GenFlex Regional Technical Coordinator for information if any of the following conditions are present:

- Roofs that exceed the maximum slope and height limits for the roof system assembly, see table 1.01-1.
- Projects that require special hail or wind coverage greater than 55 mph.
- Roofs located where localized wind phenomenon may occur, reference ASCE 7 wind maps.
- Roofs located in down-slope, foothills of mountain ranges or escarpments.
- Mechanically attached systems located within 5 miles (8.3 Km) of the ocean coastline or within 1,500 (457 m) of a Great Lake shoreline.
- Geographical areas susceptible to hurricanes.
- Roofs subject to chemical or process byproduct discharge.
- Roofs with non-linear slopes such as arches, domes and barrels, etc.
- Buildings with large openings in a wall (greater than 10% of the any one wall surface) that could be left open in a storm.
- Roofs subject to heavy or repeated traffic in an area.

- Roofs subject to positive pressure situations such as pressurized buildings, air infiltrating decks, canopies, overhangs, airplane hangars distribution centers, etc.
- Buildings with high interior humidity such as swimming pools.
- Roof decks that do not provide adequate fastener pullout resistance.
- Cold storage, freezer facilities and swimming pools constitute a special condition. A designer familiar with cold storage, indoor swimming pool construction and vapor migration should be consulted in the design of the roof system and integration with the rest of the structure envelope.



**Unlimited slope in the chart below only refers to the potential maximum installation slope. When using a mechanical hot air welder there are practical slope limitations. Safety is the first order of concerns with any project. Consult with the equipment manufacturer on the performance of the individual machine.**

Table 1.01-1 Roofing System Applicability – GenFlex TPO Membrane							
System		Gauge & Sheet Size		Slope	Maximum Height	Maximum Warranty	
EZ TPO	Adhered	0.045"	Any	Unlimited	250' (76.2 m)	15 yrs.	
		0.060"	Any			20 yr	
	Attached	0.045"	10' max	Max. 4:12 (33.3%)	120' (36.6 m)	15 yr	
		0.060"				20 yr	
	Invisiweld	0.045"	Any	Max. 4:12 (33.3%)	120' (36.6 m)	15 yr	
		0.060"				20 yr	
	Ballasted	Paver	Any	Any	Max. 2:12 (16.6%)	250' (76.2 m)	20 yr
		Stone				75' (22.8 m)	20 yr
EZ TPO Plus	Adhered	0.080"	Any	Unlimited	250' (76.2 m)	20 yr	
	Attached		10' max	Max. 4:12 (33.3%)	120' (36.6 m)		
	Invisiweld		Any	Max. 4:12 (33.3%)	120' (36.6 m)		
	Ballasted <sup>2</sup>		Paver	Any	Max. 2:12 (16.6%)		250' (76.2 m)
			Stone				75' (22.8 m)
EZ Fleece Backed TPO <sup>1</sup>	Adhered	0.045"	Any	Unlimited	250' (76.2 m)	15 yr	
		0.060"	Any			20 yr	
	Attached	0.045"	10'	Max. 4:12 (33.3%)	120' (36.6 m)	15 yr	
		0.060"				20 yr	
EZ TPO Peel & Stick	Self-Adhered TPO Membrane	0.060"	Any	Max. 2:12 (16.6%)	250' (76.2 m)	20 yr	
NOTE:							
1. Asphalt applications limited to max slope of 4:12 (33.3%).							
2. Ballast systems not approved for slopes over 2:12 (16.6%).							
3. Contact your GenFlex Regional Technical Coordinator for conditions not covered in the table above.							
4. 0.045" thick GenFlex EZ TPO and EZ Fleece Backed TPO is limited to a 15-year maximum warranty.							
		.045"* = 1.14 mm	.060" = 1.52 mm				.080" = 2.03 mm

## B. Consultation

- GenFlex recommends that a design professional be involved in the design process. For additional assistance, contact your GenFlex Regional Technical Coordinator for consultation with respect to any necessary deviations from current GenFlex requirements and standards.

- For recommendations on any specific project, about the applicability, or appropriateness, of any material's suitability for use or use of products in conjunction with any other specific material, follow these steps:
  - a) Consult the GenFlex Building Products website: [www.genflex.com](http://www.genflex.com)
  - b) Consult this manual, GenFlex Guides, specifications and, GenFlex Product Data Sheets (PDS).
  - c) Consult with the building owner or their design professional.
  - d) Consult with your GenFlex Regional Technical Coordinator for information.
- Statements in this guide are provided in good faith with the expectation that a design professional be consulted prior to any job decisions being made.

### C. Design

- As a supplier of roofing systems, GenFlex does not perform engineering or design functions and does not approve or make comments regarding them.
- GenFlex recommends that a design professional be consulted to assure proper design, (i.e. roof system selection) installation, and conformance to building codes, insurance requirements, etc.
- Refer to the GenFlex Roofing Systems Attachment Guide for additional requirements for securing insulations and membrane.

**Following are just a few of the conditions that may influence that need for a design professional:**

- **Structural conditions that might not be sufficient to support the anticipated load of the completed roof installation.**
- **Structural conditions to support the dynamic loading of the roof system.**
- **The need to review the proposed system assembly for its applicability on specific projects.**
- **The requirements of building codes for the need of a thermal barrier.**
- **The requirements of building codes for the need of a vapor barrier.**
- **The requirements of building codes for the need of an air barrier.**
- **When considering the effect of loads on the structure/decking due to the loading/staging of materials as part of system installation. The design professional should specify the load limitations to be observed by the GenFlex licensed applicator.**

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### D. Warranty

1. Where a GenFlex Roofing System and material warranty is required:
  - a) Submit an Electronic Pre-Installation Notice (P.I.N.) along with an approved roof drawing, 14 days prior to project start and receive an acknowledgement from GenFlex of acceptance or necessary enhancements to meet GenFlex requirements to receive a warranty.
  - b) The roof must be installed according to the current GenFlex requirements appropriate to the project conditions and design requirements.
  - c) The GenFlex roof system must be installed by a current GenFlex Roofing System licensed applicator.
  - d) Upon inspection and acceptance of the installed roof system by a GenFlex Technical Representative, the warranty will be issued and dated based on the completion date of the roof installation reported by the roofing contractor.
  - e) Metal Building Retrofit Projects qualify for a maximum 20-year warranty coverage.

2. GenFlex's inspection is to confirm the installation details for the roofing system for compliance with GenFlex's documents of record for warranty requirements. The inspection is not intended as an inspection for benefit of the building owner or the design professional with respect to contract, building codes or compliance with specifications other than GenFlex's.
3. Hail Coverage:
  - a) Up to 2" hail coverage requires a minimum 60 mil GenFlex EZ TPO or GenFlex EZ Fleece Backed TPO membrane and an approved, adhered high density (HD) cover board.
  - b) Severe Hail (SH) or Very Severe Hail (VSH) requires an approved Factory mutual Assembly and does not affect GenFlex warranty coverage.
  - c) GenFlex EZ TPO InvisiWeld roofing systems do not qualify for hail coverage.
  - d) Contact your GenFlex Regional Technical Coordinator for additional information.
4. Cut and Puncture Protection (CPP) warranty coverage is available with GenFlex EZ TPO Membranes.
  - a) Use of 60 mil or greater GenFlex EZ TPO or GenFlex EZ Fleece Backed TPO membrane system and additional cost per square foot. Walk pads not required. Please see warranty pricing guide for current pricing.
  - b) Use of 80 mil GenFlex EZ TPO Plus membrane and Nailbase Composite cover board.
 

**NOTE:** Roof protection pad or paver is required all roof access points.
5. An air barrier is required for projects with large wall openings that are greater than 10% of the total wall areas that can be left open in a storm. Criteria to be determined based upon GenFlex review.

**Certain situations may arise where GenFlex specifications and/or roofing requirements cannot be applied. It may not be possible for GenFlex to issue the desired warranty for projects that deviate from current GenFlex requirements and standards, unless a written request for approval has been received, reviewed and approved by a GenFlex Regional Technical Coordinator prior to application of the proposed system.**



**A GenFlex warranty cannot be issued if any of the following conditions exist:**

- Non-roofing applications such as plaza deck construction, waterproofing, pond liners, etc.
- Roofing applications for single-family residences.
- Other non-approved applications.

## 1.02 QUALITY ASSURANCE

### A. Job Site Considerations (Cautions and Warnings)

1. All safety regulations required by OSHA and other agencies having jurisdiction must be followed.
2. During the construction process, the roofing contractors is responsible for ensuring that all components of GenFlex roof system, including the finished areas are protected from damage, including, but not limited to:
  - Damage that may result from the continued construction process.
  - Direct contact with continuous steam or heat sources when the in-service temperature is more than 160 °F (71 °C) for UltraPly TPO products.
  - Asphalt, coal tar, oil based or plastic roof cements, and re-saturated roof products, which are not to be used in direct contact with the waterproofing components of the GenFlex EZ TPO Roofing Systems.
  - Discharges, such as petroleum products, greases, oils (mineral and vegetable), animal fats and other byproducts, which may come in contact with the membrane.

3. Cold weather application:
  - a) When the outside temperature is below 40 °F (4 °C), installation of GenFlex roofing systems may require additional application precautions:
    - Adhesives and sealants should remain in an environment between 60 °F and 80 °F (16 °C and 27 °C) until ready for use.
    - Materials should be used within four hours of removal from a heated storage area. If materials are not used within that time, they should be returned to the heated storage area until the temperature of the material return to 60 °F (16 °C). Typically, this is 24 hours.
  - b) For additional information and guidelines, see GenFlex Product Data Sheets (PDS), GenFlex Cold Weather Application Guidelines, GenFlex EZ TPO Roofing Systems Application Guide, GenFlex EZ Fleece Backed TPO Roofing Systems Application Guide, GenFlex EZ TPO InvisiWeld and InvisiWeld-S Roofing System Application Guide, GenFlex EZ TPO Peel & Stick Roofing System Application Guide and any other relevant GenFlex product-specific installation instructions, and NRCA Roofing and Waterproofing Manual.
4. Keep all adhesives, sealants, and cleaning materials away from ALL ignition sources (i.e., flames, fire, sparks, etc.). Do not smoke while using these materials.
  - Consult container labels, Safety Data Sheets (SDS) and Product Data Sheets (PDS) for specific safety instructions for all products used on the project.
  - Care must be used when installing fasteners to avoid possible conduits and other piping in and under the deck. It is the responsibility of the building owner to rectify any issues with conduit, piping or other obstructions under the deck that may impede the installation of the new roofing materials.
  - Fumes and adhesive solvents may be drawn into the building during installation through rooftop intakes. Refer to GenFlex's Product Data Sheets for more information.
  - Store membranes in the original, undisturbed plastic wrap in a manner to protect it from becoming damaged.
  - Do not use oil-based or bituminous-base roof cement with GenFlex membranes.
  - Insulation must be a properly stored and protected from ignition sources, moisture and damage.
  - When the outside temperature is below 40 °F (4.4 °C), certain combinations of temperature and humidity may cause condensation on the surface of solvent-based adhesives and primers. If this condition occurs, discontinue the application. When the ambient air conditions no longer cause condensation on adhesive surfaces, re-apply additional adhesive or primer and proceed.
5. The consistency of sealants, adhesives and primers will begin to thicken as the temperature drops. To minimum this, the following is recommended:
  - Start work with sealants, adhesives and primers that have been stored between 60 °F and 80 °F (16 °C and 27 °C). Insulated heated boxes may be helpful.
  - Complete test areas to determine if conditions will cause problems such as condensation with the application of the material.
  - Stop the operation or change to a warmer container when material becomes too thick to properly apply or the product falls below the recommended application temperature.
  - Do not use heat guns or open flames to dry adhesives and primers.
  - No-Fold or single fold panels are easier to apply in cold weather and are recommended.
  - If using Water-Based Bonding Adhesive, temperatures must be at least 40 °F (4.4 °C) and rising for the material to apply and perform as designed. Longer drying times should be expected for lower temperatures and higher humidity conditions.

## 1.03 PHASED CONSTRUCTION/TEMPORARY ROOFING

### 1. Phased Construction

- a) Phased Construction is defined by the NRCA as “The installation of a roof system in two or more separate time intervals.” The need for temporary roofing is determined by the design professional.



**GenFlex does not recommend phased construction. Phased construction results in unprotected roof section, which can allow moisture into the base plies or trap moisture, dust, or debris between the plies of the roof system. These application defects may increase the incidence of blistering in the GenFlex roof system.**

- b) A better option than the use of phased construction is the use of a temporary roof, which allows for the delayed installation of the roof system until more suitable weather, or until other trades can complete their projects. A temporary roof can be designed and installed in the same way as a vapor retarder and can then become a vapor retarder.

### 2. Temporary Roofing

- a) If installation of the roof system is required during unsuitable weather, or before completion of wood blocking, curbs, penetrations, or the erection of walls, a temporary roof may need to be installed.
- b) If a temporary roof is needed due to construction requirements, GenFlex recommends installing a modified asphalt base sheet or two fiberglass roofing plies in an appropriate adhesive over an approved substrate, to be used as the temporary roof. This temporary roof can serve to protect the interior of the building during the early stages of construction. It may then be removed or repaired, if necessary, and can be left as a vapor retarder prior to the installation of the finished GenFlex roofing system.
- c) If roof insulation is installed under the temporary roof, the insulation shall be inspected for wet or damaged areas, so that such areas may be removed and replaced prior to installation of the GenFlex Roofing system.
- d) When a temporary roof is specified as a vapor retarder, precaution shall be exercised in protecting the temporary roof from other construction tradesmen. Damage to the temporary roof may impair its effectiveness as a vapor retarder. If a vapor retarder is installed as a temporary roof during construction, the vapor retarder shall be examined and repaired as necessary to ensure watertight integrity prior to installation of the remainder of the roof system.
- e) For additional information regarding temporary roofs, refer to the NRCA's Roofing and Waterproofing Manual or contact your GenFlex Regional Technical Coordinator for Technical Information.

## 1.04 VAPOR RETARDERS / AIR BARRIERS



**The determination of the necessity and location for a vapor retarder or an air barrier is a project specific requirement, which is the responsibility of the building owner or their design professional. The proper assessment of the building, the need for, and the proper design and installation of, an air barrier and vapor retarder are critical to the long-term operation of the roofing system.**

**GenFlex does not review or calculate dew point analyses and therefore does not accept responsibility for damage due to recurrence rate or location of the dew point. Although not all projects require a vapor retarder, a design review should be considered for all projects.**

**The inclusion of an air barrier or vapor retarder may affect the Underwriters Laboratories (UL) or Factory Mutual (FM) Approvals rating of the roof system.**

**The inclusion of an air barrier or vapor retarder may affect the GenFlex system requirements and consequently the GenFlex warranty. Contact your GenFlex Regional Technical Coordinator for technical information prior to application of the proposed system.**

#### **A. Vapor Retarder**

1. To control moisture, a vapor retarder may be necessary to protect certain roofing components when high interior humidity is of concern. Some examples are:
  - When high interior relative humidity is present.
  - When vapor drive may be expected to form a dew point under the roof membrane or in the insulation. Building usages with high humidity interiors where vapor drive may occur, such as swimming pools, laundry facilities, paper mills and bottling plants.

In these types of environments, there is substantial upward vapor drive, and the potential exists for extreme amounts of moisture accumulation within the roof assembly. If an effective vapor retarder is not included at the proper location in the roof assembly, so that the retarder is warmer than the dew point, condensation will cause damage from the moisture retained in the roof assembly. This movement is reversed in some air-conditioned buildings in humid summer conditions. This is especially true in southern states. When specified, install a vapor retarder as specified by the project designer.

Vapor retarders are installed because water vapor causes several types of roof assembly failures such as:

- Reduced R-Value, since wet insulation becomes a conductor of heat rather than an insulator.
- Deterioration of the roof membrane, insulation, structural decks, and associated building components.
- Delamination of roof components from trapped moisture, which freezes and thaws, eventually evaporating under solar heat with the resulting vapor pressure causing blisters and delamination.

The following is a partial listing which might influence the need for a vapor retarder:

- Building usage as related to vapor drive.
- External temperature in relation to internal temperature.
- The humidity of the interior and/or exterior air.
- Building code requirements.
- Construction generated moisture, particularly during winter when temporary propane heat is required.

