**Trespa North America Ltd.**
62 Greene Street
Ground Floor
New York, NY 10012
Tel.: (1)-800-4-TRESPA
info.northamerica@trespa.com, www.trespa.com

# TS110 & TS111 EXPOSED FASTENER SYSTEMS

# INSTALLATION MANUAL AND HANDLING INSTRUCTIONS

## TRESPA METEON® DRAINED AND BACK VENTILATED RAINSCREEN SYSTEMS

## JULY 2013

V7100/version 07/2013

TRESPA®

# TABLE OF CONTENTS

TRESPA®

# TABLE OF CONTENTS

## Introduction

These guidelines are intended to provide general recommendations only. Trespa provides these guidelines and all testing, code and design data for informational purposes only and strongly advises that the customer, project owner and architect seek independent advice from a certified construction professional and/or engineer regarding application and installation as well as compliance with design requirements, applicable codes, laws and regulations, and test standards. These guidelines, and other training and documents provided by TNA, shall in no way be deemed an acceptance or approval of any design for any purpose or approval or acceptance by TNA of any material reviewed. The Installer and/or Architect are fully responsible for all design, engineering, fire, and technical performance of any system designed. Please check your local codes and applicable design requirements for proper use.

TRESPA®

# 1. TS110 & TS111 EXPOSED FASTENER SYSTEM PARTS LIST

**(NOT PROVIDED BY TRESPA)**

| PART NO. | DESCRIPTION | DRAWING | NOTES |
|---|---|---|---|
| 110-000 | J-Channel (10' length typ.) | Figure 1 | Standard |
| 110-001 | Hat-Channel (10' length typ.) | Figure 2 | Standard |
| 100-000 | 1" Panel Fastener (250/box typ.) | Figure 3 | Standard |
| 110-002 | 1" Vent Screen (10' length typ.) | Figure 4 | Standard |
| 101-000 | 1 1/2" Panel Fastener (250/box typ.) | Figure 5 | TS111 system only |
| 101-001 | 1/2" Decorative Spacer (250/box typ.) | Figure 6 | TS111 system only |
| 000-002 | Joint Closure (10' length typ.) | Figure 7 | As required |
| 000-007 | 6.4mm Clip Anchor (250/box typ.) | Figure 8 | For vent screen/jt closure |
| 000-009 | 6mm Drill Bit (each) | Figure 9 | To drill clip anchor hole |
| | SFS Centering Tool | | www.sfsintec.com |
| | Snappy Centering Tool | | www.snappytools.com |

TRESPA®

# 2. TS110 & TS111 EXPOSED FASTENER SYSTEM TOOLS LIST

## (NOT PROVIDED BY TRESPA)

| PART NO. | DESCRIPTION | NOTES |
|---|---|---|
| -- | cordless hammer drill | |
| -- | 13/64” metal drill bit | Available at most hardware store locations |
| -- | T-20 Torx screw bit | Available at most hardware store locations |
| -- | 4” magnetic bit holder | Available at most hardware store locations |
| -- | 4’ carpenter’s level | Available at most hardware store locations |
| -- | plastic horseshoe shims | |
| -- | #Q carbide tip drill bit (0.332”) | Used to drill oversized fastener holes |
| -- | #2 carbide tip drill bit (0.221”) | Used to drill fixed fastener holes |
| -- | 7 1/2” Skill saw | Field Fabrication |
| -- | 7 1/2” x 60-carbide tooth saw blade | Field Fabrication |
| -- | clamps, blocks, etc | |

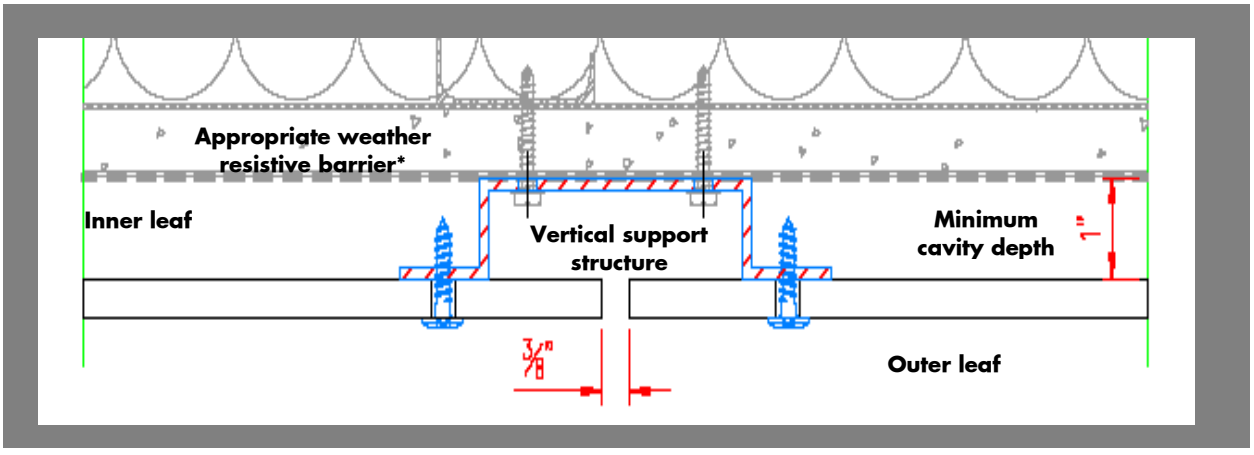
TRESPA®

## 3. DRAINED AND BACK VENTILATED RAINSCREEN PRINCIPLE

In contrast to conventional single-skin construction, the rainscreen principle is based on two separate and distinct barriers on the exterior facade of a structure. These barriers are often referred to as “leafs”. The *outer leaf* (exterior cladding) works to control and shed the majority of rain water. The small amount of water that, through a series of open joints, penetrates to the *inner leaf* (building structural wall) is drained and/or dispersed via rapid evaporation. The inner leaf also acts as the final moisture/air/vapor barrier.The following requirements are necessary to ensure proper performance of a drained and back ventilated system:

- Continuous vertical support structure behind cladding* (not by Trespa)
- Minimum general cavity depth (dimension from the sheathing or the face of exterior insulation to rear of cladding) – 1” (26mm)*
- Minimum localized cavity depth (dimension from the sheathing or the face of exterior insulation to rear of cladding) – 1/2” (13mm)*
- Minimum ventilation at top and bottom of rainscreen cladding system (2.4in$^2$/lft minimum)
- Appropriate weather resistive barrier* (not by Trespa)
- Emphasis on flashing and redirection of water
- Appropriate dead and live load structural design (not by Trespa)

Drained and back ventilated rainscreen systems (D&BV systems) are not designed to be watertight and do not utilize any gaskets, caulking or sealants. Emphasis is placed on optimal design and construction of the inner leaf (including weather barrier and flashing details) and proper installation of the outer leaf.




** Certain TNA D&BV systems meet the NFPA 285 standard. Such systems require specific components, geometry and specifications. Please refer to the drawings on **www.trespa.info** for exact design details of these systems.*

TRESPA®

# 4. WEATHER RESISTIVE BARRIERS (NOT BY TRESPA)

D&BV systems typically require a continuous weather resistive barrier at the rear of the cavity, usually located on the outer face of the inner leaf. To ensure proper performance in conjunction with a D&BV system, the weather resistive barrier should possess the following characteristics:

- UV stable
- Self-sealing or self-cinching
- Black in color

The UV stability requirement is due to the open joint design of the D&BV system and the potential long-term exposure of the weather barrier to ultraviolet rays from the sun. The black in color requirement is to minimize the visual impact of the weather barrier and increase the aesthetic sensibility. If necessary, both of these requirements can be achieved through the installation of a black flashing membrane over the existing weather barrier. The weather barrier should be installed and all penetrations and seams should be sealed per the manufacturer's written instruction*.

** Any information provided by TNA is for informational purposes only and must be confirmed with the manufacturer and/or consultant. Certain TNA D&BV systems meet the NFPA 285 standard. Such systems require specific components, geometry and specifications. Please refer to the drawings on* ***www.trespa.info*** *for exact design details of these systems.*

TRESPA®

# 5. SUBSTRUCTURE INSTALLATION GUIDELINES

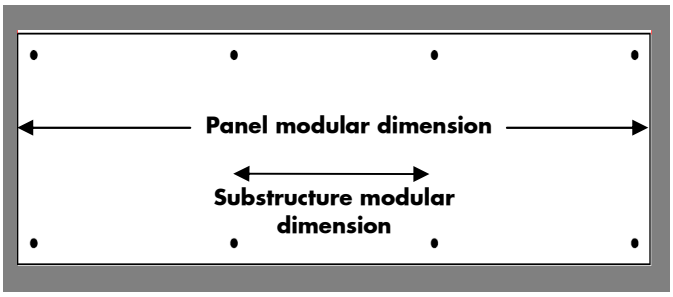
**Important Note:** *Prior to layout and installation of the substructure, the underlying structure needs to be inspected for overall building tolerance. Any structure deemed to be out of tolerance – more than 1/4" out of plumb/plane per 20 linear feet – needs to be reevaluated by the contractor of record and the architect.*

### 5.1 Backing Plate (Steel Strapping) Requirement

Due to the vertical orientation and fixed panel dimensions, the substructure will not always align with the structural support. This fact dictates the need for additional bridging to transfer loads between the steel studs (requirement applies to steel stud construction or other construction types that do not have continuous support structure). Typically, a strip of continuous steel strapping is welded (or screwed) to the face of each stud prior to installation of the exterior sheathing. The size, gauge and frequency of the strapping are specific to each project and should be determined by a licensed design professional.

### 5.2 Substructure Layout

Panel and substructure modular dimensions are often dictated by windows, doors and/or curtain wall mullions. However, for verification purposes, field measurements of the overall building elevation(s) should be obtained by the panel installation contractor. To ensure accuracy, measurements should be taken after the installation of the hard reference points (window frames, door frames, etc.).