A vapor retarder's effectiveness generally depends upon the following factors:

- The vapor retarder's permeance (perm) rating shall be as close to zero as possible.
- The adequacy of design of the vapor retarder membrane.
- The integrity of the vapor retarder's seals at perimeter and penetrations.
- The integrity of the vapor retarder's membrane after other tradesmen finish their projects during construction or any subsequent roof or equipment alterations.
- The vapor retarder's location within the insulated roof assembly.

Construction roof traffic shall be restricted to prevent damage to the vapor retarder. In the event damage does occur, repair the vapor retarder damage with the same roof components and quantities as specified for the vapor retarder installation.

Contact one of the four generally accepted agencies for help in determining the need for a vapor retarder. They are:

- National Roofing Contractors Association (NRCA) guidelines
- U.S. Army Corp of Engineering Cold Regions Research and Engineer Laboratory (CRREL) guidelines
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- Oak Ridge National Laboratory (ORNL)

2. Vapor Retarder properties:

- A vapor retarder is devised as a building envelope element that limits diffusion of moisture into an assembly. Diffusion is water vapor migration in a material. Its rate depends on two factors:
  - Water vapor pressure difference across the roof assembly.
  - Resistance of materials along the migration path.

Some materials have more resistance than others. Placing a high-resistant material in a roof assembly may help control moisture migration.

- Vapor retarders are intended to limit moisture diffusion. Therefore, the main property requirement of a vapor retarder is low water vapor permeance. Water vapor permeance is defined as:

*“The time of water vapor transmission through a unit area of flat materials or construction induced by a unit vapor pressure difference between two specified surfaces, under specified temperature and humidity conditions.”*

3. Design:

- a) The roof system designer is generally responsible for the design requirements of the roof deck, vapor retarder, and rigid insulation along with the roof system. This is more important than specifying roofing systems over high humidity buildings. The need for a vapor retarder, as well as the type, placement and location of a vapor retarder should be determined by a professional architect or engineer. The listed below, are examples of common vapor retarder applications.
  - GenFlex Vapor Shield Membrane (self-adhered) applied to an approved flat substrate that has been primed with Vapor Shield Primer. See the Vapor Shield and Vapor Shield Primer product data sheets (PDS) on the GenFlex website for application information.
  - Six (6) mil polyethylene sheeting taped at laps and to penetrations and perimeters.
- b) The roof system designer must:
  - Assure that the methods of attachment of the roof system to the vapor retarder selected are compatible.
  - Assure that the vapor retarder will extend continuously and evenly throughout the roof plane to provide a complete seal against the intrusion of moist air from the building interior. Integration of the wall and roof air retarder systems is essential.
  - Consider the effect of construction moisture on a new roof system, particularly during winter, when temporary propane heat is required.

**B. Air Barriers**

1. While some GenFlex roofing systems may require an air barrier to receive a GenFlex warranty, the need for an air barrier, as well as the type, placement and location of the air barrier must be determined by a professional architect or engineer.

2. Air barrier systems are a component of the building envelope systems that control the movement of air into and out of buildings.
3. An air barrier may consist of a single material or of two or more materials which, when installed as a system, make up an air impermeable, structurally adequate barrier.
4. Air barrier systems are generally comprised of building components and materials that have an air permeability not exceeding 0.004 cfm/sf under a pressure differential of 0.3" water.
5. No single component or material has the capability to provide a complete air barrier system for a building; therefore, air barrier systems include many components and materials that are interfaced with each other. GenFlex recommends that the individual manufacturers of these products provide written certification that their products, when used together, meet this requirement.
6. If the air barrier is to perform its intended role, it must meet several requirements including:
  - **Continuity:** The assembly must be linked together to ensure that there is no break in the air tightness of the envelope.
  - **Structural Integrity:** The air barrier must resist the imposed load or must be supported by one that can. It must resist the strongest wind load acting as either a pressure or suction without rupturing or breaking away from its support. The air barrier and its support must be sufficiently rigid to resist displacement.
  - **Air Impermeability:** A major requirement of an air barrier is that it offers a high resistance to airflow.
  - **Durability:** Durability depends largely on how a material reacts to a specific environment such as moisture, temperature, ultra-violet radiation, and to the presence of other materials (incompatibility).

## 1.05 SUBSTRATE AND SUBSTRATE REQUIREMENTS

### A. General

1. Defects that need to be corrected before work can commence should be brought to the attention of the general contractor or owner in writing. All issues should be addressed prior to beginning installation of the new roofing systems.
2. If components are discovered during installation that could be detrimental to the performance of the new roof system, they should be brought to the attention of the project designer for corrective action.
3. Good roofing practice requires a complete tear-off to the structural deck and/or structure if soundness and integrity of the existing roof system cannot be verified. Recovering an existing roof system is an alternative to removing existing roof components. However, non-destructive testing, in conjunction with core cuts, must be completed to determine the conditions of the existing roof system and decking.
4. The GenFlex EZ TPO Roof System depends on a suitable substrate to perform its intended function of weatherproofing the building.



**It is the roofing contractor's responsibility to ensure that the substrate is acceptable for the GenFlex roofing system.**

5. The substrate to which the GenFlex roof system is installed must:
  - Be structurally sound.
  - Be dry, smooth, flat, and clean.
  - Be free of sharp fins, or foreign materials that could damage the membrane.
  - Meet the minimum requirements for the system.

6. All surface voids of the immediate substrate greater than ¼" (6.35 mm) wide must be filled with insulation.
7. The building owner or the building owner's designer are responsible for validating the building structure can support the proposed installed roofing system.

**B. Fastener Pullout Requirements**

1. Substrates for membrane and or the insulation attachment are required to provide sufficient pullout resistance for the fasteners and the roof system.
2. In the case where the structural deck or structure does not meet the minimum fastener pullout requirements contact your GenFlex Regional Technical Coordinator for technical information.

<b>Table 1.04-1 Minimum Fasteners Pullout Resistance for Specific Systems</b>	
System	Minimum Fasteners Pullout
Adhered Membrane – Insulation Mechanically Attached to Deck	300 lb (136.1 Kg)
Single-Ply Mechanically Attached and Invisiweld	400 lb (181.4 Kg)
<b>NOTE:</b>	
<ul style="list-style-type: none"> <li>• Pullout test results must be submitted to GenFlex prior to project start and approval. Actual pullout values may alter the approved attachment rate.</li> <li>• Contact your GenFlex Regional Technical Coordinator for Technical Information when structural deck does not meet the minimum fasteners pullout requirements.</li> </ul>	

3. See the GenFlex Attachment Guide for the minimum adhesive pull test requirements for insulation adhesives.
4. Pullout Tests: Due to the variety of physical conditions that can affect pullout resistance, GenFlex recommends that on-site tests be conducted by an independent testing laboratory, the manufacturer's representative, or the roofing contractor, to determine actual pullout values. The following deck types that may not provide sufficient pullout resistance:
  - Steel decks thinner than 22 ga (0.76 mm)
  - Concrete less than 2,500 psi (20,684 kPa)
  - Plywood or oriented strand board (OSB) less than 7/16" (11.1 mm) thick
  - All poured or pre-cast gypsum, cementitious wood fiber and lightweight insulating concrete decks
  - Existing masonry or brick
  - Any other substrate that does not have a published pullout capacity greater than the minimum required for the applicable roof system.
- a) The sections of the substrate where integrity is most in question should be used for testing. Test areas should include the corners, drain areas, and perimeters. The minimum number of pullout test recommended is as follows:

<b>Table 1.05-3 Recommended Number of Pull Out Tests</b>		
Roof Size		Number of Pull-Out Tests
Less than 10,000 sf	Less than 1,000 m <sup>2</sup>	6
10,000 sf – 50,000 sf	1,000 m <sup>2</sup> – 5,000 m <sup>2</sup>	10
50,000 sf – 100,000 sf	5,000 m <sup>2</sup> – 10,000 m <sup>2</sup>	20
Over 100,000 sf	10,000 m <sup>2</sup>	1 per 5,000 sf (500 m <sup>2</sup> )

- b) When new construction or other conditions prevent preliminary on-site pullout tests, the fastener manufacturer should supply estimated pullout values for design and bid purposes. On-site verification of the pullout capacity must be confirmed prior to system installation. (Consider requesting a unit price bid for potential increased fastening requirement.)

### C. Moisture Considerations

1. The roofing contractor is responsible for ensuring that the substrate is suitable to receive a GenFlex roof system. Substrates must be properly cured to meet current industry standards before installing roofing components.
2. GenFlex suggests a moisture survey be conducted to determine the moisture content of any existing roof system component. All damaged and/or wet components of the existing system that would be detrimental to the new GenFlex roof system must be removed and replaced in kind, prior to its installation.
3. Failure to remove existing roof system components that cause damage to the new GenFlex roofing system constitutes a non-warrantable condition.
4. The best diagnostic technique is by taking and evaluating a series of roof cores.
5. Three techniques are currently available to evaluate the roof by indirect/non-invasive means. Results of these studies must still be correlated with roof cores. These techniques provide measurements of factors that can be associated with the presence of moisture.
  - Nuclear moisture detection
  - Infrared thermography
  - Electric capacitance
6. These techniques provide measurement of factors that can be associated with the presence of moisture, which can be correlated to the roofing cuts to verify the results of the non-destructive testing.

### D. Drainage and Slope



**Building codes may require a specific minimum slope for drainage. It is the building owner or their design professional's responsibility to consult with the controlling code agency official(s) to determine the specific requirements of each project and each system.**

**When interior drains are necessary, they must be installed at the low points of a sloped roof deck or insulation and maintained in a working condition.**

1. The NRCA and prevailing building codes recommends that a minimum roof slope of ¼" (6.4 mm) per foot be obtained to facilitate proper drainage and maximize long-term performance of the roof system. GenFlex recommends following the NRCA guidelines. The minimum GenFlex requirement is positive drainage.
2. Ponding water is defined as a condition existing on any area of the roof where water remains more than forty-eight (48) hours after precipitation. Pondered water, snow, frost and/or ice, present must be removed from the work surface(s) prior to installing the roofing system.
3. Adequacy of drainage provisions, placement, sizing and/or number of drains required is the responsibility of the building owner or their design professional. Drainage conditions should meet the requirements of applicable codes as well as standard industry recommendations.
4. In re-roofing or re-cover situations, analysis of the existing drainage conditions is the responsibility of the building owner or their design professional. Existing deck deflection or ponding water may necessitate upgrading of the drainage provisions, including relocation of existing drains, possible additions of new drains, increased bar joist support, etc. GenFlex does not design roof drainage systems or assume any liability for the adequacy (or lack of) roof drainage systems or facilities.

5. Proper and adequate drainage of the roof surface is required to assure the long-term performance of the roof system. Drains should be sufficient number, size and located to provide satisfactory and rapid drainage of the entire roof surface (withing 24 to 48 hours of precipitation). Although a minimum roof slope of ¼" (6.4 mm) per foot is recommended, other slopes are acceptable to receive a GenFlex warranty provided positive drainage is attained.
6. Tapered GenFlex ISO provides an effective and economical solution where substrate slope will not permit efficient drainage. When properly installed, it can extend the life of the roof assembly by eliminating problems associated with ponded water. GenFlex tapered ISO is available in slopes from 1/16" (1.6mm) to ½" 13 mm) per foot. GenFlex provides a variety of technical support services for the installation of tapered insulation through the GenFlex Tapered Engineering Design Department.
7. The following are just some of the reasons why proper roof drainage is important:
  - Standing water can result in deck deflection and possible structural damage.
  - Water on the roof can promote vegetation, fungal and bacterial growth.
  - In the event of an opening in the roof membrane, standing water can significantly worsen the damage to the roof system, the building itself, and interior contents.
  - It is required by many, if not all, building codes.
  - Proper drainage of the roof system prevents premature deterioration of the membrane and roof components.

#### E. Wood Nailers

1. For new construction projects, wood nailers must be kiln-dried (Southern Pine, Douglas Fir) structural grade #2 or better.
2. Wood nailer by others: Make these specifications and details available when others will install nailers. Work that compromises the integrity of the system may jeopardize the warranty. For re-roof projects and new construction projects where a poured-in-place deck will be used, wood nailers must be pressure treated for rot resistance, #2 or better lumber. Asphaltic or creosote-treated lumber is not acceptable. Lumber treated with other wood preservatives such as Pentachlorophenol, Copper Naphthenate or Copper 8-quinolinolate will adversely affect the membrane when in direct contact and are, therefore, unacceptable.

**Due to EPA regulations regarding treated wood, new treatments for lumber may be highly corrosive to fasteners. Contact the fasteners manufacturer for their recommendations on fasteners if attaching nailers that have been treated with more corrosive materials.**



**Chemical treating for fire resistance or other purposes (other than pressure treating for rot resistance, i.e. CCA, ACZA, CBA, ACQ or other copper treatments) may affect the performance of the GenFlex membrane and accessories. Contact your GenFlex Regional Technical Coordinator for technical information when using chemically treated lumber that will come in contact with the membrane.**

3. GenFlex requires wood nailers at the following locations:
  - All roof edges
  - In between flutes
  - Metal penetration pockets
  - Pipe and other penetrations
  - Wood nailers must totally support all sheet metal flanges at least ½" (13 mm) wider to roof side.
  - Gutter and scupper locations
  - Refer to Genflex details for other location requirements. Under deck securement of nailers or structural support may be required.

4. The wood nailer may be omitted when all metal flanges on roof curbs are less than 12" (305 mm) on a side or when placed on and secured directly to the deck. Under deck blocking may be required for proper support.
5. The building owner or their design professional must specify a wood nailer attachment system that will meet the required building codes. GenFlex warranty requirements call for nailers to resist a minimum force of 200 lb/ft (2.9 N/m) in any direction. The nailers should be installed per all required building codes. GenFlex fasteners are required for all roofing applications. For further clarification, please refer to Factory Mutual Loss Prevention Data Sheet 1-49.



**If forces at the building perimeter are greater than 200 lb/ft (2.9 N/m) due to increased wind speeds as dictated by code requirements and calculated using either ASCE-7 or ANSI/SPRI ES-1, then the securement of the nailers must also be increased to accommodate the calculated loads.**

## F. Expansion Joints

1. The determination of the necessity and location for expansion joints is a project specific requirement, which is the responsibility of building owner or their design professional. Typical consideration for selections criteria may include one or more of the following:
  - Where expansion, contraction or deflection joints are provided in the building structural system.
  - Roof expansion joints must be located to accommodate movements caused by building structural movement.
  - Where structural framing elements such as joists, rafters, purlins, or steel decking change direction.
  - Deck material changes (e.g. from steel to concrete deck). Where different types of roof decks such as concrete and steel abut each other.
  - Where additions are connected to existing buildings.
  - At junctions where interior heating conditions change such as a heated space abutting an unheated space.
  - Where movement between vertical walls and roof deck is anticipated.
  - Roof areas greater than 200' (61 m) on any direction.
  - Coordination and sequencing of expansion joint closure systems and their continuity, compatibility and function of seal is the responsibility of the design team.

**NOTE:** The conditions above may not be all inclusive. Other conditions may exist in which expansion joints should be considered as determined by a design professional.
2. Expansion joints must not restrict the flow of water. GenFlex expansion joint details can be located on the GenFlex Roofing Systems website or by contacting your technical coordinator.

## 1.06 FASTENERS

### A. General

Refer to the Product Data Sheet (PDS) that references the specific fastener being used for the deck penetration requirements of that fasteners. All Fasteners must be suitable for the existing deck type.

1. Roofing systems rely on the attachment of the components to the deck substrate to perform its basic functions. Wind creates uplift forces on the roof: therefore, the overall holding power of the fasteners is critical. GenFlex recommends that the use of any fasteners be investigated should there be concerns about the structural integrity of the deck or structure. Some of the items to be considered include:

- How the fastener(s) might affect the deck or structure.
  - The capability of the deck or structure to hold the fasteners and roof system in place in a wind related event.
2. The structural integrity of the deck may have been weakened over time; thus, the choice of fastener and roof attachment methods and frequency should be considered in determining the best solutions to the give deck and situation.

**Regarding fastener selection with appropriate and validated pull-out results:**

**For new installation or complete tear-off, GenFast #15 or #16 Max Fasteners and corresponding plates may be used for up to 20-year GenFlex Roofing System Warranty for mechanical attachment of the single-ply membrane into the appropriate deck.**

**For new installation or complete tear-off, GenFast #14 Fasteners and plates may be used for up to 20-year GenFlex Roofing System Warranty for mechanical attachment of insulation materials into the appropriate deck.**

**For new installation or complete tear-off, GenFast #12 Fasteners and plates may be used for up to 15-year GenFlex Roofing System Warranty for mechanical attachment of insulation materials into the appropriate deck.**

**GenFast #14 and #12 Fasteners and Plates are limited to 15-year warranty when used for insulation attachment into steel decks.**

**Re-Cover or partial tear-off require the use of GenFast #15 or #16 Max Fasteners are required for 15-year or greater warranties, except into wood decks.**



**Fastener and plates not approved for use directly under ballasted roofing systems.**

**GenFlex requires that a suitable insulation or cover board be installed over any substrate that would damage the membrane due to the additional loading of the ballast system.**



**This includes, but is not limited to:**

- **Fasteners / Plates used for insulation attachment**
- **Fasteners / Plates used for existing membrane or insulation securement**

**Substrates that are not smooth, flat, clean free of sharp fins, or foreign material that could damage the membrane**

<b>Table 1.05-1 Allowable Fasteners and Substrate Configurations</b>											
GenFlex Fastener (PDS)	Adhered Membrane System	Mechanically Attached Membrane Systems		Acceptable for 20-Year Warranty	Steel Deck	Structural Concrete Deck	Plywood or OSB Deck	Cementitious Wood Fiber Deck	Gypsum Deck	Lightweight Insulating Concrete Over (Section 1.06 F for additional requirements)	
	Insulation Attachment	Insulation Attachment	Batten Strips or Seam Plates							Steel Pan	Concrete
GenFast #12 (PDS 1030)	✓	✓		✓ <sup>2</sup>			✓ <sup>1</sup>				
GenFast #12 Preassembled Screw and Plate (PDS 1031)	✓	✓		✓ <sup>2</sup>			✓ <sup>1</sup>			✓ <sup>3</sup>	

Table 1.05-1 – Continued Allowable Fasteners and Substrate Configurations											
GenFast #14 (PDS 1027)	✓	✓		✓	✓		✓				
GenFast #14 Preassembled Screw and Plate (PDS 1033)	✓	✓		✓	✓		✓			✓ <sup>3</sup>	
GenFast #15 Washer Head (WH) (PDS 1028)			✓	✓	✓	✓	✓ <sup>4</sup>				
GenFast #15 Preassembled Screw and Plate (PDS 1034)			✓	✓	✓		✓ <sup>4</sup>				
GenFast #16 Max (PDS 1029)			✓	✓	✓		✓				
GenFast CD-10 Concrete (PDS 1005)	✓	✓	✓	✓		✓					
GenFast GypTec™ (PDS 1006)	✓			✓				✓	✓		
GenFast Lite Deck (PDS 1035)	✓							✓	✓	✓	✓
For the attachment of insulation only.											
✓ = Acceptable for use						(#)= See Note Below					
<b>NOTE:</b>											
1. GenFast #12 fasteners for insulation attachment into wood deck only. Membrane is not to be secured with GenFast #12 fasteners.											
2. Warranties are limited to 15 years when GenFast #12 fasteners are used for insulation attachment into steel decks.											
3. Insulation attachment only.											
4. Acceptable pull test required when used on OSB decking.											

Table 1.05-2 Acceptable Fastener Uses					
GenFlex Fastener (TIS)	For the attachment of:				
	Roofing Insulation (w/ Insulation Plate)	GenFlex Batten Strips	Seam Plates	Termination Bars	Other Accessories
See the specific fastener TIS for details application data.					
GenFast #12 Fastener (PDS 1030)	✓				
GenFast #12 Preassembled Screw and Plate (PDS 1031)	✓				
GenFast #14 Fastener (PDS 1027)	✓		✓	✓	✓
GenFast #14 Preassembled Screw and Plate (PDS 1033)	✓				
GenFast #15 Washer Head (WH) Fastener (PDS 1028)	✓		✓	✓	

**Table 1.05-2 – Continued  
Acceptable Fastener Uses**

GenFlex Fastener (TIS)	For the attachment of:				
	Roofing Insulation (w/ Insulation Plate)	GenFlex Batten Strips	Seam Plates	Termination Bars	Other Accessories
	See the specific fastener TIS for details application data.				
GenFast #15 Preassembled Screw and Plate (PDS 1034)			✓		
GenFast #16 Max (PDS 1029)		✓	✓		
GenFast CD-10 Concrete (PDS 1005)	✓	✓	✓	✓	✓
	Do not use with polymer batten strips.				
GenFast GypTec (PDS 1006)	✓				
GenFast Lite Deck (PDS 1035)	✓				
✓ = Acceptable for use					
<b>NOTE:</b> May require pre-drilling of purlin.					

**Table 1.05-3  
Acceptable Fastener Plate Uses**

Mechanically Attached Membranes	
GenFlex Plates	For the attachment of: GenFlex EZ .045", .060", .080" Membrane and GenFlex EZ Fleece Backed TPO .080" Membrane
GenFlex EZ TPO InvisiWeld and InvisiWeld-S Plate (PDS 1111)	For attaching insulation and membrane (when induction bonded) to approved substrates as required by GenFlex specifications and details.
GenFast 2 3/8" WH Seam Plate	For attaching GenFlex EZ TPO membranes to approved substrates for enhancements and details as needed by GenFlex specifications and details.
GenFast 3" Max Seam Plate	For attaching GenFlex TPO membrane to the appropriate roof deck.
Insulation Attachment	
GenFast 3 Inch Round Insulation Plate	For attaching insulation to approved substrates as required by GenFlex specifications and details.
GenFast AccuTrac Insulation Plate	For use with the OMG AccuTrac Insulation Fastener Tool and appropriate GenFast Fasteners to attach insulation to the appropriate deck.
GenFast GypTec Insulation Plate	For attaching insulation to approved substrates using GenFast GypTec Fasteners.

<b>Table 1.05-4 Acceptable GenFlex Batten Bar, Termination Bar and Drain Bar Uses</b>		
Batten and Termination Bars	For the attachment of: GenFlex EZ .045", .060", .080" Membrane and GenFlex EZ Fleece Backed TPO .080" Membranes	
	Perimeter Enhancement with Cover Strip	Note:
Metal Batten Strip	✓	For anchoring membrane to approve substrates as required by GenFlex specifications and details. <sup>1</sup>
GenFast Polymer Batten Strip	✓ GenFlex EZ Peel & Stick Flashing	For anchoring membrane (with acceptable cover strip) to approved substrates, as required by GenFlex specifications and details. Base Tie-ins only. <sup>1</sup>
GenFast Termination Bar		For anchoring and sealing flashing terminations to approved substrates as required by GenFlex specifications and details. <sup>2</sup>
Aluminum Drain Bar		For terminating the membrane roof edge to approved substates as required by GenFlex specifications and details. <sup>2</sup>
✓ = Acceptable for use		
<b>NOTE:</b>		
1. Using this method may require additional structure enhancements, added purlins or under deck blocking for proper securement. The designer should validate if required.		
2. Additional enhancements to walls, parapets or substrate may be required to accommodate this method of termination.		

## 1.07 DECKS

**If present, it is required that Phenolic foam insulation be removed. Once removed, a visual inspection of the deck condition and other components is required; all deteriorated components must be replaced as necessary.**



**It is the building owners or their design professional's responsibility to determine the condition of the deck.**

**Sprayed-In-Place Polyurethane Foam (PUF) roofing system require a COMPLETE TEAR-OFF of the polyurethane foam system.**

### A. General

1. Structural roof decks should be properly designed and constructed to provide sufficient strength to support the anticipated dead and live loads along with the loads anticipated due to the construction traffic without excessive deflection or movement.
2. Roof replacement usually involves more complexities than new construction roofing. Such contingencies as rusted or deteriorated decks, rotted wood components, rooftop equipment that cannot be moved or shut down, and numerous other conditions are often encountered.
  - All holes, deformations, depressions, etc., must be reinforced and/or smoothed prior to the roof application.
  - Determination and acceptance of a deck for re-roofing is the responsibility of the building owner or their design professional.
  - The deck should provide slope to drain, gutter or scupper locations.
3. Contact your GenFlex Regional Technical Coordinator when fastening requirements for Mechanically Attached Systems should pullout values be less than 400 lb (181.4 kg).

4. Even existing concrete roof decks may contain latent amounts of moisture that may affect the insulation and the roof system. To help protect the roofing components, a venting base sheet or other vapor retarder material may be installed in accordance with the manufacturer's instructions. The installation of a vapor retarder should be considered regardless of the method of attachment of the insulation or membrane attachment, hot asphalt or adhesive attachment of insulation or the membrane system.

**B. Classification**

1. Structural decks can be classified as nailable or no-nailable (sometimes both) for purposes of mechanically attaching or nailing insulation or base sheets. Nailable decks include wood and new decks of gypsum and lightweight insulating concrete. These decks are soft enough so that the above-deck components can be secured with fasteners. Cementitious wood fiber and poured or precast structural concrete decks have been referred to as non-nailable. The term non-nailable is misleading. GenFlex Roofing Systems has fasteners that are approved for these decks.
2. Structural decks can be classified as combustible or non-combustible for purposes of fire ratings and code requirements.
  - a)The building owner should validation this information with their local code authorities, insurance agency and designers.
  - b)Special consideration may be required when interior fire ratings are required.

<b>Table 1.06-1 Structural Deck Classification</b>		
<b>Deck</b>	<b>Nailable or Non-Nailable</b>	<b>Combustible or Non-Combustible</b>
Steel	Non-Nailable	Non-Combustible
Concrete	Both	Non-Combustible
Wood	Nailable	Combustible
Cementitious Wood Fiber	Both	Non-Combustible
Gypsum	Nailable	Non-Combustible
Light Weight Insulated Concrete	Nailable	Non-Combustible

**C. Steel Decks**

1. GenFlex recommends that steel decks be a minimum 22 ga (0.76 mm).
2. Factory mutual Research-Approved steel decks are currently available in 22 ga (0.295", 0.794 mm), 20 ga (0.0358", 0.909 mm) and 18 ga (0.0474", 1.204 mm) thick steel sheets with 1.5" (38 mm) deep corrugations. The corrugations (ribs) are cold rolled in the sheets. The deck has a 6" (152 mm) module, that is, the ribs are 6" (152 mm) on center. All fastening approvals and recommendations are based on this profile. Approved and recommended spacing's are such that the fasteners will engage the top flange of the deck. Another common configuration is 3" (76 mm) deep deck, which usually has an 8" (203 mm) module.
3. When mechanically attaching a membrane to a steel deck see section 1.09 for specific requirements.
4. When mechanically attaching insulation, steel decks are required to have a minimum fastener pullout of 300 lb per fastener for adhered roofing systems.
5. GenFlex single-ply membranes **may not** be adhered or fastened directly to a steel deck.
6. On steel decks, the edges of insulation boards running parallel with the deck are required to be supported by the top flange of the metal deck. The board should have a minimum 1 ½" bearing on the steel deck flange. Cantilevering insulation boards over deck flutes can result in fracturing insulation boards, reducing the support for the membrane, making it susceptible to puncture.

7. All deteriorated components must be replaced, in kind.
8. For retrofit of metal buildings, refer to the GenFlex TPO Metal Building Retrofit Guide and Specifications. Direct attachment of GenFlex mechanically attached or fully adhered roofing systems to metal roofs (regardless of gauge) without an acceptable substrate board is strictly prohibited.
9. Existing standing seam panels and structural purlins must be in suitable condition to accommodate installation of the new roofing system.
10. Use caution to not over or under drive the fastener.
11. Fastening rates and installation methods may vary based on warranty requirements, project conditions and other factors. Validate requirements with your GenFlex Regional Technical Coordinator prior to start of the project.

<b>Table 1.06-2 Acceptable Fasteners for Steel Decks</b>	
<b>Insulation:</b>	
GenFast #12	¾" (19 mm) through deck
GenFast #12 Preassembled	1" (25 mm) through deck
GenFast #14	¾" (19 mm) through deck
GenFast #14 Preassembled	1" (25 mm) through deck
<b>Membrane:</b>	
GenFast #15 Preassembled	1" (25 mm) through deck
GenFast #15 Washer Head (WH)	1" (25 mm) through deck
GenFast #16 Max	1" (25 mm) through deck

<b>Table 1.06-3 Acceptable Insulation Adhesives for use direct to Steel Decks</b>
GenFlex One Step GenFlex ISO Bond GenFlex Quick Dual
<b>NOTE:</b> 1. Deck must be clean, free of all processing oils and other contaminants. 2. Bead spacing should ensure top flute adhesion is made. 3. Use only 4' x 4' (1.2 m x 1.2 m) insulation boards with adhesives. 4. Factory Mutual (FM) does not recognize adhesion of insulation direct to steel decks.

#### **D. Structural Concrete Roof Decks**

1. GenFlex recommends that the concrete deck be a minimum of 2,500 psi (20,684 KPa).
2. Refer to section 1.09 for fastening requirements for mechanically attached systems should pullout values be less than 400 lbf (181.4 kg).
3. When mechanically attaching insulation, structural concrete roof decks require a minimum fasteners pullout of 300 lb (1.8 kN) per fastener for adhered roofing systems.

 **The suitability of mechanically fastening insulation or membrane to any hollow core, pre-stressed or post-tensioned structural concrete deck assembly is the responsibility of the design professional. Special consideration needs to be given to the relationship between the deck attachment allowances and GenFlex mechanical attachment requirements.**

4. Verify with the building owner or the owners design professional about the suitability of mechanical fastening into pre-stressed and post-tensioned structural concrete.
5. Newly poured decks must be sufficiently cured to allow adhesion to the substrate surface. Cure times vary. A roof consultant, structural engineer, or concrete industry professional should be contacted to perform moisture tests if readiness of concrete is in question.
6. Pre-cast concrete panes may not always be a suitable substrate to receive insulation due to the potential for irregularities, even if the joints are grouted. It may sometimes be necessary to consider pouring a leveling layer of structural or lightweight concrete over the panels prior to roofing.

7. Concrete additives can have a negative impact on the adhesion of asphalt membranes and insulation products. The concrete supplier/installer should certify that any additives in the mix will not render the deck unsuitable for roofing application for warranted systems.
8. GenFlex does not accept for warranty any concrete substrates that have been sealed with chemical sealers or silicon surface treatments.

<b>Table 1.06-4 Single-Ply Adhesion/Attachment to Structural Concrete Roof Decks</b>	
<b>GenFlex EZ TPO Membrane</b>	
Adhered	GenFlex EZ TPO may be adhered directly to poured-in-place structural concrete using appropriate membrane adhesive.
Mechanically Attached	Required protection mat or insulation.
<b>GenFlex EZ TPO Plus Membrane</b>	
Adhered	Minimum substrate of: 1" (25 mm) GenFlex ISO or GenFlex GL ISO, 1.5" (38 mm) GenFlex Nail Base/GenFlex NB, ½" (13 mm) GenFlex HD ISO, or ¼" (6 mm) DensDeck Prime or Securock properly installed for the job conditions.
Mechanically Attached	
<b>GenFlex EZ Fleece Backed TPO Membrane</b>	
Adhered	GenFlex EZ Fleece Backed TPO may be adhered directly to poured-in-place structural concrete using EZ TPO FB Bonding Adhesive (LVOC), Quick Dual or hot asphalt.
<b>GenFlex EZ TPO Peel &amp; Stick Membrane</b>	
Adhered	Self adhered directly to poured-in-place structural concrete. Priming may be required prior to application.



**When mopping direct to concrete decking, precautions must be taken to protect everything below from dripping hazards of the hot asphalt.  
Staining of the TPO membrane may occur when asphalt is used.**

<b>Table 1.06-5 Acceptable Fasteners for Steel Decks</b>	
<b>Insulation:</b>	
GenFast #14	Minimum 1" (25 mm) into the structural concrete deck
GenFast #15	
GenFast CD-10 Concrete Fastener	
<b>Membrane:</b>	
GenFast #14	Minimum 1" (25 mm) into the structural concrete deck
GenFast #15	
GenFast CD-10 Concrete Fastener	
<b>NOTE:</b> Pre-Drilling or Pilot Hole may be required.	