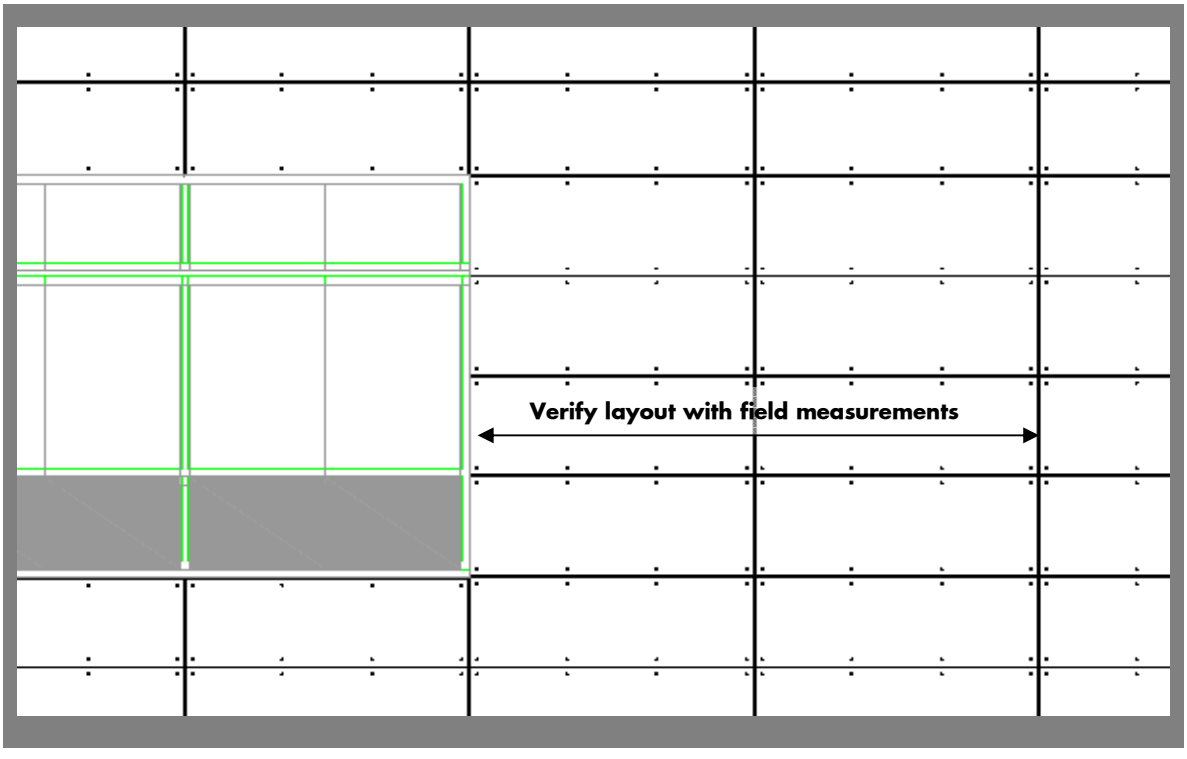

Dimensions to be confirmed should include overall elevation dimensions and specific measurements (door to end of building, window to door, etc.). Measurements can then be transferred onto the shop drawings for the development of 'as-built' drawings. Prior to establishing substructure modular dimensions, the installing contractor needs to account for the width of the j-channel and/or hat channel (see Figures 1 & 2). From this determination, the installing contractor can subtract the required width of the extrusion and establish the distance between the extrusions (substructure modular dimension). Once established, the substructure modular dimensions can be carried from individual panels to the entire elevation where standard rectilinear layout is used. The layout is recommended to begin at the center of the elevation and progress outward, with the end dimensions absorbing the odd, non-modular sizes. The field measurements should be used to verify the layout prior to commencement of installation.

## 5.3 System Anchor Location and Frequency

**Important Note:** *TNA does not provide system anchors (mechanical connections of system sub-structure to the load-bearing structural wall) or make any suggestion warranty as to the method or frequency of attachment for D&BV systems. TNA recommends every project be thoroughly reviewed by a design professional to determine the appropriate system anchor and frequency of attachment. See Appendix A for system weight and dead load and Appendix B for design wind load specifications.*

Adequate attachment requirements will depend upon project specific conditions and structural design. Considerations include the appropriateness of the system anchor, anchor spacing and selection and placement of structural wall supports. General substructure installation guidelines:

- Vertical in orientation
- One anchor on each extrusion should be installed in the top of the upper most slotted hole to create a single fixed attachment point
- Remaining substructure anchors should be centered vertically in the slotted, pre-drilled substructure attachment points (thermal expansion/contraction)
- An approximate gap of 1/4 inch (6mm) should exist between the end (top) of each j or hat channel and the start (bottom) of the next j or hat channel (thermal expansion/contraction)
- Individual panels should not span the ¼" (6mm) gap between j or hat channels. Panel layout should be analyzed prior to sub-structure installation and sub-structure should be cut to avoid such connections.
- Substructure anchor must thoroughly engage in the underlying support system (steel stud, backing plate, etc.)



### 5.4 Shimming (Not by Trespa)

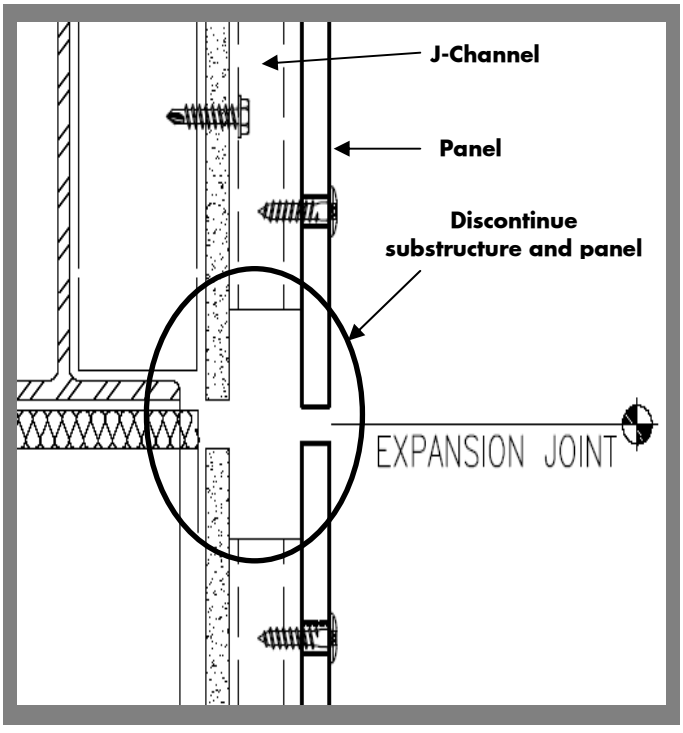
Prior to substructure installation, the underlying structure needs to be inspected for overall building tolerance (see start of section). If the underlying structure is within tolerance but is still not precisely plumb, shims can be used to level the substructure matrix. Shimming is at the risk of the installer and should warrant review by a design professional. The following serve as general shimming guidelines:

- Always shim between the substructure and the underlying structure. **Never shim between the substructure and the panels**
- Standard building practice suggests shimming (1/4" per 20 linear feet) is permissible. This should be checked for the project prior to performing work
- Install shims to stay in place over the intended life of the installation
- Only use shims of proven quality and similar materials that will withstand the intended life of the installation
- For aesthetic reasons, shims should not be installed at panel joints

*Certain TNA D&BV systems meet the NFPA 285 standard. Such systems require specific components, geometry and specifications. Please refer to the drawings on www.trespa.info for exact design details of these systems.*

### 5.5 Expansion Joints (Not by Trespa)

Extreme caution should be used for areas of discontinuity of the underlying structure. These areas include expansion (drift) joints, seismic joints, flashing details, anchor penetration points, etc. Expansion joints are utilized in both horizontal and vertical applications and are typically identified on the structural plans. Design of an expansion joint work-around is ultimately the responsibility of the designer/architect.

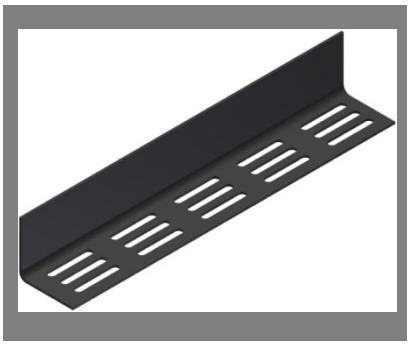



**Under no circumstances can substructure and/or panel attachments bridge two dissimilar load bearing wall assemblies.** Substructure layout and panel joints should be designed to accommodate all such conditions and should account for the maximum anticipated movement of the building and panel.

## 5.6 Vent Screen, Joint Closure and Other Peripherals

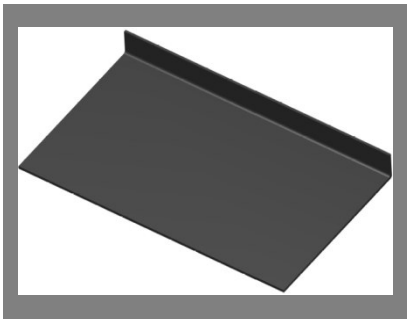
### 5.6.1 Vent Screen (standard)

A vent screen is a light gauge, perforated aluminum component (painted black) that is typically installed at all window/door heads and at the base of the D&BV system. Vent screen not only allows for the required ventilation and drainage but inhibits vermin from accessing the rainscreen cavity. Vent screen is not necessary at door/window jambs or, if properly flashed, at the top (parapet) of the rainscreen system. Vent screen can be attached to either the underlying structure or to the back of the panel using clip anchor (part #000-007).



### 5.6.2 Joint Closure (as required by architect)

A joint closure is a light gauge aluminum component (painted black) attached to the back of the panel at horizontal panel joints. Joint closures are an architectural aesthetic and serve to limit the intrusion of water into the cavity. Joint closures should only be fastened to the top panel and allowed to hang freely behind the lower adjacent panel to allow the natural movement of the D&BV system.



# 6. PANEL INSTALLATION GUIDELINES

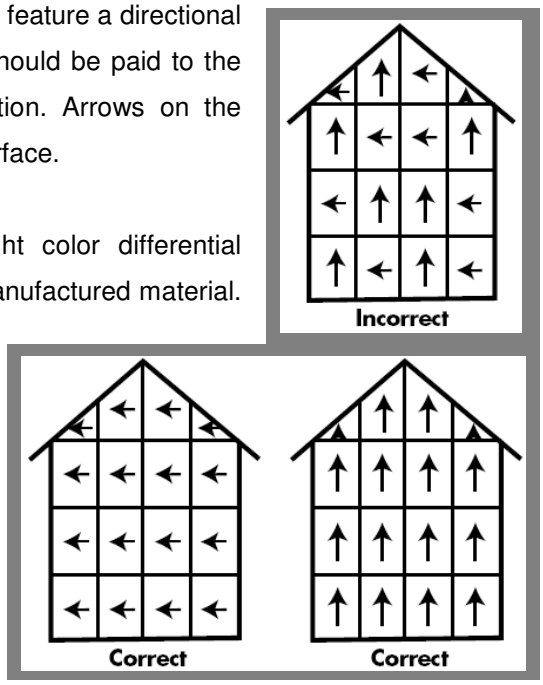
**Important Note:** *The following is an example of a typical panel installation sequence and/or scenario and is intended for demonstration purposes only. Installation procedures will vary from project to project and from condition to condition on the same project.*

### 6.1 Field Measurements

Measurements should be obtained from hard reference points (see section 5.2) and the panel dimensions and layout should be thoroughly examined prior to fabrication and/or installation. The shop drawings should reflect field measurements and the eventual panel cut-list should be based on this information. Once completed, the panel installation contractor should verify the cut list prior to fabrication.