<b>Table 1.06-6 Acceptable Insulation Adhesives for use direct to Structural Concrete Decks</b>
GenFlex Quick Dual GenFlex ISO Bond GenFlex One Step
<b>NOTE:</b> 1. Deck must be clean, free of all residual materials and other contaminants. 2. Primer may be required. 3. Use only 4' x 4' (1.2 m x 1.2 m) insulation boards with adhesives.

**E. Wood Decks: Plywood, OSB and Wood Plank**

1. GenFlex recommends that plywood and OSB decks have a minimum 7/16" (10.5 mm) thickness.
2. A minimum of 1" (25 mm) GenFlex GL ISO is required when installing GenFlex EZ TPO Plus systems over wood decks. (A thermal barrier may be required depending on local building codes and/or specific project requirements.)
3. Adhered and mechanically attached GenFlex EZ TPO single-ply systems may be installed directly to a OSB or plywood decking when:
  - a) The surface is structurally sound, smooth, flat, clean, dry, free of sharp fins, loos splinters or foreign materials that may damage the membrane.
  - b) The deck is secured using threaded fasteners that provide a smooth profile, meeting FM 4470 and the guidelines found in "Designing Commercial Roofs to Withstand Wind Uplift Forces" document, which can be found at apawood.org. **NOTE:** Nails are not permitted.
  - c) Tongue and groove panels are recommended.



**Fire treated plywood may be used provided it has not been treated with Ammonium Phosphates.**

4. Refer to Section 1.09 for fastening requirements for mechanically attached systems should pullout values be less than 400 lbf (181.4 kg).
5. When mechanically attaching insulation to wood decks, the required fastener pullout is of 300 lb (1.8 kN) per fastener minimum for adhered roofing systems.
6. When nailing a base sheet, wood decks are required to have a minimum per fasteners pullout of 40 lb (0.24 kN) for cap nails.

<b>Table 1.06-7 Single-Ply Adhesion/Attachment to Wood Roof Decks</b>	
<b>GenFlex EZ TPO Plus Membrane</b>	
Adhered	The GenFlex EZ TPO Plus membrane may be adhered directly to a wood deck by using EZ TPO Bonding Adhesive LVOC and GenFlex EZ TPO Bonding Adhesive.
Mechanically Attached	The GenFlex EZ TPO Plus membrane may be attached directly to a wood deck using appropriate GenFlex Fasteners, Plates and Battens.
InvisiWeld or Invisiweld-S	The GenFlex EZ TPO Plus membrane may be attached directly to a wood deck using GenFlex EZ TPO InvisiWeld or InvisiWeld-S Plates and appropriate Fasteners
<b>GenFlex EZ TPO Membrane</b>	
Adhered	The GenFlex EZ TPO membrane may be adhered directly to a wood deck by using EZ TPO Bonding Adhesive LVOC and GenFlex EZ TPO Bonding Adhesive.
Mechanically Attached	The GenFlex EZ TPO membrane may be attached directly to a wood deck using appropriate GenFlex Fasteners, Plates and Battens.
InvisiWeld or Invisiweld-S	The GenFlex EZ TPO membrane may be attached directly to a wood deck using GenFlex EZ TPO InvisiWeld or InvisiWeld-S Plates and appropriate Fasteners
<b>GenFlex EZ Fleece Backed TPO Membrane</b>	
Adhered	Quick Dual, EZ TPO FB Bonding Adhesive (LVOC)
Mechanically Attached	The GenFlex EZ Fleece Backed TPO membrane may be attached directly to a wood deck using appropriate GenFlex Fasteners, Plates and Battens.
<b>GenFlex EZ TPO Peel &amp; Stick Membrane</b>	
Self Adhered	The GenFlex EZ TPO Peel & Stick Membrane system may be adhered directly to a wood roof deck. <b>NOTE:</b> Priming may be required.

<b>Table 1.06-8 Acceptable Fasteners for Plywood, OSB or Wood Plank Decks</b>	
<b>Insulation:</b>	
GenFast #12	Minimum 1" (25 mm) into or through deck
GenFast #12 Preassembled	
GenFast #14	
GenFast #14 Preassembled	
<b>Membrane:</b>	
GenFast #14	Minimum 1" (25 mm) into or through deck
GenFast #15 Preassembled	
GenFast #15 Washer Head (WH)	
GenFast #16 MAX	

<b>Table 1.06-9 Acceptable Insulation Adhesives for use direct to Plywood, OSB and Wood Plank Decks</b>
GenFlex Quick Dual GenFlex ISO Bond GenFlex One Step
<b>NOTE:</b>
1. Deck must be clean, free of all residual materials and other contaminants.
2. Primer may be required.
3. Use only 4' x 4' (1.2 m x 1.2 m) insulation boards with adhesives.

#### F. Cementitious Wood Fiber Decks

1. Mechanically attached membrane systems are not approved into Cementitious Wood Fiber Decks.
2. When mechanically attaching insulation, cementitious wood fiber decks are required to have a fastener pullout of 300 lb (1.8 kN) for each fastener for adhered roofing systems.
3. GenFlex recommends that cementitious wood fiber decks have a minimum 2" (51 mm) thickness.
4. GenFlex EZ TPO Membranes cannot be installed directly to a cementitious wood fiber deck. The membrane must be adhered to an acceptable GenFlex insulation or cover board.

<b>Table 1.06-10 Acceptable Fasteners for Cementitious Wood Fiber Decks</b>	
<b>Insulation:</b>	
GenFast GypTec Fastener	Minimum 1 ½" (38 mm) into or through deck
GenFast Lite Deck Fastener	Minimum 2" (51 mm) into or through deck
<b>Membrane:</b>	
Not Approved	

<b>Table 1.06-11 Acceptable Insulation Adhesives for use direct to Cementitious Wood Fiber Decks</b>
GenFlex Quick Dual GenFlex ISO Bond GenFlex One Step
<b>NOTE:</b>
1. Deck must be clean, free of all residual materials and other contaminants.
2. Primer may be required.
3. Use only 4' x 4' (1.2 m x 1.2 m) insulation boards with adhesives.

#### G. Gypsum Roof Decks

1. GenFlex Recommends that the gypsum roof deck have a minimum 2" (51 mm) thickness.
2. Mechanically attached membrane systems are not approved into gypsum decks.
3. When attaching insulation to a gypsum roof deck, a fastener pullout of 300 lb (1.8 kN) per GenFast GypTec and GenFast Lite Deck Fasteners is required for adhered roofing systems.
4. GenFlex EZ TPO Membranes cannot be installed directly to a gypsum roof deck. The membrane must be adhered to an acceptable GenFlex insulation or cover board.

Table 1.06-12 Acceptable Fasteners for Gypsum Roof Decks	
<b>Insulation:</b>	
GenFast GypTec Fastener	Minimum 1 ½" (38 mm) into or through deck
GenFast Lite Deck Fastener	Minimum 2" (51 mm) into or through deck
<b>Membrane:</b>	
Not Approved	

Table 1.06-13 Acceptable Insulation Adhesives for use for attachment direct to Gypsum Decks
GenFlex Quick Dual GenFlex ISO Bond GenFlex One Step
<b>NOTE:</b>
1. Deck must be clean, free of all residual materials and other contaminants.
2. Primer may be required.
3. Use only 4' x 4' (1.2 m x 1.2 m) insulation boards with adhesives.

## H. Lightweight Insulating Concrete Roof Decks



GenFlex suggests a vapor retarder be considered over any Lightweight Concrete Roof Deck, especially over Lightweight Concrete with aggregate. However, where not specifically required in the chart below, the determination of the necessity and placement of a vapor retarder is project-specific and rests with the building owner or their design professional.

1. GenFlex recommends the lightweight insulating concrete have a minimum 2" (51 mm) thickness.
2. Refer to section 1.09 for fastening requirements for mechanically attached systems should pullout values be less than 400 lbf (181.4 kg). All mechanically attached membrane systems must attach into or through a structural concrete deck or steel form pan.
3. When mechanically attaching insulation through lightweight insulating concrete, into a structural deck, a fasteners pullout of 300 lb (1.8 kN) per fastener is required for adhered roofing systems.
4. A properly prepared existing, dry, and sound, un-insulated built-up roof system (all splits and blisters repaired) can function as a vapor retarder in a warranted GenFlex system but will not be included within GenFlex warranty coverage.

Table 1.06-14 Single-Ply Adhesion/Attachment to Lightweight Insulating Concrete Roof Decks		
New System with Insulation		New System without Insulation
GenFlex EZ TPO Plus		
Adhered	Insulation and Vapor Retarder Required	Not Allowed
Mechanically Attached	Vapor Retarder Required	Not Allowed
GenFlex EZ TPO		
Adhered	Insulation and Vapor Retarder Required	Cellular Lightweight Concrete: GenFlex EZ TPO membrane may be fully adhered directly to Cellular Lightweight Insulating Concrete Roof Deck using appropriate GenFlex membrane adhesives. A vapor retarder is not required, provided that the deck is clean, smooth, dry, and free of sharp edges or fins, loose or foreign materials, oil, grease, and other materials that may damage the membrane.

<b>Table 1.06-14 – Continued</b>		
<b>Single-Ply Adhesion/Attachment to Lightweight Insulating Concrete Roof Decks</b>		
New System with Insulation		New System without Insulation
Mechanically Attached	Insulation and Vapor Retarder Required	The vapor retarder is not required, provided that the deck is clean, smooth, dry, and free of sharp edges, fins, loose or foreign materials, oil, grease, and other materials that may damage the membrane.
<b>GenFlex EZ Fleece Backed TPO</b>		
Adhered with EZ TPO FB Bonding or Quick Dual Adhesive	Insulation and Vapor Retarder Required	Cellular Light Weight concrete: GenFlex EZ Fleece Backed TPO membrane may be adhered directly to Cellular Lightweight Insulating concrete roof Deck using an appropriate GenFlex membrane adhesive. A vapor retarder is not required, provided that the deck is clean, smooth, dry, free of sharp edges, fins, loose or foreign materials, oil, grease, and other materials that may damage the membrane.
Adhered with Hot Asphalt	Insulation and Vapor Retarder Required	Not Allowed
Mechanically Attached	Insulation and Vapor Retarder Required	A vapor retarder is not required, provided that the deck is clean, smooth, dry and free of sharp edges, fins, loose or foreign materials, oil, grease and other materials that may damage the membrane.
<b>GenFlex EZ TPO Peel &amp; Stick</b>		
Self Adhered	Insulation and Vapor Retarder Required	Cellular Lightweight Concrete: GenFlex EZ TPO Peel & Stick membrane may be fully adhered directly to a Cellular Lightweight Insulating Concrete Roof Deck. A vapor retarder is not required, provided that the deck is clean, smooth, dry, and free of sharp edges, fins, loose or foreign materials, oil, grease, and other materials that may damage the membrane.

<b>Table 1.06-15</b>	
<b>Acceptable Fasteners for Lightweight Insulating Concrete Roof Decks</b>	
<b>Acceptable Fasteners into Steel Pan</b>	
GenFast #14	Pre-Drill may be required. Minimum ¾" (19 mm) penetration through pan.
GenFast #14 Preassembled Screw and Plate	Pre-Drill may be required. Minimum 1" (25 mm) penetration through pan.
<b>Acceptable Fasteners into Structural Concrete Substrate</b>	
GenFast #14	Pilot hole required. Minimum ½" (13 mm) deeper than fastener embedment. See PDS. Minimum 1" (25 mm) penetration into structural concrete.
<b>Acceptable Fasteners into Lightweight Concrete</b>	
GenFast Lite Deck Fastener	Pilot hole required. Minimum ½" (13 mm) deeper than fastener embedment. See PDS. Minimum embedment of 2" (51 mm) into deck is required

#### I. Special Considerations for Partial Tear Off and Retrofit/Recover Applications



If present, it is required that Phenolic foam insulation be removed. Once removed, a visual inspection of the deck condition and other components is required: all deteriorated components must be replaced as necessary. It is the building owner or their design professional's responsibility to determine the conditions of the deck.

1. A **Partial Tear Off** is the removal of the existing roofing membrane, installing a new layer of insulation over the existing in-place insulation, and installing a new membrane roofing system over the new insulation.
2. A **Retrofit or Recover** is the installation of a new membrane roofing system (including insulation) over an existing roofing membrane.
3. The effect of existing moisture on the performance of the new system may be significant depending upon the roofing components selected. Therefore, a moisture survey should be conducted to determine the moisture content of the existing roof system components. All components of the existing system that would be detrimental to the new GenFlex roof system must be removed and replaced in kind prior to installation.
4. Limitations in flashing heights may be encountered. Existing building features (3.g., door or window locations, weep holes, and through-wall flashings) may not allow sufficient clearance to provide proper termination above the potential water level, additional insulation, or other details. Detailed consideration of these conditions is critical to the integrity of the roofing system. Contact your GenFlex Regional Technical Coordinator for technical information or assistance.
5. Confirm the structural integrity of the existing deck and specify repair or replacement as required.
6. Existing roof components are not included in the GenFlex warranty.
7. Verify that the attachment of the existing roof system is acceptable for the specific new GenFlex roof system.

<b>Table 1.06-16 Special Considerations for Partial Tear Off and Retrofit/Recover Applications</b>	
<b>Deck</b>	<b>Special Considerations</b>
Steel Decks and Nailable Decks (Wood Plank, Plywood, OSB, Gypsum, Cement Wood Fiber, Poured in Place Concrete Decks)	The attachment of the existing system may not be sufficient if the existing insulation is not mechanically fastened or not fastened correctly, or if the existing system contains fasteners that may be corroded. It is strongly recommended that the existing roof system be mechanically attached to the structural deck according to local code, insurance and GenFlex requirements, and prior to installing the new insulation.
Non-Nailable Decks (Poured in Place Concrete Decks, Pre-Cast Concrete Decks, Post-Tension Concrete Decks, Hollow Core)	If the existing insulation or membrane is not adequately adhered to the deck, it is strongly recommended that the existing roof system be removed to the deck.

**The suitability of mechanically fastening insulation or membrane to any hollow core, pre-stressed or post-tensioned structural concrete deck assembly is the responsibility of the design professional. Special consideration needs to be given to the relationship between the deck attachment allowances and GenFlex mechanical attachment requirements.**



**All recover or retrofit systems using adhesives for insulation attachment require a pull test to verify adhesion. Refer to the GenFlex Attachment Guide for adhesion pull test requirements for GenFlex insulation adhesives.**

**When using fasteners, verify that the substrate has sufficient fastener pullout resistance to meet system requirements.**

## **J. Partial Tear Off**

1. Partial Tear Off and Recover is the removal of the existing membrane, installing a new layer of insulation over the existing in place insulation and a new membrane over the new insulation.
2. The existing insulation must be suitable for use as a component of the new roof system. The existing insulation must be:
  - a) Dry and free of trapped moisture.
  - b) Re-secured as necessary to meet GenFlex, local code, or other specified wind uplift requirements.
  - c) An acceptable substrate for the new insulation and the new membrane.
3. If existing insulation is to remain, all damaged or wet components must be removed and replaced, in kind, prior to installing the new roof system.
4. Existing roof components are not included in the GenFlex warranty.

## **K. Retrofit/Recover Applications**

1. Existing Smooth Surface Build-Up or Modified Bitumen Roofs
  - a) New insulation or cover board is required, except:
    - When installing an appropriate roof membrane directly to a properly prepared smooth surface BUR or modified bitumen roof. The existing smooth asphalt roof must not have been coated or resaturated. GenFlex EZ Fleece Backed TPO 45 mil membrane is limited to 15-year warranty.
    - Staining of the GenFlex EZ Fleece Backed TPO Membrane may occur when attached directly to existing BUR or Modified Bitumen Roof.
    - Bonding to an existing asphalt-based roof system is not acceptable when the melting point of the existing asphalt is less than 180 °F (82 °C).
  - b) The GenFlex EZ Fleece Backed TPO Membrane System may be adhered to a properly prepared smooth surface BUR or Modified Bitumen roof. The exiting smooth asphalt or Modified Bitumen roof must not have been coated or resaturated.
    - All damaged or wet components must be removed and replaced prior to installing the new roof system.
    - Existing roof components are not included in the GenFlex warranty.
2. Mineral Surfaced Modified Bitumen
  - a) GenFlex EZ Fleece Backed TPO Membrane may be adhered to a properly prepared granulated modified bitumen roof. GenFlex EZ TPO Fleece Backed TPO 45 mil membrane is limited to a 15-year warranty.
  - b) Insulation, cover board, or protection mat required, except when installing an GenFlex EZ TPO Fleece Backed membrane system.
  - c) All damaged or wet components must be removed and replaced, in kind, prior to installing the new roof system.
  - d) Existing roof components are not included in the GenFlex warranty.
3. Asphalt Built Up and Modified Roofs with Flood Coat & Gravel
  - a) New insulation or cover board is required. Use of 4' x 4' (1.2 m x 1.2 m) boards are recommended.
  - b) All damaged or wet components must be removed and replaced, in kind, prior to installing the new roof system.
  - c) Existing roof components are not included in the GenFlex warranty.
  - d) The removal of loose gravel may be required to meet local building code requirements or for structural consideration. If loose gravel is removed, some method of leveling may be required to provide a suitable substrate for new insulation.