### 6.2 Directionality

Some color selections (Metallics, Wood Decors and some Naturals) feature a directional quality inherent in the finish/color surface. Special consideration should be paid to the orientation of the panels during fabrication and prior to installation. Arrows on the backside of the panel will indicate the direction of the finish/color surface.




Additionally, some directional panels are “batch-sensitive” (slight color differential between sheet material) and might not exactly match previously manufactured material.

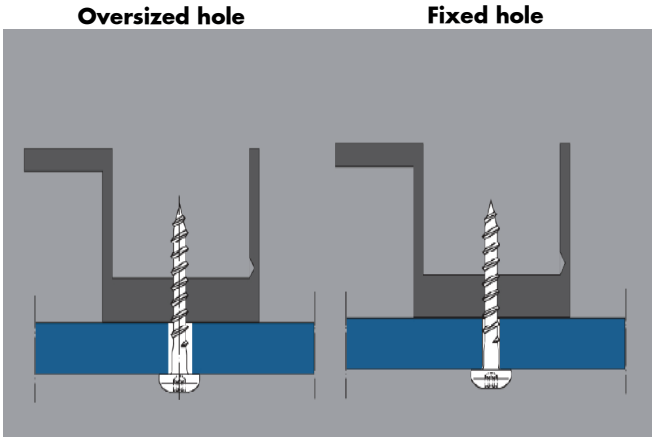
Special consideration should be taken when ordering or installing replacement (or additional) directional material. For instance, it may be helpful to order a contingency amount of extra panels during the original order placement to account for unforeseen project needs.

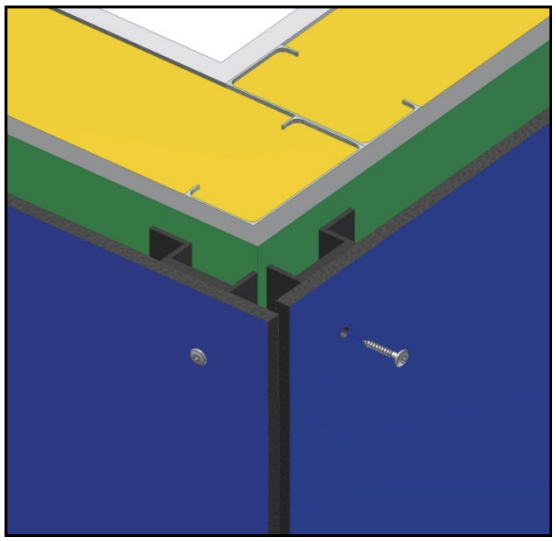
TRESPA®

### 6.3 Panel Installation

Once the weather proofing is completed and the substructure has been installed plumb and level, the panel installation can commence. (Please reference section 7.2 for panel fastener hole size and locations.) Panels are typically installed from the bottom of the elevation to the top, using a laser level or temporarily secured ledger board to the substructure. It is vital to ensure the first row is level and straight, as all subsequent rows are erected off this first series of panels.

To properly install a panel, temporarily secure the panel to the structure using clamps or blocks. Then, using a 13/64" drill bit, pre-drill the extrusion through the single fixed (smaller) panel hole, typically located nearest to the center of the panel (be careful not to penetrate the weather barrier). Next, using the T-20 Torx head screw bit, drive the panel fastener into the pre-drilled hole, careful not to over tighten or break off the fastener head (adjust the chuck torque on the cordless hammer drill to bring the fastener snug against the panel – over tightening fasteners may inhibit panel movement and cause panels to cup and/or bow).



Prior to removing the clamps or blocks, drill and install at least one more fastener in the panel (for best results, choose fastener locations that will hinder the panel from shifting or rocking after the clamps or blocks are removed). When pre -drilling the substructure at the remaining oversized (larger) panel holes, use a centering tool to make sure the fasteners are centered in the hole.

**Failing to center the fasteners can inhibit panel movement, is the most common cause of bowing and cupping of panels, and may put undue stress on the fastener itself.**

To install the next row of panels, set the next panel on top of the panel below and insert several shim stacks between the panels to create the required 3/8" (10mm) panel joint space (small pieces of 10mm material may be used to achieve the same result). Shim stacks can also be used to gauge the required 3/8" (10mm) vertical joint spacing between the panels. ***Protective foil and/or labels should be removed from the face of the panels immediately after installation.***

### 6.4 Radius Applications

Trespa Meteon is produced as a flat panel and cannot be pre-formed or post-formed during or after the manufacturing process. However, installing Meteon in a radius application can be accomplished with a few minor variations/restrictions:

- Exposed fastener system only
- 1/4" (6mm)***** and 5/16" (8mm) thick material only
- Minimum panel height to length ratio of 1:2
- Divide fastener spacing in half (double number of panel fastener locations and the amount of the aluminum supporting system)

The process of forming panels over curved substructure is done manually on the jobsite and requires no special tooling or panel preparation. Below are the minimum radii for each thickness:

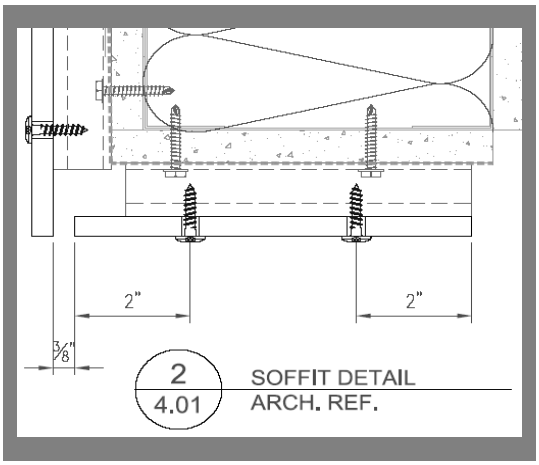
| Panel Thickness | Minimum Panel Radius |
|---|---|
| 6 mm (1/4")***** | 2 m (6' 6") |
| 8 mm (5/16") | 4 m (13' 0") |

Not all finishes and/or decors are available in the required thicknesses***** and not all finishes can be curved without risk of material surface interference. Contact TNA's Technical Department for more information on this type of application.

**6mm(1/4") material is only available as a special order with restrictions on colors/textures. Please make sure to check with TNA's technical department to confirm the availability of product.*

### 6.5 Soffit Applications

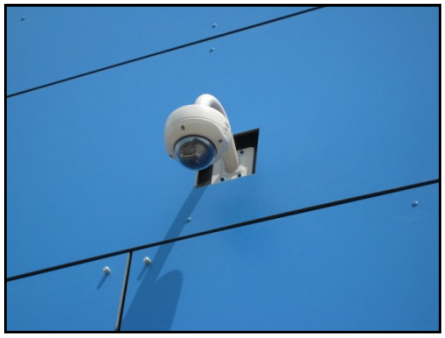
Soffit and jamb applications have the same requirements as exterior facade applications, with the addition of:




- Substructure layout should be configured as a continuation of the facade cladding so as to not inhibit drainage and/or ventilation
- Increased fixing is recommended to control the impact of deflection at soffits. A rule of thumb is to multiply the pre-determined project specific fixing distances (see section 7.2.3) by 0.75.
- 1/4” (6mm) slope per linear foot to ensure adequate drainage
- At least 2 fasteners horizontally and 2 fasteners vertically in each panel

### 6.6 Signage and System Penetrations

Signage and system penetration connections should be designed to transfer the load directly to the structure behind the system. Panel cutouts should be large enough (minimum 3/8” spacing) to account for the movement of the panels and/or rainscreen system. Adhesive attachment of signage is not recommended due to the nonporous nature of the panel. Lightweight signage should not bridge panel joints.



# 7. FIELD FABRICATION GUIDELINES

The bulk of project panel fabrication should take place on CNC machinery at a trained Trespa fabricator's facility prior to delivery to the jobsite. However, some field fabrication may be necessary.

### 7.1 Cutting and Drilling Panels

Trespa Meteon is composed of approximately 70% wood fiber and 30% phenolic resin. The material cuts like a very dense wood product. Saw blades and drill bits should be carbide or diamond-tipped and intended for fine-finish woodwork. The following general guidelines apply to processing Trespa material:

**Stationary circular saw:**

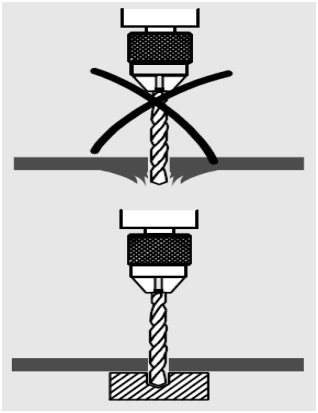
| Diameter | Tooth Count | Number of Revolutions | Blade Thickness | Height Setting |
|---|---|---|---|---|
| 12″ | 72 | 6000 | 1/8″ | 1 3/16″ |
| 14″ | 84 | 5000 | 3/16″ | 1 3/8″ |
| 16″ | 96 | 4000 | 3/16″ | 1 9/16″ |

**Hand circular (skill) saw:**

| Diameter | Tooth Count | Number of Revolutions | Blade Thickness | Height Setting |
|---|---|---|---|---|
| 6″ | 60 | 4000 | 1/8″ | 5/8″ |
| 7 1/4″ | 80 | 4000 | 3/16″ | 3/4″ |

Feed rate and tooth design:
23 – 72 ft/min. with alternate tooth or trapezoidal flat tooth

The tooth of the saw blade should enter on the decorative side of the panel at a rake angle of 45º. All cut edges should be beveled with sandpaper or router to dull the sharp edge and deter chipping of the finish surface. Notches or cutouts in the panel should first be drilled with 1/4" diameter hole and then cut out with a jigsaw. Make sure to support the underside of the panel when drilling holes (see picture at right).