4. Coal Tar Built Up Roofs
  - a) New insulation or cover board is required.
  - b) All damaged or wet components must be removed and replaced, in kind, prior to installing the new roof system.
  - c) Flow of existing coal tar into the building may occur when new fasteners penetrate an existing coal tar pitch membrane and substrate.



**Flow of existing coal tar into the building may occur when new fasteners penetrate an existing coal tar pitch membrane and substrate.**

- d) The removal of loose gravel may be required to meet local building code requirements or for structural consideration. If loose gravel is removed, some method of leveling may be required to provide a suitable substrate for the insulation.
- e) Existing roof components are not included in the GenFlex warranty.

5. Existing Single-Ply Systems

- a) New insulation or cover board is required.
- b) Recover over single-ply roofing systems require that all existing base tie-ins be removed or cut prior to the new roof installation.
- c) All damaged or wet components must be removed and replaced, in kind, prior to installing the new roof system.
- d) Existing roof components are not included in the GenFlex warranty.

L. Preparation of Existing Gravel, Smooth, and Granule Surfaced Asphalt Membranes

1. Verify the attachment of the existing roof system is acceptable. If existing insulation is not mechanically fastened, contains fasteners that may be corroded or loose, or the attachment may not be sufficient, consideration should be given to re-attaching the roof system prior to installing the new insulation.
2. When adhering insulation to a gravel surfaced roof, all loose gravel or granules must be removed by vacuuming and/or, power brooming. After all loose gravel has been removed; spud the remaining gravel smooth to provide a level bonding surface.
3. If adhering the insulation or cover board with asphalt, prime the surface using an ASTM D41 asphalt primer.
4. The existing assembly should be re-secured as necessary to meet local code and insurance or design wind uplift requirements.

**Sprayed In-Place polyurethane foam (PUF) roofing systems require a COMPLETE TEAR-OFF of the Sprayed In-Place polyurethane foam system.**



**Existing roofs over Phenolic Insulation require a COMPLETE TEAR-OFF of the entire roof system to the structural deck. When Phenolic insulation is removed, a visual inspection of the deck conditions and other components is required; all deteriorated components must be replaced as necessary.**

## 1.08 BASE SHEET

### A. General

1. Depending on the base sheet and substrate, base sheets may be attached with fasteners, hot asphalt or head fusing as required by the specifications.
2. GenFlex does not manufacture modified based sheets and plies. Please contact your GenFlex Regional Technical Coordinator for review and approval of use for appropriate base sheet or plies. Only GenFlex products will be included in the GenFlex Warranty.

3. Where the slope exceeds ½" (13 mm) in 12" (305 mm), or 4.2% slope, and hot asphalt is required, GenFlex recommends that an appropriate mopping asphalt or Type IV asphalt is used. Only GenFlex products will be included in the GenFlex Warranty.
4. GenFlex does not manufacturer or supply Type III or Type IV asphalt and does not warrant the performance of products not supplied by GenFlex.

<b>Table 1.07-1 Allowable Base Sheet Attachments</b>			
Substrate to which base sheet or base ply will be attached:	Attachment Method		
	Mechanically Attached	Heat Weld	Hot Asphalt
<b>Decks</b>			
Structural Concrete	✓	✓	✓
Plywood or Oriented Strand Board	✓		
Wood Plank	✓		
Poured or Pre-Cast Gypsum	✓		
Cementitious Wood Fiber	✓		
Lightweight Insulating Concrete Decks (See Section 1.06 I for additional requirements)	✓		
<b>Re-Cover</b>			
Existing Smooth Surface Built-Up or Modified Bitumen Roofs		✓	✓
Asphalt Gravel Surfaced Built-Up Roofs			✓
Mineral Surface Built-Up or Modified Bitumen Roofs		✓	✓
<b>New Insulation / Cover Board</b>			
GenFlex ½" HD ISO	✓		
Structodek HD Wood Fiber Board	✓		✓
GenFlex Nailbase Composite Board	✓		
DensDeck Products	✓	✓	✓
Securock	✓	✓	✓
✓ = Acceptable for use			
Reference must be made to other sections of the other GenFlex guides, details drawings, and Product Data Sheets for additional information and/or specific requirements. Contact your GenFlex Regional Technical Coordinator for additional information.			



**Roofing plies or base sheets cannot be fully mopped to polyiso insulation. A suitable overlay must be used to separate the polyiso insulation from the fully adhered, hot asphalt applied, ply.**

**The following are overlays over polyiso that re generally acceptable when attaching any ply sheet with hot asphalt:**

- Compatible cover boards
- Approved DensDeck product
- A base sheet mechanically attached through the polyiso insulation into the structural deck

## 1.09 INSULATION

### A. General

1. Insulation must provide a suitable substrate for the proposed roof system as well as insulating the building.
  - Install only as much insulation as can be covered with roofing membrane and completed before the end of the day's work or before the onset of inclement weather.

2. Insulation thickness requirements may vary for code compliance. Contact the local code or insurance official before contacting your GenFlex Regional Technical Coordinator for technical information.
3. Refer to insulation or cover board Product Data Sheet (PDS) for specific spanning capabilities.
4. Refer to the GenFlex Attachment Guide for adhesion pull test requirements for GenFlex Insulation Adhesives.



**Only GenFlex branded insulation or those sold by GenFlex can be included in the GenFlex Roof System Warranty.**

5. Neatly fit insulation to all penetrations, projections, and nailers. Insulation should be loosely fitted, with gaps greater than ¼" (6.3 mm) filled with acceptable insulation. Under no circumstances should the membrane be left unsupported over a space greater than ¼" (6.3 mm). Tapered insulation with acceptable facers for bonding must be installed around roof drains so as to provide proper slope for drainage as shown in GenFlex Details.
6. Stagger insulation joints when installing multiple layers of insulation. All joints between layers should be staggered but is not required for the issuance of a GenFlex Warranty.
7. Refer to the GenFlex Attachment Guide and this document for pull test requirements.

**B. Attachment**

1. Insulation may be installed using approved GenFlex fasteners and plates, adhesives, and asphalt. It is acceptable to combine fastener and adhesive attachment methods in multi-layer applications.
2. Tapered insulation below the 1" (25 mm) minimum thickness must be fastened at a rate of one (1) fastener and plate per (2) ft<sup>2</sup> (0.22 m). If possible, install the tapered insulation first, covered by flat stock.
3. Refer to specific GenFlex Product Data Sheets (PDS) for installation and fastening requirements.
4. When a composite of two insulation layers is installed, the fastening pattern required for the top board thickness must be used. A common fastener may be used to install multilayer applications. Some restrictions apply to fasteners length depending on standards used.



**Ballasted systems are not allowed when membrane is installed directly onto a hard surface, such as DensDeck, Securock, OSB, Gypsum, GenFlex ½" HD ISO or concrete. Ballasted systems are not allowed when the membrane is installed directly to a layer of mechanically attached insulation.**

<b>Table 1.08-1 Insulation/Cover Board Attachment Options by Deck and Re-cover/Retrofit</b>					
Substrate to Which Insulation / Cover Board Will Be Attached or Adhered	Attachment Method				
	Mechanically Attached	ISO Bond	One Step	Quick Dual	Hot Asphalt
		Adhesive attachment may require a primer and an adhesive pull test*.			
<b>Decks</b>					
Steel	✓	✓	✓	✓	N/A
Structural Concrete	✓	✓	✓	✓	✓
Plywood or Oriented Strand Board	✓	✓	✓	✓	N/A
Wood Plank	✓	✓	✓	✓	N/A
Poured or Pre-Cast Gypsum	✓	✓	✓	✓	N/A
Cementitious Wood Fiber	✓	✓	✓	✓	N/A

<b>Table 1.08-1 – Continued</b>					
<b>Insulation/Cover Board Attachment Options by Deck and Re-cover/Retrofit</b>					
Substrate to Which Insulation / Cover Board Will Be Attached or Adhered	Attachment Method				
	Mechanically Attached	ISO Bond	One Step	Quick Dual	Hot Asphalt
		Adhesive attachment may require a primer and an adhesive pull test*.			
Lightweight Insulating Concrete Decks (See Section 1.06 I for additional requirements)	✓	✓	✓	✓	N/A
<b>Re-Cover/Retrofit</b>					
Existing Smooth Surface Built-Up Roof or Modified Bitumen Roofs	✓	✓	✓	✓	✓
Coal Tar Built-Up Roofs	N/A	✓	✓	✓	N/A
Asphalt Gravel Surfaced Built-Up Roof	✓	✓	✓	✓	✓
Mineral Surface Built-Up Roof or Modified Bitumen Roof	✓	✓	✓	✓	✓
GenFlex Vapor Shield Membrane	✓	✓	✓	✓	N/A
GenFlex recommends mechanically attaching a cover board over existing insulation. The responsibility of identifying and removing damages or wet insulation is that of the contractor.					
Sprayed Urethane Roof (PUF)	Complete tear-off required				
Existing Roof with Phenolic Insulation	Complete tear-off required. When phenolic insulation is removed, a visual inspection of the deck conditions and other components is required, and all deteriorated components must be replaced as necessary.				
*Refer to the GenFlex Attachment Guide for adhesion pull test requirements for insulation adhesives.					
✓ = Acceptable for use			N/A = Not Applicable		

### C. Multiple Layers of Insulation

1. Where overall insulation thickness is 2" (51 mm) or greater, GenFlex recommends installation the insulation in two (2) or more layer.
2. Insulation may be installed in one or multiple layer applications for the GenFlex warranty. If installed in multiple layers, the joints of each succeeding and adjoining layer should be staggered from the joints of previous layers by a minimum of 6" (152.4 mm) in each direction.
3. When a composite of two insulation layers is installed, the fastening pattern required is dependent on the top board type and thickness. A common fastener may be used to simultaneously fasten all layers to the structural deck.

<b>Table 1.08-2</b>				
<b>Insulation/Cover Board Attachment to Acceptable Substrate by Approved Adhesive Type</b>				
Acceptable Substrate	Adhesive Type			
	ISO Bond	One Step	Quick Dual	Hot Asphalt
GenFlex ISO / GenFlex GL ISO	✓	✓	✓	✓
Coated Glass Facer Polyiso / GenFlex CG ISO	✓	✓	✓	N/A
GenFlex ½" HD ISO	✓	✓	✓	N/A
Structodek HD Wood Fiberboard	✓	✓	✓	✓
DensDeck	✓	✓	✓	✓
DensDeck Prime	✓	✓	✓	✓
DensDeck StormX Prime	✓	✓	✓	N/A
Securock Gypsum-Fiber	✓	✓	✓	✓
Perlite Insulation	N/A	N/A	N/A	✓
Asphalt Based Sheet	✓	✓	✓	✓

Table 1.08-2 – Continued Insulation/Cover Board Attachment to Acceptable Substrate by Approved Adhesive Type				
Acceptable Substrate	Adhesive Type			
	ISO Bond	One Step	Quick Dual	Hot Asphalt
GenFlex Vapor Shield	✓	✓	✓	N/A
NOTE:				
<ul style="list-style-type: none"> <li>• GenFlex Recommends mechanically attaching a cover board over existing insulation. The responsibility of identifying and removing damaged or wet insulation is that of the contractor.</li> <li>• Refer to the GenFlex Attachment Guide for adhesion pull test requirements for insulation adhesives.</li> <li>• Primers may be required.</li> </ul>				
✓ = Acceptable for use			N/A = Not Applicable	

#### D. Mechanical Attachment of Insulation and Cover Board to Approved Substrates

1. Insulation must be fastened with appropriate GenFlex fasteners and insulation plates.
2. Insulation must be installed in accordance with the fastening rate and pattern for the applicable system, as shown in the GenFlex Attachment Guide, specification or tested assemblies.
3. Fastening rates and patterns may vary for code or regulatory compliance. Contact your local code or insurance official before contacting your GenFlex Regional Technical Coordinator for technical information.
4. When a composite of two insulation layers is installed, the fastening pattern required is dependent on the top board type and thickness. A common fastener may be used to simultaneously fasten all layers to the structural deck.
5. In areas where tapered insulation thickness is below the 1" (25 mm) minimum thickness, insulation must be fastened at a rate of one (1) fastener and plate per two (2) ft<sup>2</sup> (0.22 m<sup>2</sup>).

Table 1.08-3 Insulation Mechanical Attachment										
Structural Deck	Attachment Method (GenFast Fasteners/Plates)									
	#12	#12 Preassembled	#14	#14 Preassembled	#15 Preassembled	#15 Washer Head	#16 Max	CD-10	GypTec	Lite Deck
Steel	✓ <sup>2</sup>	✓ <sup>2</sup>	✓ <sup>2</sup>	✓ <sup>2</sup>	N/A	✓	N/A	N/A	N/A	N/A
Structural Concrete	N/A	N/A	✓	N/A	N/A	N/A	N/A	✓	N/A	N/A
Plywood or OSB	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A
Wood Plank	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A
Gypsum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓
Cementitious Wood Fiber	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓
Lightweight Insulating Concrete – Steel Deck <sup>1</sup>	N/A	N/A	N/A	✓ <sup>3</sup>	N/A	N/A	N/A	N/A	N/A	✓
Lightweight Insulating Concrete – Structural Concrete <sup>1</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
✓ = Acceptable for use					N/A = Not Applicable					
NOTE:										
<ol style="list-style-type: none"> <li>1. See section 1.06 H for additional requirements.</li> <li>2. Approved for insulation attached on warranties up to 15-years.</li> <li>3. Fastener must penetrate the steel deck a minimum of 1" (25 mm).</li> </ol>										

#### E. Minimum Rate of Attachment for Insulation Boards

1. Refer to GenFlex technical documents or tested assemblies for the required patterns for proper placement of approved fasteners and plates for insulation. Default to the more conservative fastening rates. For non-standard fastener densities, contact your GenFlex Regional Technical Coordinator for information.
2. Certain specifications, performance requirements, code requirements and job conditions may call for increased densities of fasteners in the perimeters and corner of roof.