Do not remove the protective film on gloss panels until after installation. If the film burns or melts during routering and/or cutting, remove only the film on the edge areas.

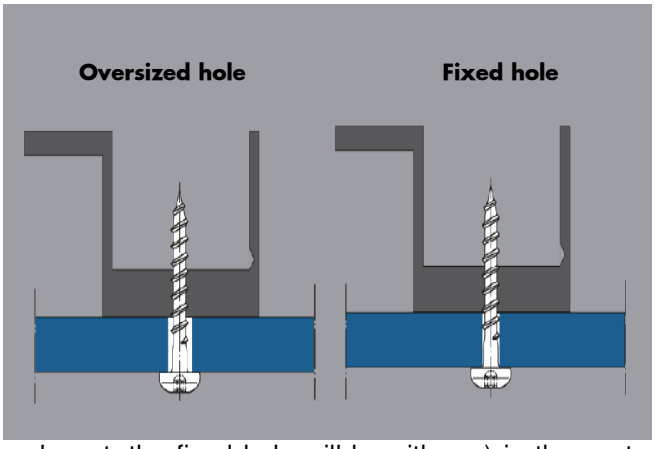
### 7.2 Panel Fastener Hole Size and Location

TNA's D&BV systems have been designed and engineered based upon the panel material qualities and composition of the underlying substructure components. There are three factors to consider when determining the size and location of the holes to drill in each panel:

- Fixed vs. oversized holes
- Minimum and maximum edge distances
- Maximum fastener spacing

#### 7.2.1 Fixed vs. Oversized Holes

Each panel will have one "fixed" hole (0.221" diameter) with the remaining fastener locations termed "oversized" holes (0.332" diameter). The fixed hole serves to secure the panel in place and acts as the origin of any panel movement. The oversized holes further secure the panel but also allow for the panel to move based upon climactic changes. For the TS 110 & TS 111 systems, the over-sized holes can accommodate normal movement on panels up to 120" in size. Panels larger than 120" will require additional engineering and design to accommodate the normal panel movement. Dependent upon the panel fastener layout, the fixed hole will be either a) in the center fastener location b) the left of center fastener location or c) the upper-left of center fastener location.




#### 7.2.2 Minimum and Maximum Edge Distances

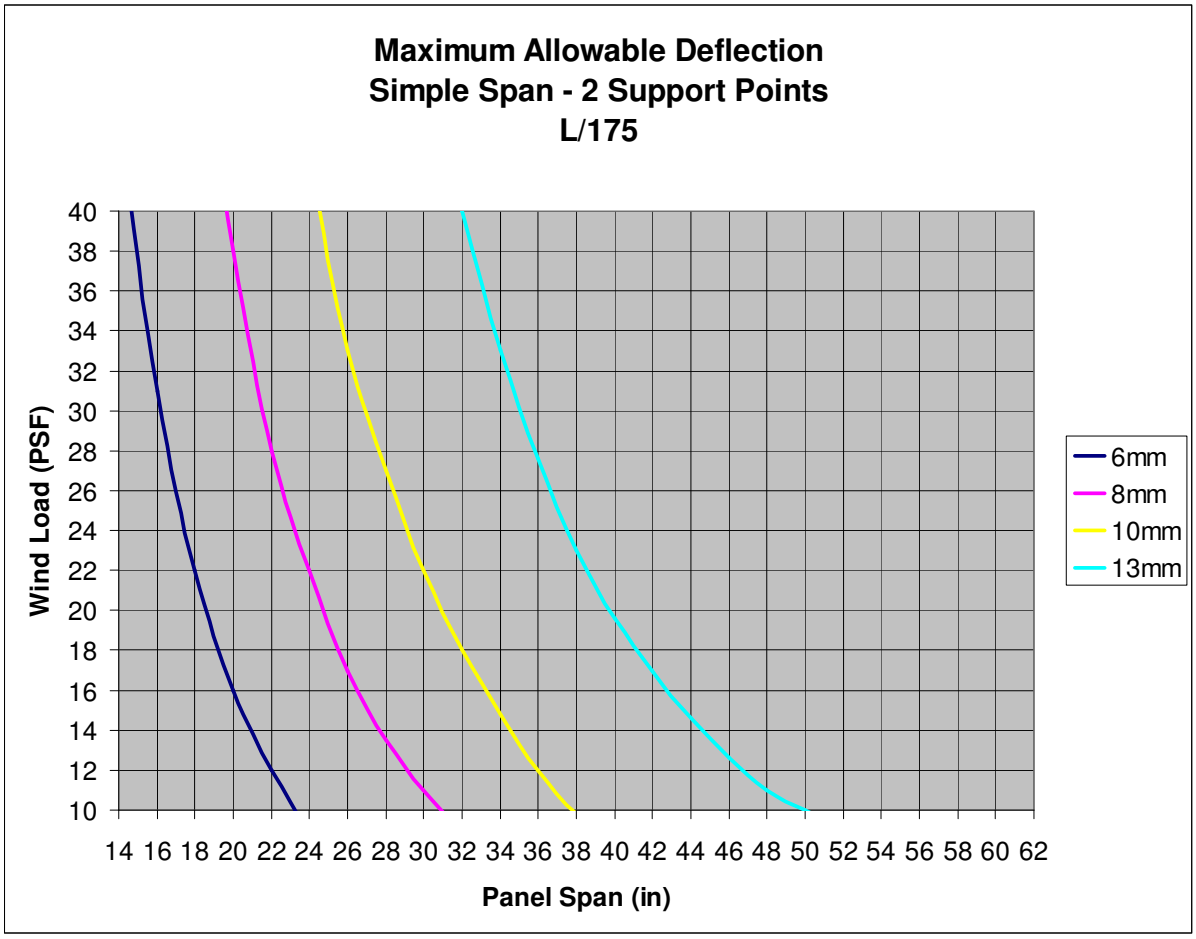
TNA's D&BV system has been designed using a maximum L/175 panel deflection criteria*. Accordingly, panel fastener hole locations should be no less than 3/4" (20mm) from the edge of the panel and a maximum of 10 times the panel thickness. Standard TS110 exposed fastener system spacing is 2" (50mm) from the edge of the panel. Using 2" spacing will also align panel fasteners at the center of the Hat Channel (Figure 2) flanges at vertical joint connections.

**Gloss Finish panels have a deflection criteria of L/500 and panel fasteners locations should adjust accordingly. Please visit* ***www.trespa.info***

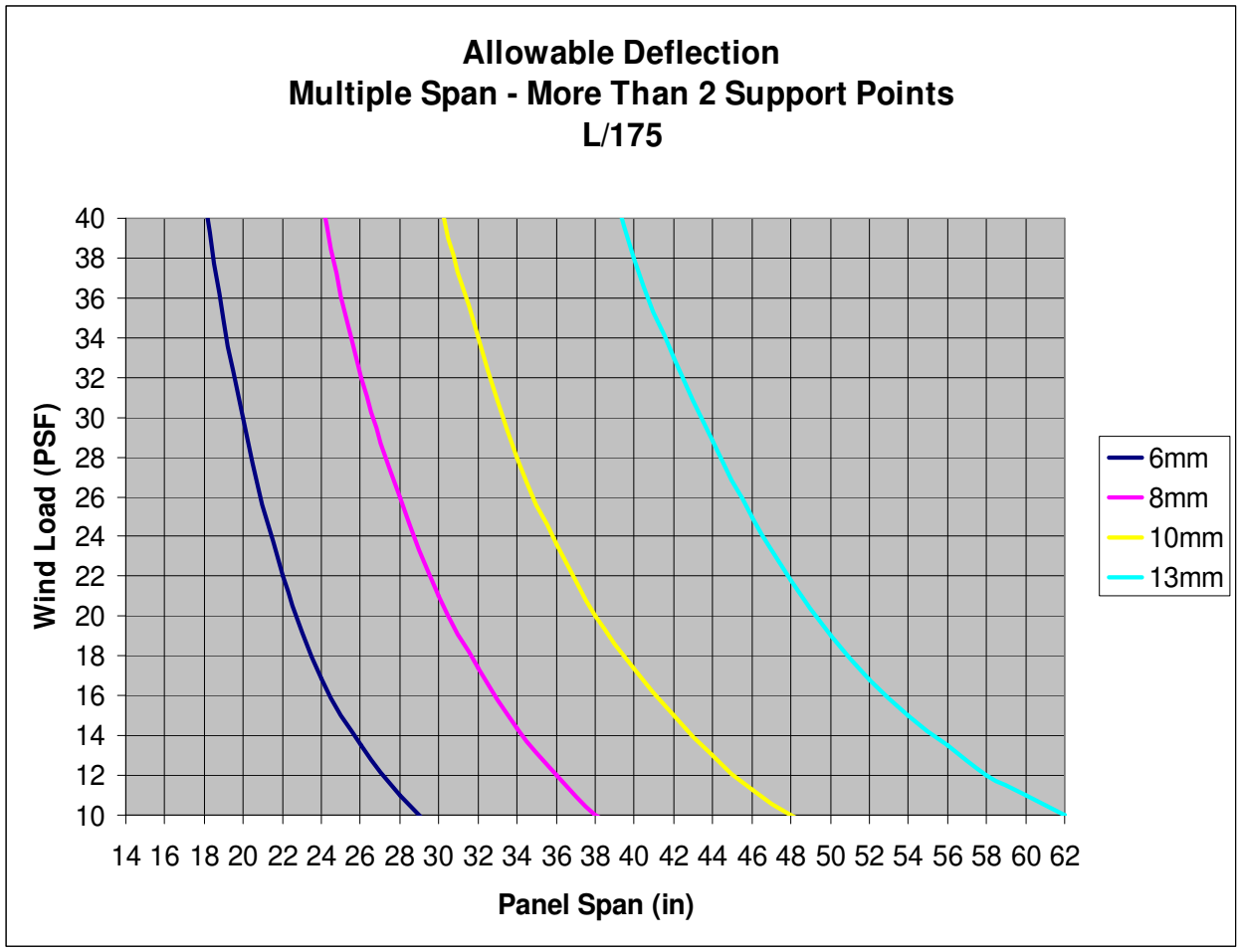
### 7.2.3 Maximum Fastener Spacing

Based upon L/175 deflection criteria and Trespa Meteon's material properties, the two graphs below provide the maximum panel fastener spacing for each panel thickness based on the project specific wind-loads.

The first graph indicates simple span connections, while the second graph indicates multiple span connections. Please note that horizontal and vertical bracket spacing will act independent from one another. **Also note that 6mm panels are only available via special order with restrictions on colors/textures.** Please make sure to check with TNA's technical department to confirm availability of product.




*The above chart is intended to provide general information only. Please confirm the applicable design, engineering, fire, and technical performance requirements.*




*The above chart is intended to provide general information only. Please confirm the applicable design, engineering, fire, and technical performance requirements.*

**Important Note:** *The above guidelines represent typical fastener hole spacing intended for general building construction. To determine the appropriate fastener spacing, all projects should be engineered and thoroughly reviewed by a design professional as required by national and local building codes. See Appendix B (Maximum Allowable Deflection Charts) or contact TNA's Technical Department for more information on project-specific applications.*

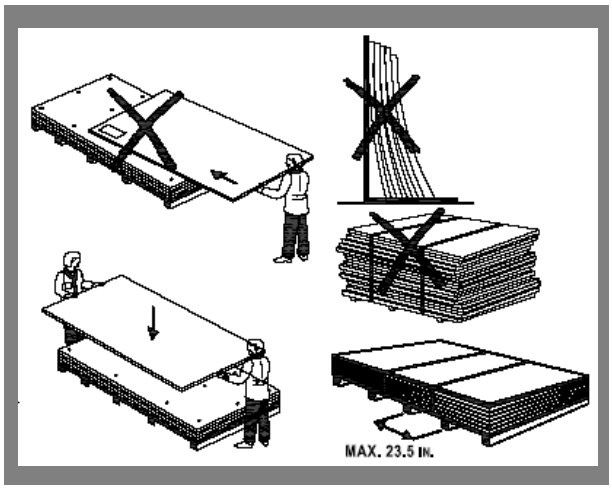
# 8. HANDLING, STORAGE AND MAINTENANCE GUIDELINES

Trespa Meteon is extremely weather resistant. The UV resistance and color stability are very high and neither the surface nor the core will dramatically react to excessive moisture or sunlight exposure when installed correctly. However, mishandling and improper storage can have adverse effects on the panels. The following basic guidelines should be used when handling, storing or performing maintenance on the panels.

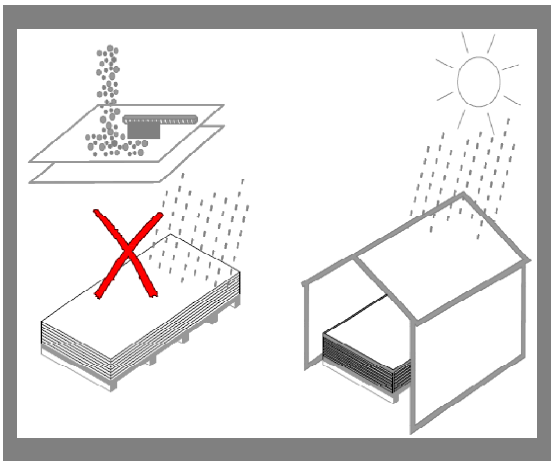
## 8.1 Shipping and Handling Guidelines

The following basic guidelines should be used when shipping and/or handling the panels:

- Shipping pallets should be stable, flat and at least the same dimension as the panels
- Shipping pallets should be thoroughly strapped and properly balanced
- Protective layers should be included between the panels and the pallet, as well as on the uppermost panel
- Protective dividers (foam, cork, etc.) must be used between each sheet to avoid damaging the decorative surface
- To prevent scratches, lift the panels evenly.
- Do not drag, slide or drop the panels




## 8.2 Storage Guidelines



The following basic guidelines should be used when storing panels for any length of time:

- Store in a covered or enclosed area protected against moisture and heat
- Store in an environment with ambient temperature and humidity
- Stored panels should be supported over the entire surface. Do not store panels on end
- Prevent moisture from forming between the panels

## 8.3 Cleaning and Maintenance Guidelines

Trespa Meteon requires minimum maintenance. Most industrial pollutants (dirt, dust, soot, etc.) are washed away during typical rain storms. However, to ensure the best possible appearance, panels should be cleaned after installation and at yearly intervals thereafter. In locations where there is heavy traffic or industrial pollution, Trespa Meteon gloss panels attract as much surface dust as windows. Special maintenance and care should be paid to gloss panels in mostly urban areas. Several forms of pollution can adversely affect facade materials, namely:

- Air pollution (soot, dust, grease, grime, oil) – clean with a soap and water solution
- Building construction pollution (paint, mastic, sealing foam, bitumen) – fresh cement can be cleaned with diluted hydrochloric acid and some paints and adhesives can be cleaned with organic solvents. Once dried, two-part paint and adhesive cannot be removed
- Graffiti (spray cans, felt tipped pens) – clean with organic solvents or special graffiti remover
- Natural pollution (moss, algae) – clean with a soap and water solution

Rinse panels thoroughly with clean water after using solvents and especially after using acidic cleaning agents. Never use cleaning agents with abrasive or polishing components. Only use sponges, soft nylon brushes or cloths. Avoid brushes with hard rigid bristles. Refresh the water regularly and make sure no abrasive components (e.g. sand) are left on or in the sponge or brush. Avoid streaks by rinsing the panel with clean water and wiping dry.

TRESPA®

## Sources and References


- Anderson, J.M. and Gill, J.R., “Rainscreen Cladding,” Ciria, 1988.
- Keleher, Richard, “Rain Screen Principles in Practice,” *Technics,* April 1993
- MCA Rainscreen Task Force, “Understanding the Rainscreen Principle,” Metal Construction Association, December 12, 2006 [R12]
- W.C. Brown, G.A. Chown, G.F. Poirier and M.Z. Rousseau, NRC-CNRC Construction Technology Update No. 34, “Designing Exterior Walls According to the Rainscreen Principle,” National Research Council of Canada, Institute for Research in Construction, 1999

TRESPA®

# APPENDIX A – PANEL WEIGHTS AND SYSTEM DEAD LOAD
## TS 110 & TS 111 SYSTEMS

| Material Thickness | Avg. panel weight (per $ft^2$) | Avg. substructure weight (per $ft^2$) | Total avg. system weight (per $ft^2$) |
|---|---|---|---|
| 1/4″ (6mm) | 1.8 lbs | 1.6 lbs | 3.4 lbs |
| 5/16″ (8mm) | 2.4 lbs | 1.4 lbs | 3.8 lbs |
| 3/8″ (10mm) | 3.0 lbs | 1.2 lbs | 4.2 lbs |
| 1/2″ (13mm) | 3.8 lbs | 1 lbs | 4.8 lbs |

TRESPA®

# APPENDIX B – MAXIMUM ALLOWABLE DEFLECTION CHARTS

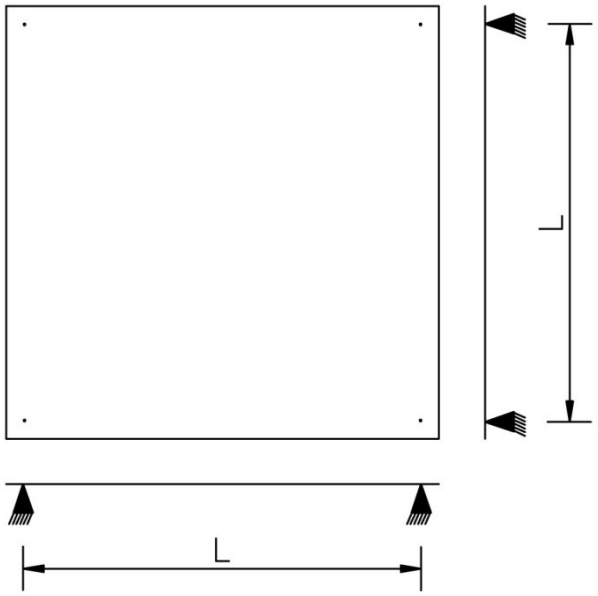
The charts that follow have been developed based on the two general conditions seen in panel installation - Simple Span (2 support points) and Multiple Spans (more than 2 support points). ***These charts are only intended to provide a general guideline for typical design and aesthetics purposes. Projects should be engineered by a design professional as required by national and local building codes.***

**Simple Span Panels**

The following chart, showing the Panel Deflection for Simple Span applications, is based on wind load and the panel thickness. The calculation used to determine these curves is:

$$\Delta_{max} = \frac{5wL^4}{384EI}$$

$\Delta_{max}$ = Maximum Allowable Panel Deflection
w = 0.7 x Wind Load (IBC Table1604.3.f)
L = Span between anchor points
E = Modulus of Elasticity (1,300,000 psi for Meteon)
I = Moment of Inertia (varies with thickness)