<b>Table 1.08-4 Mechanically Attached Membrane - Minimum Fastening Rate per Insulation Board</b>				
System	Insulation	Min. Insulation Thickness	Fasteners per 4' x 4' Board	Fasteners per 4' x 8' Board
EZ TPO Plus, EZ TPO, EZ Fleece Backed TPO <b>NOTE:</b> New construction or complete tear off to the deck	GenFlex ISO / GL ISO	1"	4	5
	GenFlex Coated Glass Facer Polyiso / CG ISO	1"	4	5
	GenFlex 1/2" HD ISO	1/2"	4	5
	GenFlex HD Composite ISO	1 1/2"	4	5
	Nailbase Composite Board / NB ISO	1 1/2"	4	5
	DensDeck	1/4"	4	5
	DensDeck Prime	1/4"	4	5
	DensDeck StormX Prime	5/8"	4	5
	Securock	1/4"	4	5
Structodek HD Fiberboard (max 15-year warranty)	1/2"	4	5	
EZ TPO Plus, EZ TPO, EZ Fleece Backed TPO <b>NOTE:</b> New construction with an air barrier or a recover over existing loose laid or mechanically attached single-ply system.	GenFlex ISO / GL ISO	1/2" – 1.4"	8	16
		1.5" – 1.9"	6	12
		2" or greater	4	8
	GenFlex Coated Glass Facer Polyiso / CG ISO	1/2" – 1.4"	8	16
		1.5" – 1.9"	6	12
		2" or greater	4	8
	GenFlex 1/2" HD ISO	1/2"	6	12
	GenFlex HD Composite ISO	1 1/2"	6	12
	Nailbase Composite Board / NB ISO	1 1/2"	6	12
	DensDeck	1/4"	8	16
		1/2"	6	12
		5/8"	4	8
	DensDeck Prime	1/4"	8	16
		1/2"	6	12
		5/8"	4	8
	DensDeck StormX Prime	5/8"	4	8
	Securock	1/4"	8	16
		1/2"	6	12
5/8"		4	8	
Structodek HD Fiberboard (max 15-year warranty)	1/2"	8	16	
<b>NOTE:</b>				
1/4" = 6.4 mm	5/8" = 16 mm	1.4" = 35.6 mm	1.9" = 48.2 mm	4' x 4' = 1.22 m x 1.22 m
1/2" = 13 mm	1" = 25 mm	1.5" = 38 mm	2" = 51 mm	8' x 8' = 2.44 m x 2.4 m

Table 1.08-5 Adhered Membrane - Minimum Fastening Rate per Insulation Board				
System	Insulation	Min. Insulation Thickness	Fasteners per 4' x 4' Board	Fasteners per 4' x 8' Board
EZ TPO Plus, EZ TPO, EZ Fleece Backed TPO, EZ TPO Peel & Stick	GenFlex ISO / GL ISO	½" – 1.4"	8	16
		1.5" – 1.9"	6	12
		2" or greater	4	8
	GenFlex Coated Glass Facer Polyiso / CG ISO	½" – 1.4"	8	16
		1.5" – 1.9"	6	12
		2" or greater	4	8
	GenFlex ½" HD ISO	½"	6	12
	GenFlex HD Composite ISO	1 ½"	6	12
	Nailbase Composite Board / NB ISO	1 ½" – 1.9"	6	12
		2" or greater	4	8
	DensDeck Prime	¼"	6	12
		½"	6	10
		⅝"	5	8
	DensDeck StormX Prime	⅝"	4	8
	Securock	¼"	6	12
½"		5	10	
⅝"		4	8	
Structodek HD Fiberboard (max 15-year warranty)	½"	8	16	
<b>NOTE:</b>				
¼" = 6.4 mm      ⅝" = 16 mm      1.4" = 35.6 mm      1.9" = 48.2 mm      4' x 4' = 1.22 m x 1.22 m				
½" = 13 mm      1" = 25 mm      1.5" = 38 mm      2" = 51 mm      8' x 8' = 2.44 m x 2.4 m				

Table 1.08-6 Minimum Fastener Pullout Resistance for Specific Systems <sup>2</sup>	
System	Minimum Fastener Pullout <sup>1</sup>
Adhered Membrane with Attached Insulation	300 lb (136.1 Kg)
Single-Ply Mechanically Attached	400 lb (181.4 Kg)
Base Sheet Mechanically Attached	300 lb (136.1 Kg)
Base Sheet Nailed to Deck (Cap Nail or Approved LWC Fastener <sup>3</sup> )	40 lb (18.1 Kg)
<b>NOTE:</b>	
1. In the case where the structural deck does not meet the minimum fastener pullout requirements, contact a GenFlex Regional Technical Coordinator for additional requirements.	
2. Documented pulls may be required.	
3. Contact a GenFlex Regional Technical Coordinator for approval.	

#### F. Asphalt Attachment of Insulation / Cover Board to Substrate

- The proposed insulation or cover board must be compatible with the roof substrate, the proposed bitumen, and the requirements of the GenFlex roof system.
- Hot steep asphalt (ASTM D 321 Type III or Type IV) may be used to attach insulation beneath a ballasted, fully adhered or mechanically attached roof system.
- When using hot asphalt for attachment:
  - The insulation must be no larger than 4' x 4' (1.2 m x 1.2 m)
  - Stagger all insulation joints from adjoining boards and subsequent layers by 6" (153 mm)
- Assure that all health and safety measures are followed when installing hot asphalt to protect the installers as well as occupants of the building.
- Expanded or extruded polystyrene insulation cannot be attached or adhered to with hot asphalt.

<b>Table 1.08-7 Approved Substrates for use with Asphalt Attachment of Insulation / Cover Board</b>		
Approved base sheets that have been attached in accordance with GenFlex requirements		✓
Approved base plies that have been adhered in accordance with GenFlex requirements		✓
Compatible Insulation	GenFlex ISO / GL ISO	✓
Compatible Cover Boards	Approved DensDeck and Securock products (DensDeck must be primed with ASTM D41)	✓
Poured-In-Place or Pre-Cast Structural Concrete Deck primed with ASTM D41 Primer		✓
Existing properly prepared asphalt membrane roofing systems	Uncoated smooth or granular surface BUR	✓
	Granule surfaced SBS modified asphalt roofing systems	✓
	Gravel Surface Built-Up roofing systems	✓
✓ = Acceptable for use		

**G. Adhesive Attachment of Insulation / Cover Board to Substrate**

1. Assure that all safety measures are followed when installing insulation adhesives to protect the installer as well as the occupants of the building.
2. GenFlex insulation adhesives must be applied in accordance with the installation instructions and Product Data Sheets.
3. When insulation or cover boards are attached with adhesives the boards must be no larger than 4' x 4' (1.2 m x 1.2 m).
4. Insulation joints shall be staggered from adjoining and adjacent layers, 6" (153 mm) minimum.
5. Refer to the GenFlex Roofing Systems Attachment Guide, Product Data Sheets and details for bead spacing patterns and pull test requirements.
6. Existing decks with residual asphalt must be cleaned and scraped as smooth as possible.
7. Existing decks shall be smooth, flat, clean, dry, free of sharp fins, or foreign materials.

<b>Table 1.08-8 Allowable Adhesive Attachment of Insulation / Cover Board to Structural Deck</b>									
Structural Deck	ISO Bond			Quick Dual			One Step		
	Acceptable	Pull Test Required	Not Acceptable	Acceptable	Pull Test Required	Not Acceptable	Acceptable	Pull Test Required	Not Acceptable
Steel <sup>1</sup>	✓			✓				✓	
New Structural Concrete <sup>2</sup>	✓			✓			✓		
Existing Structural Concrete <sup>3</sup>		✓			✓			✓	
Plywood, OSB, Wood Planking	✓			✓			✓		
Cementitious Wood Fiber	✓				✓		✓		
Poured or Pre-Cast Gypsum		✓			✓			✓	
Cellular Lightweight Insulating Concrete (Celcore or Elastizell) <sup>2</sup>		✓			✓			✓	
Lightweight Insulating Concrete Decks (See Section 1.06 I for additional requirements) <sup>2</sup>		✓						✓	
✓ = Acceptable for use									
<b>NOTE:</b>									
1. New steel decks require cleaning to remove processing oils or other contaminants.									
2. New poured decks must have a minimum 28-day drying/cure time and be dry and free from "weather" and residual moisture.									
3. Existing concrete containing residual asphalt must be scraped as smooth as possible, and free from residual moisture.									

Table 1.08-9 Allowable Adhesive Attachment of Insulation / Cover Board to Base Layer of Insulation									
Substrate	ISO Bond			Quick Dual			One Step		
	Acceptable	Pull Test Required	Not Acceptable	Acceptable	Pull Test Required	Not Acceptable	Acceptable	Pull Test Required	Not Acceptable
GenFlex ISO / GL ISO	✓			✓			✓		
GenFlex Coated Glass Facer Polyiso / CG ISO	✓			✓			✓		
GenFlex ½" HD ISO	✓			✓			✓		
GenFlex HD Composite ISO	✓			✓			✓		
Nailbase Composite Board / NB ISO			✓			✓			✓
DensDeck Prime	✓			✓			✓		
DensDeck StormX Prime	✓			✓			✓		
Securock	✓			✓			✓		
Structodek HD Fiberboard (max 15-year warranty)	✓			✓			✓		
Perlite Insulation			✓			✓			✓
Vapor Shield	✓			✓			✓		
Approved Asphalt Base Sheet		✓			✓		✓		
✓ = Acceptable for use									
<b>NOTE:</b> When insulation is installed with adhesives a maximum 4' x 4' (1.2 m x 1.2 m) boards are to be used unless noted otherwise.									

Table 1.08-10 Allowable Adhesive Attachment of Insulation / Cover Board to Retrofit / Recover									
Substrate	ISO Bond			Quick Dual			One Step		
	Acceptable	Pull Test Required	Not Acceptable	Acceptable	Pull Test Required	Not Acceptable	Acceptable	Pull Test Required	Not Acceptable
Smooth Surface BUR <sup>1</sup>		✓			✓			✓	
Existing Asphalt Roofs <sup>1,2</sup> Gravel Surfaced BUR Mineral Surfaced BUR Mineral Surface Modified		✓			✓			✓	
Coal Tar Pitch BUR <sup>1,3</sup>		✓				✓		✓	
Existing Single-Ply Systems <sup>1</sup>			✓			✓			✓
✓ = Acceptable for use									
<b>NOTE:</b> 1. Primer may be required. 2. All interruptions in the existing roof membrane must be re-sealed to prevent air infiltration. Primer may be required. 3. Aged and Oxidized.									

## 1.10 ROOF MEMBRANE

### Membrane Securement Options for Single-Ply Membrane Systems

The following outlines the various securement options for individual system types. Compliance with all installation criteria is required to issue a GenFlex Roofing System Warranty. Additional attachment requirements may be necessary to comply with design criteria, insurance requirements or local building code. Review the GenFlex EZ TPO Design Guide, GenFlex EZ TPO InvisiWeld Design Guide and corresponding application guides, details and other technical information for specific installation methods.

**NOTE:** An air barrier is required for projects with large wall openings that are greater than 10% of any one wall area that could be left open in a storm. Criteria for enhancements to be determined based upon GenFlex's review. Contact your GenFlex Regional Technical Coordinator for Technical Information.

1. See the GenFlex Attachment Guide for additional membrane and insulation securement requirements.
2. Due to the nature of mechanically attached roofing systems, some fluttering or billowing of the membrane can be expected and may produce sound under certain conditions.
3. Appropriate GenFlex Seam Plates, Batten Strips (R.M.A. only) and appropriate fasteners must be used to secure the GenFlex Mechanically Attached System membrane.
4. Where the structural deck does not provide the minimum required fastener pullout resistance additional fastening or alternate installation methods may be required. This may result in the project not being warrantable.
5. Consult with local building code, insurance officials and design professionals to determine if more stringent securements are required.
6. The methods outlined below are options that may be used to achieve a GenFlex Warranty. Not all systems may qualify for a GenFlex warranty. It is important to review your project conditions and proposed system with your GenFlex Representative prior to starting a project.
7. Fastening spacing and methods in this guide assumes that the deck/structure is dry and free of any deterioration. GenFlex recommends that pullout testing be completed and documented by a third party on all projects where deck conditions cannot be confirmed.
8. Splice GenFlex EZ TPO membrane by heat welding the side and end laps with a hot air welder. Refer to the GenFlex EZ TPO Application Guide for additional welding information.
9. If reinforced TPO membrane thickness is greater than .045" (1.14 mm), T-joint patches must be installed at all reinforced membrane seam intersections. For specific instructions, refer to the GenFlex EZ TPO Roofing System Application Guide and GenFlex EZ TPO Lap Splice Details.
10. Refer to GenFlex details and application specifications for specific requirements.



**GenFlex EZ TPO Peel & Stick Membrane is an adhered membrane only. It is not approved for mechanical attachment.**

<b>Table 1.09-1 Approved Immediate Substates for TPO Membranes Up to 20-Year Warranties</b>						
New Insulation or Cover Board	GenFlex EZ TPO or EZ TPO Plus			GenFlex EZ TPO Peel & Stick	GenFlex EZ Fleece Backed TPO	
	Adhered	Attached	Ballasted	Adhered	Adhered	
GenFlex ISO	✓	✓	✓	✓	✓	
Coated Glass Facer Polyiso	✓	✓	✓	✓	✓	
GenFlex ½" HD ISO	✓	✓	N/A	✓	✓	
GenFlex HD Composite ISO	✓	✓	N/A	✓	✓	
Nailbase Composite Board	✓	✓	N/A	✓	✓	
DensDeck	N/A	✓	N/A	N/A	N/A	
DensDeck Prime	✓	✓	N/A	✓	✓	
DensDeck StormX Prime Board	✓	✓	N/A	✓	✓	
Securock Gypsum-Fiber	✓	✓	N/A	✓	✓	
Securock Glass-Mat	N/A	✓	N/A	N/A	N/A	
Structodek HD Fiberboard (Maximum 15 Year Warranty)	✓	✓	✓	✓	✓	
Perlite Insulation	N/A	N/A	N/A	N/A	N/A	
EPS/XPS Insulation	N/A	N/A	✓	N/A	N/A	
Fiberglass Insulation	N/A	N/A	✓	N/A	N/A	
Approved Asphalt Base Sheet	N/A	N/A	N/A	N/A	✓	
✓ = Approved; N/A = Not an approved attachment method for this membrane.						

<b>Table 1.09-2 Approved Immediate Substates for TPO Membranes Up to 20-Year Warranties</b>						
Structural Deck	GenFlex EZ TPO or EZ TPO Plus			GenFlex EZ Fleece Backed TPO (Horizontal Substrates)		
	Adhered	Mechanically Attached	Ballasted	EZ TPO FB Bonding Adhesive	Quick Dual	Hot Asphalt
Structural Concrete	✓	✓		✓	✓	✓
Plywood or Oriented Strand Board	✓	✓		✓		✓
Wood Planking	✓	✓		✓		✓
Poured or Pre-Cast Gypsum*				✓*		✓
Cementitious Wood Fiber						
Lightweight Insulating Concrete Decks (See Section 1.06 I for additional requirements)	✓	✓		✓		✓
✓ = Acceptable for use						
* EZ TPO FB Bonding Adhesives acceptable to Pre-Cast Gypsum Only						

<b>Table 1.09-3 Approved Recover/Retrofit Substrates for TPO Membranes Up to 20-Year Warranties</b>							
Properly Prepared Recover / Retrofit Substrate – Membrane Direct Applied	GenFlex EZ TPO or EZ TPO Plus			GenFlex EZ Fleece Backed TPO (Horizontal Substrates)			
	Adhered	Mechanically Attached	Ballasted	Mechanically Attached	EZ TPO FB Bonding Adhesive	Quick Dual	Hot Asphalt
Smooth Surface Built-Up or Smooth Modified Bitumen Roofs	✓	✓*	✓*	✓	✓	✓	✓
	45 mil. max. 15 Years			45 mil. max. 15 Years			
Mineral Surface Built-Up or Modified Bitumen Roofs		✓*	✓*	✓	✓	✓	✓
	45 mil. max. 15 Years			45 mil. max. 15 Years			
✓ = Acceptable for use * Protection mat required							

<b>Table 1.09-4 Available Adhesives for GenFlex EZ TPO Membranes</b>	
Adhered Single-Ply Membrane	Approved Adhesives
GenFlex EZ TPO GenFlex EZ TPO Plus	EZ TPO Bonding Adhesive EZ TPO Bonding Adhesive LVOC EZ TPO FB Bonding Adhesive (LVOC) All Purpose Bonding Adhesive Water Based Bonding Adhesive P (15-year max.)
GenFlex EZ Fleece Backed TPO (Horizontal Substrates)	EZ TPO FB Bonding Adhesive (LVOC) Quick Dual™
GenFlex EZ TPO Peel & Stick	Not Applicable – The self adhering adhesive is pre-applied to the bottom side of the membrane.
<b>NOTE:</b> Validate compatible substrate with all adhesives listed above.	

## 1.11 BALLAST

### A. General

1. All ballast should be of adequate size and weight to provide proper protection against wind uplift. The building owner or his design professional is responsible for the ballast design and selection on a specific building. GenFlex does not certify or comment on stone ballast other than to state the requirements for warranty described in this technical guide. Regarding size and roughness of stone ballast refer to local building codes, the ANSI/SPRI “Wind Design Standard for Ballasted Single-Ply Roofing Systems RP-4” or Factory Mutual Technical Advisory Bulletin 1-29 for information regarding stone ballast requirements on loose laid single-ply roofing systems.
2. The weight of the ballast must be considered when determining the structure’s ability to support the load of staged materials or the completed roof installation and other expected loads. GenFlex takes not responsibility for making this structural analysis, but strongly recommends that a professional engineer or registered architect make this determination prior to the job start.
3. Install ballast materials daily as a maximum time frame. Failure to do so may cause damage to the system from wind or allow movement of the insulation.
4. Do not stockpile ballast materials.