TRESPA®

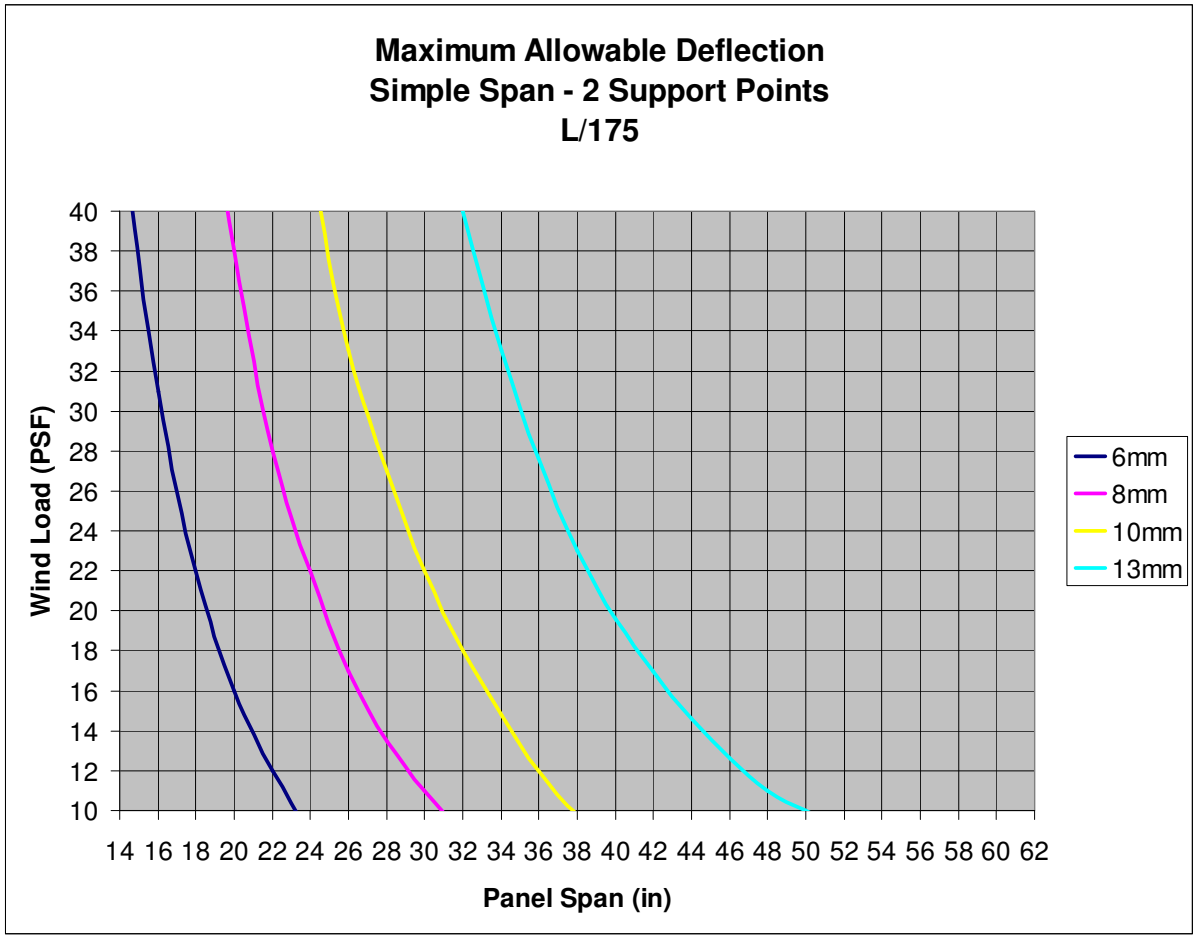
## Simple Span Examples

**6mm Meteon** (Dark Blue Line)
With a Maximum Span of 18" (X Axis) $\Delta_{max}$ = 0.102" ≈ *L/175*
When exposed to a **Wind Load of 22 psf** (Y Axis)

**8mm Meteon** (Red Line)
With a Maximum Span of 24" (X Axis) $\Delta_{max}$ = 0.136" ≈ *L/175*
When exposed to a **Wind Load of 22 psf** (Y Axis)

**10mm Meteon** (Yellow Line)
With a Maximum Span of 30" (X Axis) $\Delta_{max}$ = 0.171" ≈ *L/175*
When exposed to a **Wind Load of 22 psf** (Y Axis)

**13mm Meteon** (Light Blue Line)
With a Maximum Span of 39" (X Axis) $\Delta_{max}$ = 0.222" ≈ *L/175*
When exposed to a **Wind Load of 22 psf** (Y Axis)




*The above chart is intended to provide general information only. Please confirm the applicable design, engineering, fire, and technical performance requirements.*

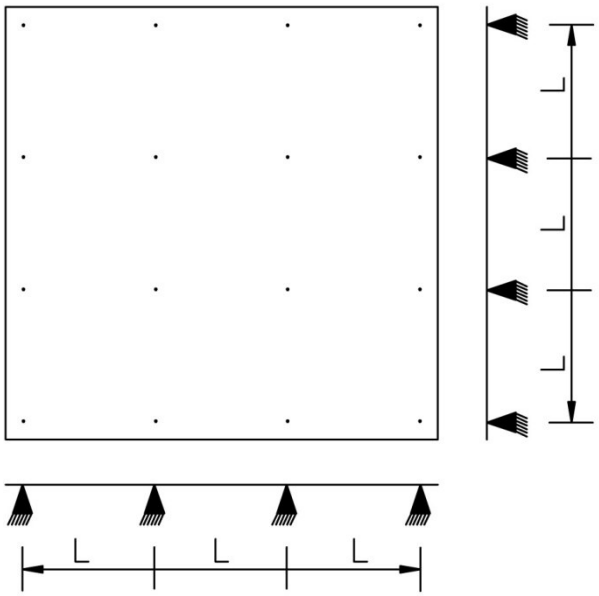
TRESPA®

## Multiple Span Panels

More often, panels require multiple anchor points in length, width or both. For these conditions, the Panel Deflection Based on Multiple Span applications is based on a slightly different formula. The calculation used to determine these curves is:

$$\Delta_{max} = \frac{0.0069wL^4}{EI}$$

$\Delta_{max}$ = Maximum Allowable Panel Deflection
w = 0.7 x Wind Load (IBC Table1604.3.f)
L = Span between anchor points
E = Modulus of Elasticity (1,300,000 psi for Meteon)
I = Moment of Inertia (varies with thickness)



TRESPA®

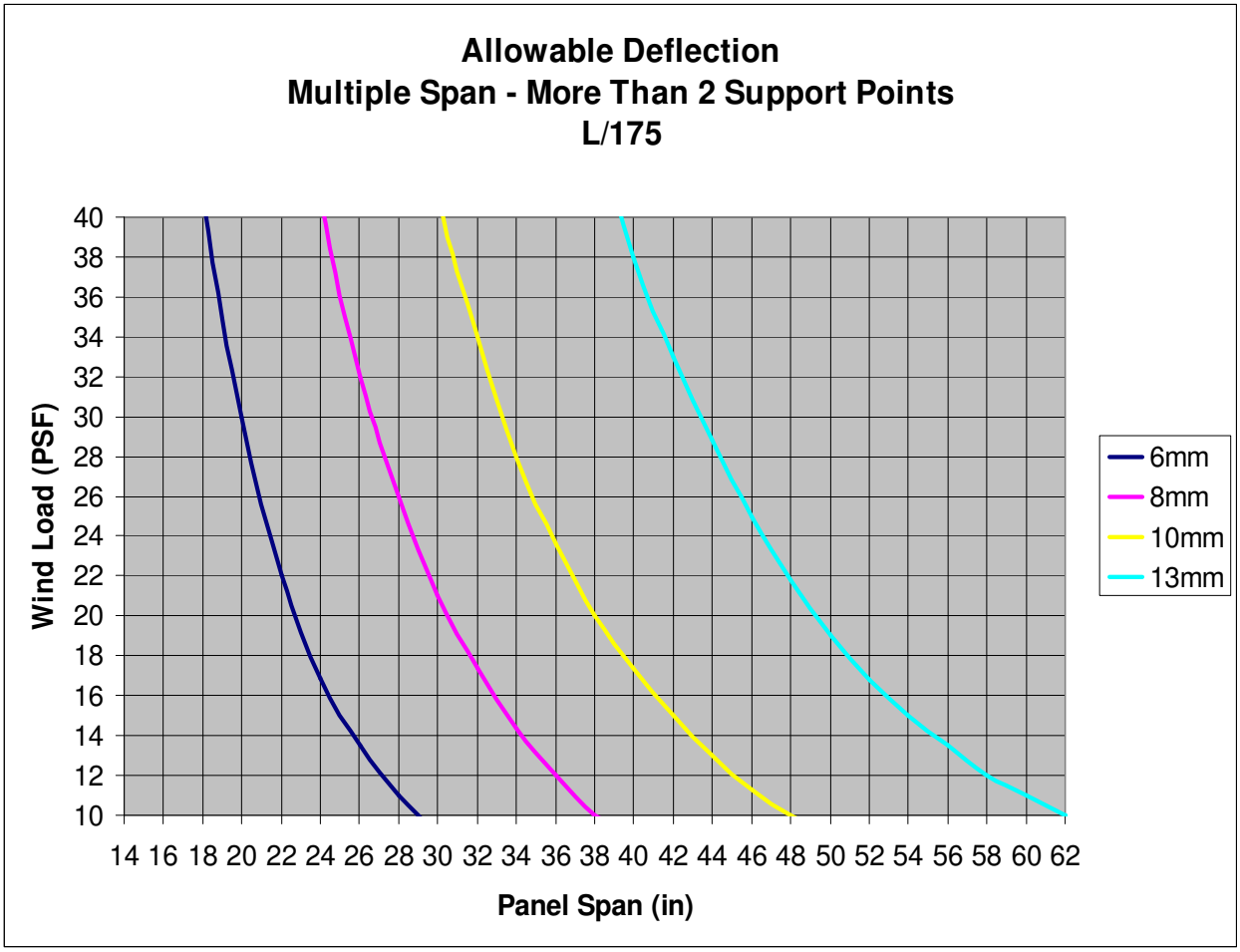
## Multiple Span Examples

**6mm Meteon** (Dark Blue Line)
With a Maximum Span of 22" (X Axis) $\Delta_{max}$ = 0.121" ≈ *L/175*
When exposed to a **Wind Load of 22 psf** (Y Axis)

**8mm Meteon** (Red Line)
With a Maximum Span of 29½" (X Axis) $\Delta_{max}$ = 0.165" ≈ *L/175*
When exposed to a **Wind Load of 22 psf** (Y Axis)

**10mm Meteon** (Yellow Line)
With a Maximum Span of 37" (X Axis) $\Delta_{max}$ = 0.209" ≈ *L/175*
When exposed to a **Wind Load of 22 psf** (Y Axis)

**13mm Meteon** (Light Blue Line)
With a Maximum Span of 48 1/4" (X Axis) $\Delta_{max}$ = 0.275" ≈ *L/175*
When exposed to a **Wind Load of 22 psf** (Y Axis)




*The above chart is intended to provide general information only. Please confirm the applicable design, engineering, fire, and technical performance requirements.*