**Ballasted systems are not allowed when membrane is installed directly onto a hard surface, such as DensDeck, Securock, OSB, Gypsum, GenFlex ½" HD ISO or concrete. Ballasted systems are not allowed when the membrane is installed directly to a layer of mechanically attached insulation.**



**GenFlex requires that a suitable insulation or cover board be installed over any substrate that would damage the membrane. This includes but is not limited to:**

- **Fasteners / Plates used for insulation attachment**
- **Fasteners / Plates used for existing membrane / insulation securement**
- **Substrates that are not smooth, flat, clean, free of sharp fins, or foreign materials that could damage the membrane**

**B. Stone Ballast**

1. Stone ballast should be smooth, water worn gravel with rounded edges and corners, relatively free of fractures, loam sand, or other foreign substances and contain no more than 4% fines.
2. Unless otherwise designed, the minimum ballast coverage required by GenFlex for warranty is 10 lb/ft<sup>2</sup> (48.8 kg/m<sup>2</sup>) using nominal ¾" to 1 ½" (19 mm to 38 mm) diameter stone meeting ASTM D 488 size #4 using ASTM C-136 method of testing.
3. This rate may not provide adequate membrane coverage if stone larger than ASTM D 448 size #4 is used.

<b>Table 1.10-1 Minimum Coverage Requirements for Various Ballast Gradations</b>		
<b>ASTM Size No.</b>	<b>Nominal Size</b>	<b>Minimum Acceptable Coverage</b>
4 (GenFlex Minimum)	¾" (19 mm) to 1 ½" (38 mm)	10 lb/ft <sup>2</sup> (48 kg/m <sup>2</sup> )
357	¾" (19 mm) to 2" (51 mm)	10 lb/ft <sup>2</sup> (48 kg/m <sup>2</sup> )
3	1" (25 mm) to 2" (51 mm)	10 lb/ft <sup>2</sup> (48 kg/m <sup>2</sup> )
24	¾" (19 mm) to 2 ½" (63 mm)	11 lb/ft <sup>2</sup> (54 kg/m <sup>2</sup> )
2	1 ½" (38 mm) to 2 ½" (63 mm)	13 lb/ft <sup>2</sup> (63 kg/m <sup>2</sup> )
1	1 ½" (38 mm) to 3 ½" (89 mm)	16 lb/ft <sup>2</sup> (78 kg/m <sup>2</sup> )

**C. Concrete Pavers**

1. Only approved ballast systems are permitted on warranty GenFlex installations. Though GenFlex approves of using heavy weight pavers as a ballast material they may not be include din the warranty.
2. When heavy weight ballast pavers are used, they must be smooth trowel finished interlocking pavers and should be applied at a rate of not less than 12 lb/ft<sup>2</sup> (58.48 kg/m<sup>2</sup>). Maximum space between pavers should be ½" (13 mm).
3. Interlocking paving stones weight a minimum of 10 lb/ft<sup>2</sup> (48.8 kg/m<sup>2</sup>) which have proven performance for wind and weather resistance, may be used. This system should have a minimum performance warranty from the paver manufacturer equal to the GenFlex roof warranty.
4. Approved protection mat or an additional layer of GenFlex membrane must be installed between the membrane and all pavers. The protection mat or additional membrane layer must be completely covered with pavers to prevent ultraviolet degradation of the mat.

**D. Crushed Stone Ballast**

1. Crushed stone ballast should be durable, free of excessive sharps or fractures, loam, sand or other foreign substance, meeting the physical testing requirements below.
2. Protection mat or an additional layer of GenFlex membrane must be installed between the membrane and the crushed stone ballast. The protection mat must be completely covered with crushed stone ballast to prevent ultraviolet degradation of the mat.

3. Unless other wise designed, the minimum ballast coverage required by GenFlex for warranty is 10 lb/ft<sup>2</sup> (48.8 kg/m<sup>2</sup>) using nominal ¾" to 1 ½" (19 mm to 38 mm) diameter stone.

<b>Table 1.10-2 Physical Testing Requirements for Crushed Stone Ballast</b>	
Specific Gravity	Minimum 2.40 Mg/m <sup>3</sup> (ASTM C 127)
Impact Resistance	Maximum 40% weight loss (ASTM C 535 and C131)
Soundness	ASTM C 88
Weight Loss – Sodium Sulfate	Maximum 12%
Weight Loss – Magnesium Sulfate	Maximum 18%

#### **E. Mechanically Attached Systems**

Within GenFlex Specification, reference is mad to GenFlex’s Mechanically Attached Systems. Mechanically Attached TPO Roofing Systems include:

- GenFlex EZ TPO Mechanically Anchored Systems – using appropriate GenFlex fasteners and seam plates
- GenFlex EZ TPO Invisiweld Systems – using appropriate GenFlex fasteners and Invisiweld or Invisiweld-S Insulation Plates
- GenFlex EZ Fleece Backed TPO Systems – using appropriate GenFlex fasteners and seam plates
- GenFlex EZ TPO RMA Systems – using GenFlex TPO Peel & Stick RMA Strips secured with appropriate GenFlex fasteners and seam plates



**GenFlex EZ TPO Peel & Stick is an adhered membrane only. It is not approved for mechanical attachment.**

**GenFlex recommends that when installing mechanically attached membranes over steel decks, the field attachment should run perpendicular to the deck panels.**

1. See the GenFlex Attachment Guide for specific membrane layout requirements.
2. Due to the nature of mechanically attached roofing systems, some fluttering or billowing of the membrane can be expected and may produce sound under certain conditions.
3. Appropriate GenFlex seam plates or batten strips (wide weld systems only) must be used with GenFlex fasteners to secure the GenFlex mechanically attached system membrane.
4. Where the deck will not provide a minimum fastener pullout resistance of 400 lb (1.8 kN), GenFlex has designed a system of alternate fastener spacing to be used based on fastener pullout capacity (see Table 1.10-3).
5. Consult with local building code and insurance officials or design professionals to determine if more stringent securements are required. Below is a minimum attachment requirement to receive a GenFlex warranty.

<b>Table 1.10-3 Minimum Fastening Rates – Mechanically Attached Warranty Requirements</b>		
Minimum Pullout Values	Fastener Spacing for Field	Fastener Spacing for Perimeter
400 lbf (1.8 kN) or greater	12" (305 mm) o.c.	12" (305 mm) o.c.
300 lbf to 399 lbf (1.3 kN to 1.3 kN)	9" (229 mm) o.c.	6" (152 mm) o.c.
200 lbf to 299 lbf (0.9 kN to 1.3 kN)	6" (152 mm) o.c.	6" (152 mm) o.c.
Less than 200 lbf (0.9 kN)	This system is not applicable	

6. The fastener spacing in the above tables assumes that decking is dry and free of any deterioration. GenFlex recommends that pullout testing be completed by a GenFlex Licensed Applicator on all re-roof projects, regardless of deck type to confirm pullout resistance.

7. For decks other than those listed above, contact your GenFlex Regional Technical Coordinator for technical information.



**For retrofit of metal buildings, refer to the GenFlex TPO Metal Building Retrofit Guide. Direct attachment of GenFlex Mechanically Attached Roofing Systems to metal roofs (regardless of gauge) is strictly prohibited.**

8. Perimeter Attachment Section
  - a) Roof perimeter areas must be attached in accordance with the GenFlex Attachment Guide.
  - b) As an alternate to mechanical attachment, the perimeter area may be fully adhered.
    - The adhered perimeter area must cover the same area as if the perimeters were mechanically attached, as indicated in the GenFlex Attachment Guide
    - The adhered perimeter area must be prepared in accordance with the substrate and insulation requirements of the GenFlex adhered roof system
    - The adhered perimeter area must be isolated from the mechanically attached field of the roof by a continuous row of GenFlex fasteners and seam plates

#### **F. Membrane Lap Splicing**

1. Splice GenFlex TPO membrane by heat welding the side and end laps with a hot air welder. Refer to the **GenFlex Application Guide**, details, and other technical information for additional welding information.
2. If reinforced TPO membrane thickness is greater than .045" (1.14 mm), T-Joint patches must be installed at all reinforced membrane seam intersections. For specific instructions, refer to the GenFlex Application Guides and GenFlex TPO Lap Splice Details.
3. GenFlex warranties up to 20 years may utilize GenFlex TPO Seam Tape products as appropriate.
4. Refer to GenFlex details and application specifications for specific requirements.

#### **G. Membrane Lap Splicing (GenFlex EZ Fleece Backed TPO Membrane)**

1. Splice GenFlex EZ Fleece Backed TPO Membrane side laps by heat welding with a hot air welder. Refer to the GenFlex TPO Application Guide for additional welding information. In the absence of a selvage edge follow end lap splicing procedure noted in sept 2 below.
2. End laps are to be completed by butting the GenFlex EZ Fleece Backed TPO Membrane sheets together and hot air welding an 8" (203 mm) wide strip of GenFlex EZ TPO Membrane to complete the end lap splice.
3. If reinforced TPO membrane thickness is greater than .045" (1.14 mm), T-Joint patches must be installed at all reinforced membrane seam intersections. For specific instructions, refer to the GenFlex Application Guides and GenFlex EZ TPO Lap Splice Details.
4. GenFlex warranties up to 20 Years may utilize GenFlex TPO Seam Tape products as appropriate.
5. Refer to GenFlex details and application specifications for specific requirements.

## **1.12 FLASHING**

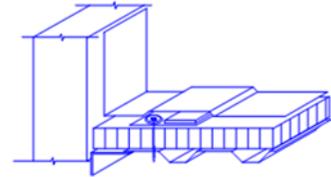
### **A. Design Considerations**

1. Many factors affect the performance of the flashing system. Extended warranties may require special flashing applications and details. Design drawings for several common applications are available from the GenFlex Roofing Products website. Contact your GenFlex Regional Technical Coordinator for technical information.

2. A flashing is a roofing element used to prevent water from penetrating the exterior surface of a roof or to intercept and lead water of fit. Flashings divert the water to the roof membrane. The roof membrane then carries it to the roof drain system. Typically, a flashing intercepts water flowing down parapets, down wall or higher adjacent construction and down roof penetrations. There are four typical locations where a flashing is needed.
  - Terminations
  - Junctions
  - Projections
  - Joints
3. In any flashing detail, there are up to three different flashing components:
  - Base Flashing
  - Counter Flashing
  - Cap Flashing

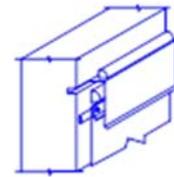
**Base Flashing:**

An extension of the roofing material or a different material that is bonded to the roof to form a waterproof joint. It extends upward along the vertical surface to divert water onto the membrane. The base flashing should reach a higher level than that reached by water on the roof. In some situations, water may have to be temporarily stored on the roof. This may occur during heavy rainfalls, where the drain size is inadequate, where local building regulations require controlled flow drains, or where ice and snow restrict drainage.



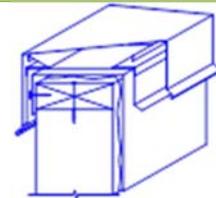
**Counter Flashing**

Counter Flashing is used, in some situations, to carry water onto the base flashing and the membrane. This may be the case where a wall rises above a roof surface. The counter flashing covers the vertical termination of the base flashing. It provides protection for the base flashing and may serve to shed water. Where required, the counter Flashing is secured to the parapet or wall cladding.



**Cap Flashing**

Cap flashings are horizontal coverings for parapets and expansion joints. Cap flashing should be sloped toward the roof and secured to allow differential movement. Failure to provide for adequate flashing height at the design stage may result in serious problems that cannot be corrected subsequently.



4. Limitations in flashing heights may be encountered. Existing building features (i.e., door or window locations, weep holes, through-wall flashings, etc.) may not allow sufficient clearance to provide proper termination above the potential water level, additional insulation, or other details. Detailed consideration of these conditions is critical to the integrity of the roofing system. Contact a GenFlex Regional Technical Coordinator for assistance.
5. Remove all loose existing flashings.
6. All penetrations passing through the membrane must be flashed.
7. All penetrations passing through the vapor barrier and/or air barrier must be flashed and terminated or tied in correctly. Consult with the air/vapor barrier designer to validate these detail requirements.

## B. Wall/Curb Flashing materials and Requirements

1. The following chart lists the flashing requirements for GenFlex Single-Ply systems.
2. Refer to the GenFlex EZ TPO Application Guide, Product Data Sheets (PDS) and details drawings for additional information.
3. All membrane base tie-ins must be attached to substrates which provide a minimum of 200 lbf (89 kN) force in any direction.

<b>Table 1.10-1 Wall/Curb Flashing Materials Up to 20 Year Warranty</b>	
<b>Membrane and Detail</b>	<b>Detail Description</b>
<b>GenFlex EZ TPO and EZ TPO Plus Membrane</b>	
All Flashings	Curbs, walls, and expansion joints must be anchored with appropriate base tie-in detail, using GenFlex EZ TPO Peel & Stick RPS Strip or TPO Seam Plates (see current details for alternate base tie-in details). Curbs and walls must be flashed using minimum 0.045" GenFlex EZ TPO Membrane, GenFlex EZ TPO Peel & Stick Membrane or GenFlex Non-Reinforced Flashing. Flashings may be sealed with welded details or Peel and Stick products where acceptable and may include GenFlex TPO Coated Metal.
Roof Edges	GenFlex One Edge, Fascia System, Gravel Stop, Drip Edge or coping details may be used, Drain Bar Systems, GenFlex Coping Systems or GenFlex TPO Coated Metal. Peel & Stick details may be used.
Parapets	GenFlex Coping System
<b>GenFlex EZ Fleece Backed TPO Membrane</b>	
All Flashings	Curbs, walls and expansion joints must be anchored with appropriate base tie-in detail using foam adhesive (Quick Dual) with GenFlex EZ Fleece Backed TPO membrane, or GenFlex Seam Plates and Fasteners with TPO membrane. Curbs and walls must be flashed using minimum 0.045" GenFlex EZ TPO membrane, GenFlex EZ TPO Peel & Stick membrane or Non-Reinforced Flashing.
Roof Edges	GenFlex One Edge, Fascia System, Gravel Stop, Drip Edge or coping details may be used, Drain Bar Systems, GenFlex Coping Systems, or GenFlex TPO Coated Metal. See Fleece Backed specific details for additional information.
Parapets	GenFlex Coping System
<b>GenFlex EZ TPO Peel &amp; Stick Membrane</b>	
All Flashings	Curbs, walls and expansion joints must be anchored with appropriate base tie-in detail, using GenFlex EZ TPO Peel & Stick RPS or TPO seam plates (see current details for alternate base tie-in details). Curbs and walls must be flashed using minimum 0.045" EZ TPO Membrane, GenFlex EZ TPO Peel & Stick Membrane or GenFlex Non-Reinforced Flashing. Flashings may be sealed with welded details or Peel & Stick products where acceptable and may include GenFlex TPO Coated Metal.
Roof Edges	GenFlex One Edge, Fascia Systems, Gravel Stop, Drip Edge or coping details may be used, Drain Bar Systems, GenFlex Coping Systems or TPO Clad Metal. Peel & Stick details may be used.
Parapets	GenFlex Coping System
<b>GenFlex EZ TPO Invisiweld</b>	
All Flashings	Curbs, walls, and expansion joints must be anchored with appropriate base tie-in detail, using GenFlex EZ TPO Peel & Stick RPS Strip, TPO seam plates or InvisiWeld plates (see current details for alternate base tie-in details). Curbs and walls must be flashed using minimum 0.045" GenFlex EZ TPO Membrane, GenFlex EZ TPO Peel & Stick or GenFlex Non-Reinforced Flashing. Flashings may be sealed with welded details or peel & stick products where acceptable and may include GenFlex TPO Coated Metal.

<b>Table 1.10-1 – Continued</b>	
<b>Wall/Curb Flashing Materials</b>	
Up to 20 Year Warranty	
<b>Membrane and Detail</b>	<b>Detail Description</b>
GenFlex EZ TPO Invisiweld	
Roof Edges	GenFlex One Edge, Fascia Systems, Gravel Stop, Drip Edge or coping details may be used, Drain Bar Systems, GenFlex Coping Systems or TPO Clad Metal. Peel & Stick details may be used.
Parapets	GenFlex Coping System

### **C. Penetrations (Pipes, Conduits, Etc.)**

#### 1. Pipe Flashings:

Wherever possible, all round rigid penetrations ranging in size from 1 ½" (38 mm) outside diameter to 8" (203 mm) outside diameter should be flashed with GenFlex Pre-Molded Pipe Flashings. If it is not possible to fit an GenFlex TPO Pre-Molded Flashing on the pipe due to site conditions, the pipe should be covered with a field-fabricated flashing in accordance with GenFlex Details. GenFlex Non-Reinforced Flashing accessories may be utilized up to a 20-year.

#### 2. Flexible penetrations (electrical and braided cables, etc.):

Flexible penetrations or conduits may not be flashed with pre-molded, field-fabricated flashings or penetration pockets. Flexible penetrations must be installed through a rigid gooseneck, a sheet metal enclosure or other isolating structure.

### **D. Penetration Pockets**

#### 1. The following types of penetrations require the installation of penetration pocket detail:

- Rigid pipes with an outside diameter less than 1" (25 mm) and up to 4" (102 mm).
- Clusters of pipes.
- Unusual shapes, e.g., structural beams, channels, or angles.

#### 2. A minimum clearance of 1" (25 mm) between penetrations and on all sides of the penetration pocket, is required to assure adequate allowance of GenFlex pourable sealer around each penetration.

#### 3. Secure penetration pockets and flash per GenFlex Details.

#### 4. Fill penetration pockets with GenFlex Pourable Sealer and mound to shed water. Pourable Sealer must be a minimum of 2" (51 mm) deep and 1" (25 mm) thick around the penetration.

### **E. Curbs and Terminations**

#### 1. All flashing terminations above the field of the roof membrane (except penetration pockets and Pre-Molded GenFlex accessories) should provide a minimum design height of at least 8" (203 mm).

#### 2. There are situations where minimum design height cannot be met. In these situations, minimum flashing height should be no lower than the potential water level that could be reached because of a deluging rain. Wherever a vertical termination height is 5" (127 mm) or less, a GenFlex Termination Bar detail that is subsequently counter flashed, is required. Do not flash over existing through-wall flashings, weep holes or scuppers.

#### 3. Termination must be made directly to a sound, watertight, rigid, vertical substrate. For retrofit conditions, existing loose flashing materials must be removed, or overlaid with ½" (16 mm) exterior grade plywood. Termination bars are not to be installed into gypsum or wood substrates.

#### 4. When using a surface-mounted termination, (i.e., termination bar or surface-mounted counterflashing) ensure a consistent seal along the wall interface. The wall surface above the termination must be waterproof.

5. Gypsum board, used as a substrate for flashings, must be moisture resistant exterior grade with laminated fiberglass facers and recommended for this application by the gypsum board manufacturer. Base tie-ins must be made into the deck because gypsum does not provide the required minimum fasteners pullout resistance of 200 lbf (0.9 kN).
6. Uneven substrates such as stucco, cobblestone, textured masonry, or corrugated metal panels, etc. are not suitable to receive flashings. Such surfaces must be prepared to provide an acceptable substrate by attaching minimum 5/8" (16 mm) exterior grade or pressure treated plywood. Attach as required for structural integrity.
7. DensGlass® Gold is not an acceptable substrate for any GenFlex membrane wall flashing system.

#### **F. Scuppers**

1. Provide and install a new welded watertight sleeve.
2. Set welded watertight scupper in GenFlex Waterstop Sealant and secure scupper to the structure.
3. Flash in accordance with GenFlex details.

#### **G. Expansion Joints**

Install where specified by the project designer. Install expansion joints in accordance with GenFlex Details. Custom expansion joint details may be reviewed for approval by your GenFlex Regional Technical Coordinator. Expansion joints are not covered under the GenFlex Roofing System Warranty.

#### **H. Sheet Metal Work**

1. Coping, gravel stops, drain bars, counter flashings etc., must be supplied by GenFlex. If GenFlex is not able to supply a given sheet metal product or design, it must be installed per current GenFlex details but will not be included as part of the GenFlex Warranty.
2. The installed membrane roofing system must be made watertight before sheet metal application.
3. It is the owner's responsibility to maintain non-GenFlex sheet metal in a watertight condition.
4. Make these specifications available to the sheet metal fabricator/contractor.
5. Attachment:
  - a) Counter flashings, copings, and other perimeter or penetration metal work must be properly fastened and sealed by the roofing contractor or others.
  - b) All sheet metal work not supplied by GenFlex should be fabricated and installed in accordance with the most stringent requirements from one of the following organizations, the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), the national Roofing Contractors Association (NRCA), ANSI/SPRI or Dade County.

**Some specific roofing details in GenFlex's Technical Specifications may exceed SMACNA recommendations. For such details, follow GenFlex requirements.**

**Refer to ANSI/SPRI ES-1 for information on enhanced wind design for metal edge treatments and performance criteria.**

**Extended wind speed warranties require enhanced edge details. Contact your GenFlex Regional Technical Coordinator for technical information.**

6. If a metal flashing product by others is submitted via a deviation request for inclusion in the warranty coverage, the following are minimum requirements for consideration:
  - a) The sheet metal work must be shop or factory formed or extruded.
  - b) Minimum requirements regarding sheet metal work material are 24 ga (0.61 mm) G-90 Kynar pre-finished steel or 0.040" (1 mm) aluminum (mill finished, pre-finished or anodized).



- c) A deviation request for inclusion of sheet metal work in warranty coverage must accompany the PIN for submitted by the installing contractor.
  - d) The deviation request must include shop drawings of the sheet metal work to be included and a roof plan showing the installed location and linear dimension for each profile.
  - e) Should the deviation request be granted, the installing contractor will be responsible to GenFlex Roofing for a period of two-years from the date of GenFlex's inspection and acceptance under their installer's agreement.
7. Metal work not in conformance with GenFlex specifications and details or which compromises the integrity of the roof system may jeopardize issuance of the warranty for the entire project. GenFlex does not warranty the performance of products GenFlex does not supply.
  8. GenFlex EZ Fleece Backed TPO Membrane may require special consideration, see specific details or contact your GenFlex Regional Technical Coordinator for additional information.

## 1.13 WALKWAYS

### A. Locations

Walkways help protect the membrane from damage due to necessary rooftop service traffic.

1. Walkway systems on warranted GenFlex roofs are required at all access points (ladders, hatches, doorways, etc.) and are recommended for use:
  - On roof areas that are subject to foot traffic more frequently than once a month.
  - Around all serviceable rooftop units.
2. It is the responsibility of the building owner to maintain walkway systems.
3. Traffic related roof damage is not covered by the GenFlex Warranty. In areas of extreme traffic, contact your GenFlex Regional Technical Coordinator for options to enhance the roof system to prevent or mitigate damage to roofing components.

### B. Walkway Material

1. For GenFlex EZ TPO Roofing Systems, approved walkways are to be utilized in the areas indicated above. Walkways are to be installed in accordance with the instructions provided in the Product Data Sheets (PDS) or Applications Guide for each product.
2. Walkways may be constructed using GenFlex TPO Walkway Pad or approved pavers (with sacrificial membrane layer).
3. Concrete pavers, with an additional layer of membrane installed beneath the paver for protection, may be substituted for walkway pads on adhered systems. Consult details and guides for additional information.
4. Special Requirements for mechanically attached systems: Pavers and loose walkway pads are not approved for use on mechanically attached membrane systems.
5. Contact your GenFlex Regional Technical Coordinator for information regarding other materials designated as a walking surface.

## 1.14 WARRANTY

### A. General

1. Consult this Single-Ply Design Guide opening section 1.01 – General Design Criteria – Initial Design Considerations and Warranty Requirements.
2. GenFlex roofing systems may qualify for up to 20-Year warranty coverage on new construction or complete tear off existing roofing components.
3. For new construction or complete tear-off, GenFlex #12, GenFast #12 Preassembled Screw and Plate, GenFast #14 Fastener, GenFast #14 Preassembled Screw and Plate, GenFast CD-10 Concrete, GenFast GypTec, GenFast Lite Deck Fasteners and appropriate plates may be

used for mechanical attachment of insulation to the appropriate deck. See the Product Data Sheets for additional information.

4. For Re-Cover or partial tear off applications, GenFast #15 Fasteners and appropriate plates are required for membrane attachment and GenFast #14 Fasteners and appropriate plates are required for insulation attachment.
5. Tie-Ins to other roofing systems are not warranted by GenFlex.
6. Failure of a flashing or termination to an intermediate element (e.g., metal panel, insulation, surface treatment, etc.), which itself could fail and admit moisture beneath the membrane is beyond the limits of the GenFlex warranty.
7. Upon GenFlex's inspection and acceptance of the installed roof system, the requested warranty can be issued. GenFlex's inspection is not intended as an inspection for the benefit of the owner or design professional with respect to contract, building codes or compliance with specifications other than GenFlex's. Warranted GenFlex roofing systems are to be installed only on commercial, industrial, institutional, or multi-family commercial housing structures in the United States and Canada. Issuance of a warranty for projects outside the US and Canada must be submitted to your GenFlex Regional Technical Coordinator for consideration prior to bidding. Individual residential construction does not qualify for a GenFlex warranty. Only GenFlex supplied components are eligible to be covered as part of the GenFlex warranty.

<b>Table 1.13-1 Maximum Warranty Terms for GenFlex EZ TPO Systems</b>			
<b>Thickness</b>	<b>Membrane</b>	<b>5-15 Years</b>	<b>20 Years</b>
.080" (2.0 mm)	GenFlex EZ TPO Plus	Yes	Yes
.060" (1.52 mm)	GenFlex EZ TPO	Yes	Yes
.045" (1.14 mm)	GenFlex EZ TPO	Yes	Yes (except Invisiweld)
.060" (1.52 mm)	GenFlex EZ TPO Peel & Stick / GenFlex EZFlex TPO Peel & Stick	Yes	Yes
.060" (1.52 mm)	GenFlex EZ Fleece Backed TPO	Yes	Yes
.045" (1.14 mm)	GenFlex EZ Fleece Backed TPO Membrane 45 mil	Yes	Yes

8. It is the owner's responsibility to expose the membrane if warranty service is required when access is impaired. Such impairment includes, but its not limited to:
  - Design features, such as window washer systems, which require the installation of traffic surface units more than 80 lb (36.3 kg) per unit.
  - Any equipment, ornamentation, building service units and other roof top surfacing materials that are not defined as part of the membrane assembly.
  - Intricately placed or multicolored ballast configurations.
  - Individual pavers utilized as ballast, which weight more than 80 lb (36.3 kg) per unit, unless otherwise required by GenFlex for wind uplift resistance.
  - Interlocking paver systems that utilize mechanical clips, strapping, adhesive, etc.
  - Rooftop equipment that does not provide GenFlex with reasonable access to the membrane.
  - Severely ponded water, snow, ice and other unrelated materials.

The charts below are only a summary of general warranty coverage. Contact your GenFlex representative for full scope of warranty requirements and approval.

The following table show the types and minimum thickness of GenFlex insulation acceptable for use as an immediate substrate for GenFlex roofing membranes in GenFlex Roofing System Warranties. Other approved insulations may be allowed below the immediate substrate insulation.

<b>Table 1.13-2</b>					
<b>Chart of Acceptable Insulation Substate and Attachment for GenFlex EZ TPO Membranes</b>					
Maximum 20 Year GenFlex Roofing Warranty (unless noted otherwise)					
Insulation	Minimum Thickness	System			
		Ballasted	Mechanically Attached	Invisiweld	Adhered <sup>2</sup>
GenFlex ISO (Flat and Tapered)	1" (25 mm)	✓	✓	✓	✓
Coated Glass Facer Polyiso	1" (25 mm)	✓	✓	✓	✓
GenFlex HD Composite ISO	1.5" (38 mm)	N/A	✓	✓	✓
Nailbase Composite Board	1.5" (38 mm)	N/A	✓	✓	✓ <sup>2</sup>
Structodek HD	½" (13 mm) – 15 Year Max.	✓	✓	✓	✓ <sup>2</sup>
GenFlex ½" HD ISO	½" (13 mm)	N/A	✓	✓	✓
DensDeck Products <sup>1</sup>	¼" (6 mm)	N/A	✓	✓	✓ <sup>1,2</sup>
Securock Gypsum-Fiber	¼" (6 mm)	N/A	✓	✓	✓ <sup>2</sup>
NOTE:					
1. Adhered membrane requires DensDeck Prime or DensDeck Prime StormX to be used.					
2. Hot asphalt attachment approved for GenFlex EZ Fleece Backed TPO only.					
✓ = Approved; N/A = Not an approved attachment method for this insulation					

<b>Table 1.13-3</b>		
<b>GenFlex EZ TPO System / Membrane / Flashing Options by Warranty Term</b>		
Warranty Term	Acceptable Roof System / Membrane(s) / Application	Acceptable Flashing Option(s)
5, 10, 15 Year	<ul style="list-style-type: none"> <li>45 or 60 mil GenFlex EZ TPO</li> <li>80 mil GenFlex EZ TPO Plus</li> <li>60 mil EZ TPO Peel &amp; Stick</li> <li>45 or 60 mil GenFlex EZ Fleece Backed TPO</li> <li>Invisiweld (60 mil or 80 mil)</li> </ul>	<ul style="list-style-type: none"> <li>45 or 60 mil GenFlex EZ TPO</li> <li>80 mil GenFlex EZ TPO Plus</li> <li>TPO Coated Metal</li> <li>60 mil EZ TPO Peel &amp; Stick</li> </ul>
20 Year	<ul style="list-style-type: none"> <li>60 mil GenFlex EZ TPO</li> <li>80 mil GenFlex EZ TPO Plus</li> <li>60 mil EZ TPO Peel &amp; Stick 60 mil GenFlex EZ Fleece Backed TPO</li> <li>Invisiweld (60 mil or 80 mil)</li> </ul>	<ul style="list-style-type: none"> <li>60 mil GenFlex EZ TPO</li> <li>80 mil GenFlex EZ TPO Plus</li> <li>TPO Coated Metal</li> <li>60 mil EZ TPO Peel &amp; Stick</li> </ul>

<b>Table 1.13-4 GenFlex EZ TPO Warranty Summary – Eligible to GenFlex Licensed Applicators Only</b>		
<b>Warranty Name</b>	<b>Specification</b>	<b>Coverage</b>
Up to 2" Hail	Min. 60 mil GenFlex EZ TPO Membrane Adhered to approved adhered cover board	Repair leaks in roof system caused by GenFlex supplied materials or workmanship used to install them, plus damage by hail up to 2" (51 mm) in diameter. Warranty term maximum 20 Years.
Cut and Puncture	GenFlex EZ TPO Plus membrane adhered to approved substrate board	Repair leaks in roof system caused by GenFlex supplied materials or the workmanship used to install them, plus damage by cut or puncture. No dollar limit to repair warranted leaks. Warranty term maximum 20 Years.
Wind Speed up to 100 mph	Min. 60 mil GenFlex EZ TPO membrane, adhered or attached over approved substrate board	Repair leaks in roof system caused by GenFlex supplied materials or workmanship used to install them, plus leaks caused by wind speeds at 100 mph or less. No dollar limit to repair warranted leaks. Warranty term maximum 20 Year.
GenFlex Roofing System Limited 5, 10, 15 or 20 Year Warranty	See GenFlex specifications for the term requested	Repair leaks in the roofing system caused by GenFlex supplied materials or the workmanship to install them. No dollar limit to repair warranted leaks.
Membrane-Only Warranty	See GenFlex specifications for the term requested	Limited warranty providing replacement membrane sufficient to repair leaks in the GenFlex Roofing Membrane which leaks because of normal exposure to weather or manufacturing defects in the membrane.
<b>NOTE:</b> See Warranty Pricing Guide for pricing information.		

<b>Table 1.13-5 GenFlex Thermoplastic Membrane Only Warranty System</b>					
<b>Membrane</b>	<b>Thickness (mil)</b>	<b>Max Term (Years)</b>	<b>MAS</b>	<b>Invisiweld</b>	<b>Adhered</b>
GenFlex EZ TPO	45	15	✓	✓	✓
	60	20	✓	✓	✓
GenFlex EZ TPO Plus	80	20	✓	✓	✓
GenFlex EZ TPO Peel & Stick / GenFlex EZFlex TPO Peel & Stick	60	20	N/A	N/A	✓
GenFlex EZ Fleece Backed TPO	100	15	✓	N/A	✓
	115	20	✓	N/A	✓
✓ = Approved; N/A = Not an approved attachment method for this membrane.					