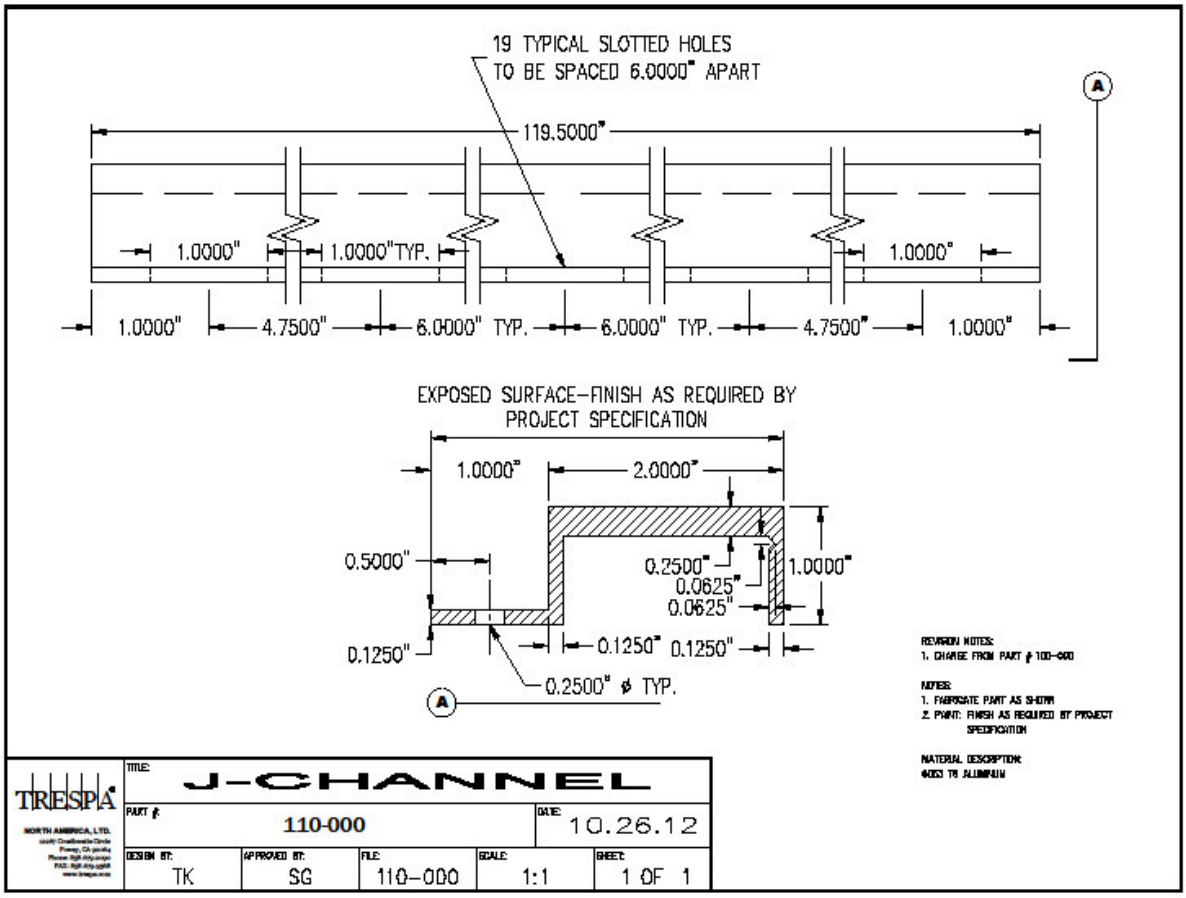
# APPENDIX C – TRESPA METEON MATERIAL PROPERTIES

Please check **www.trespa.info** for the latest version of the material properties:

HTTP://WWW.TRESPA.INFO/IMAGES/CODEV8001_TRESPA_MATERIAL_PROPERTY_DATASHEET_VERSION3%202_DATE10-01-2012_TCM37-46519.PDF

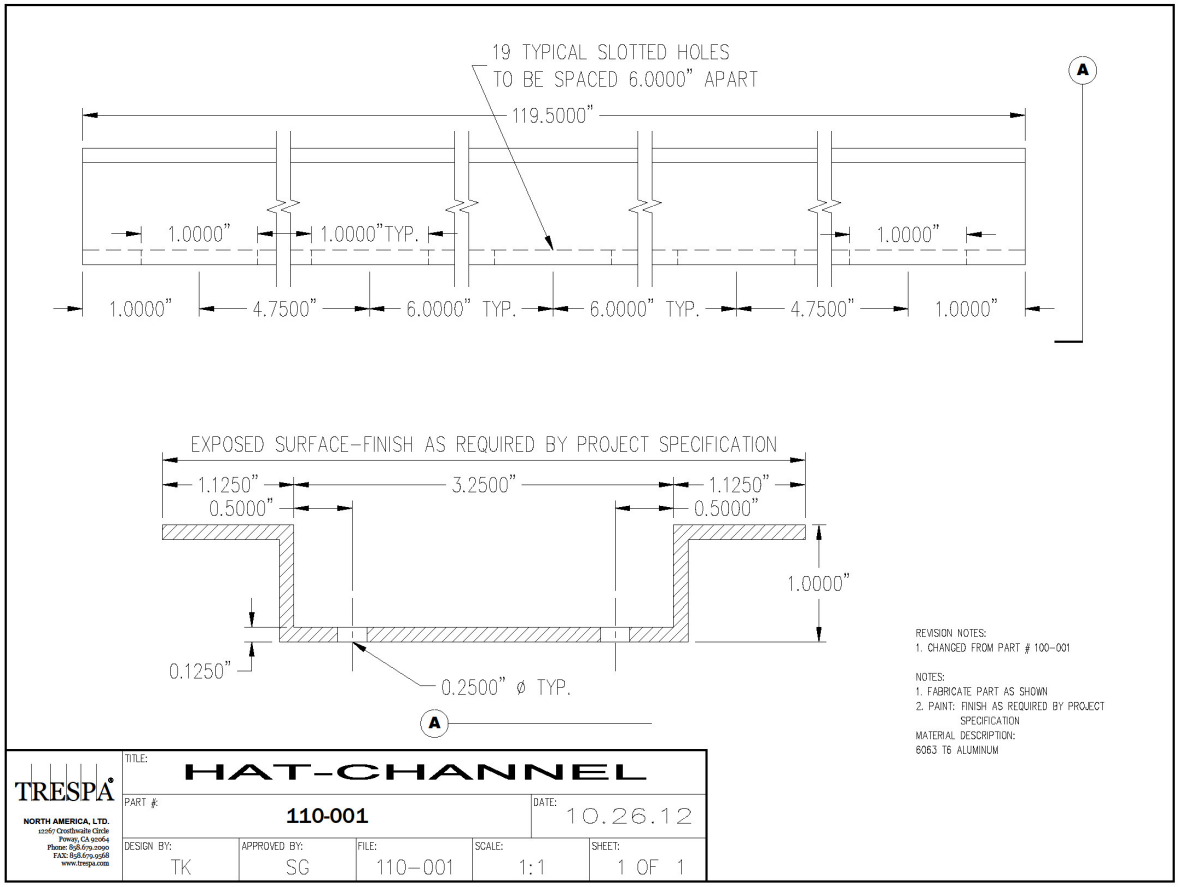
TRESPA®

## FIGURE 1



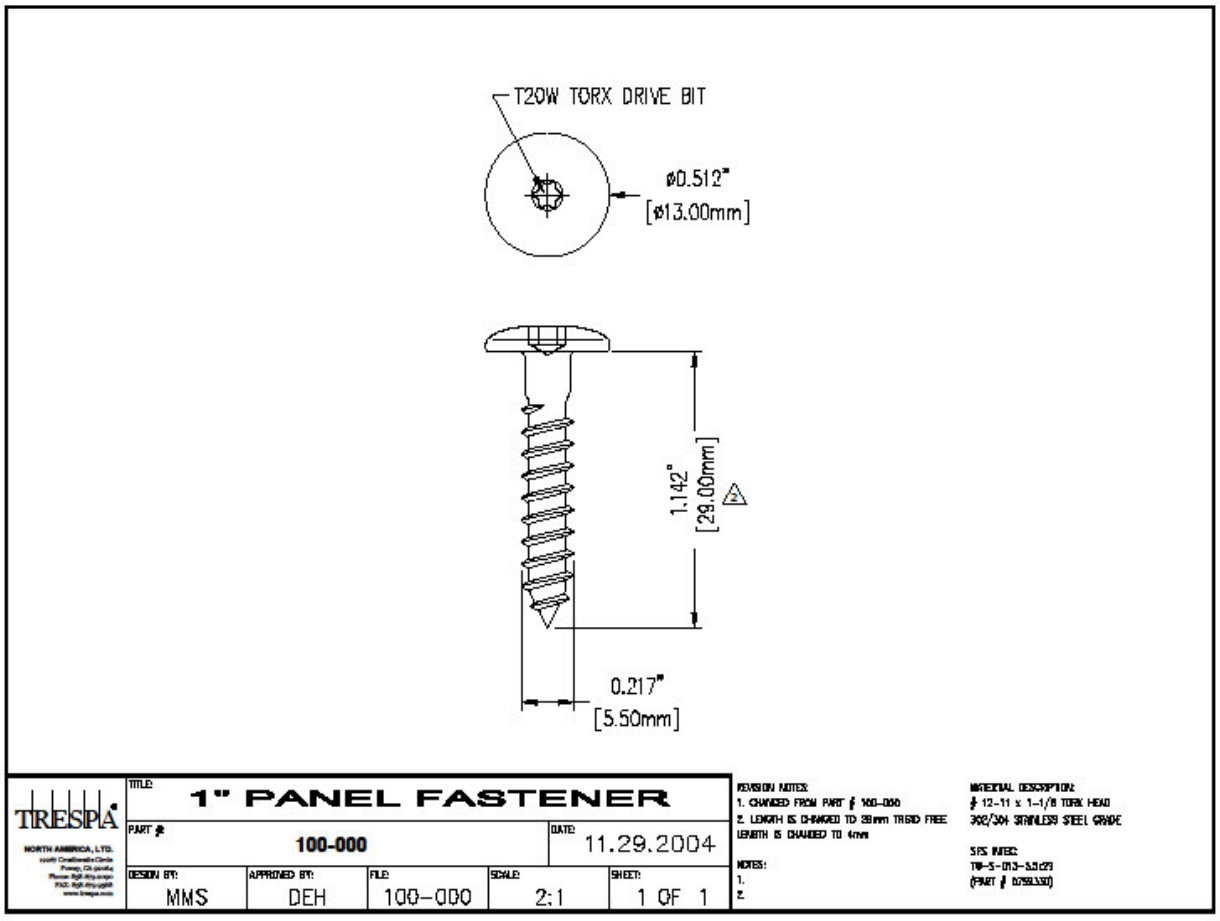
TRESPA®

## FIGURE 2



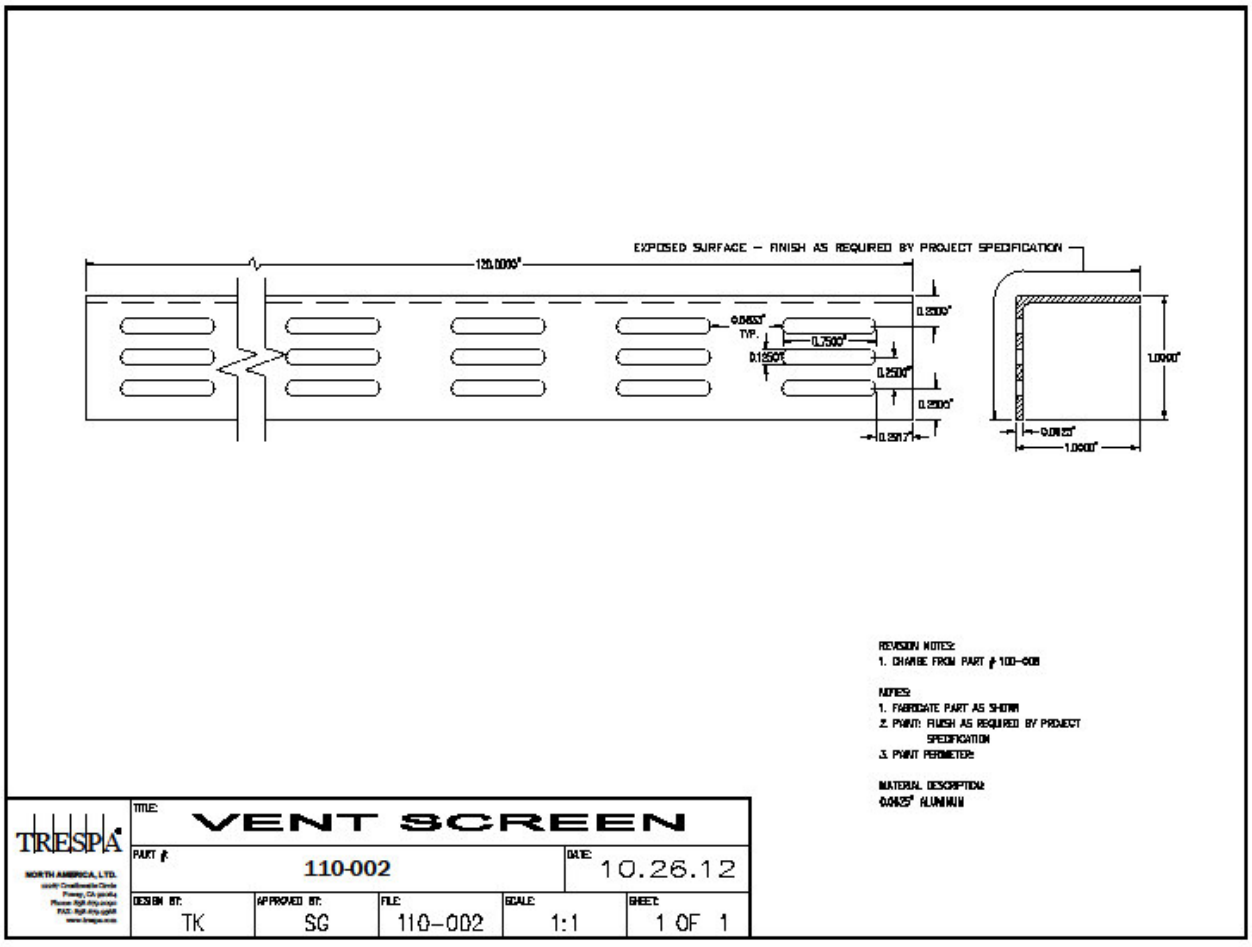
TRESPA®

## FIGURE 3



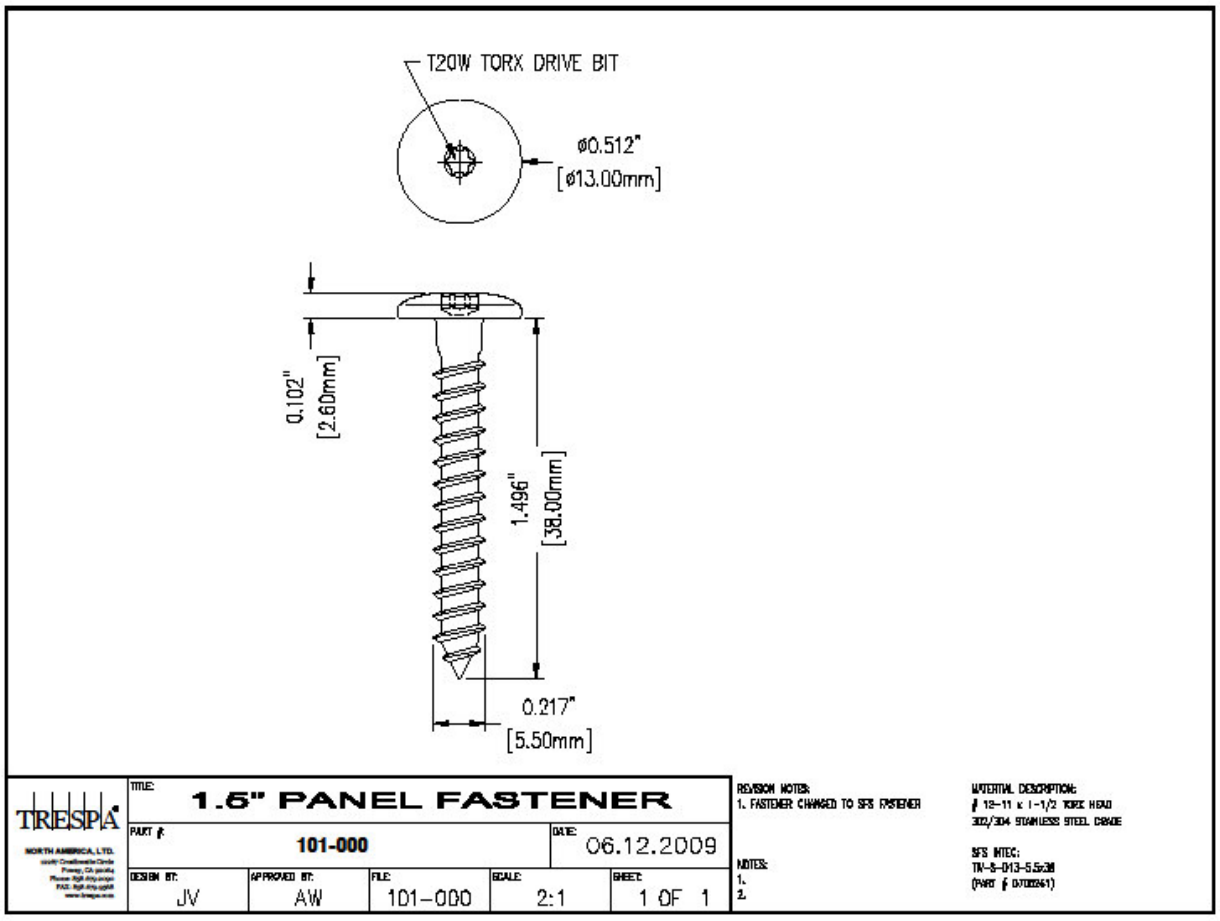
TRESPA®

## FIGURE 4



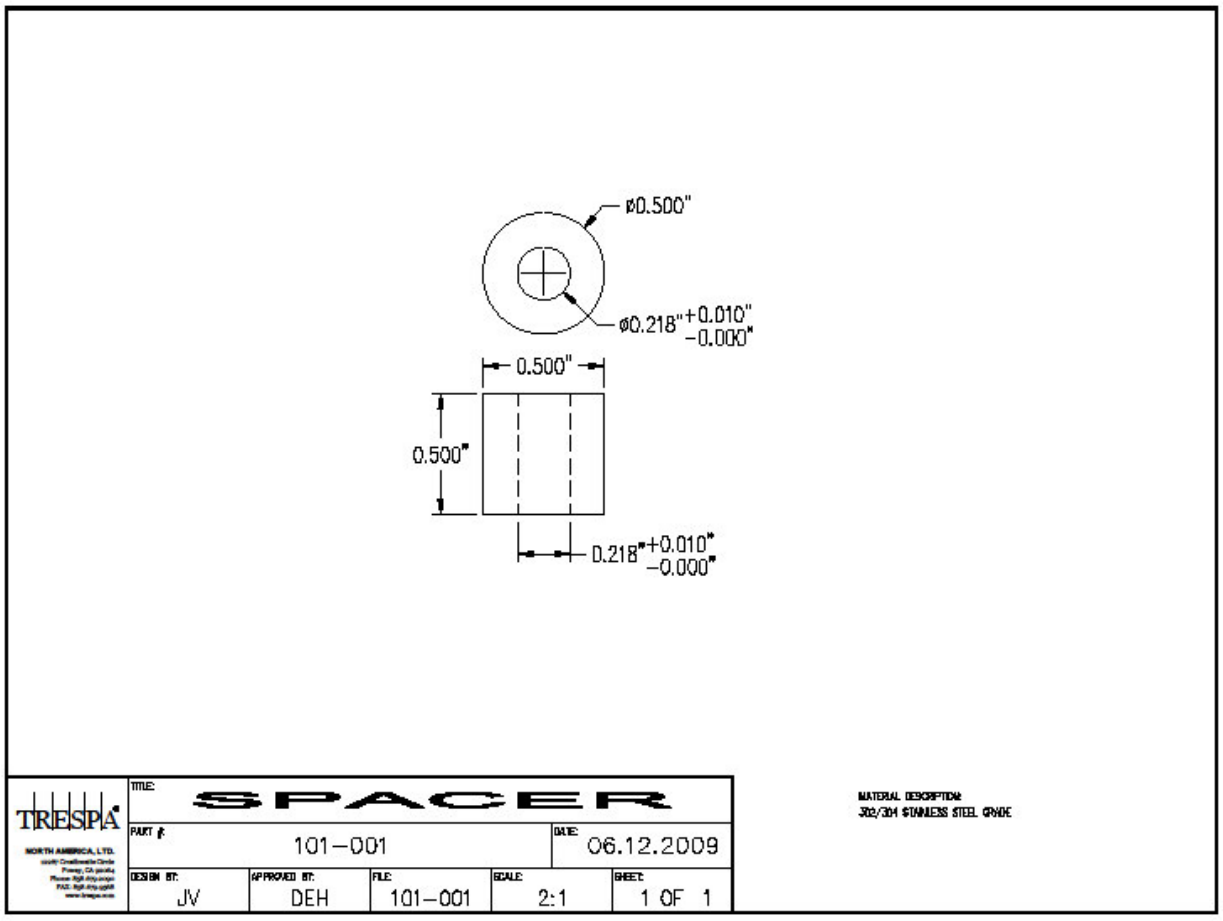
TRESPA®

## FIGURE 5



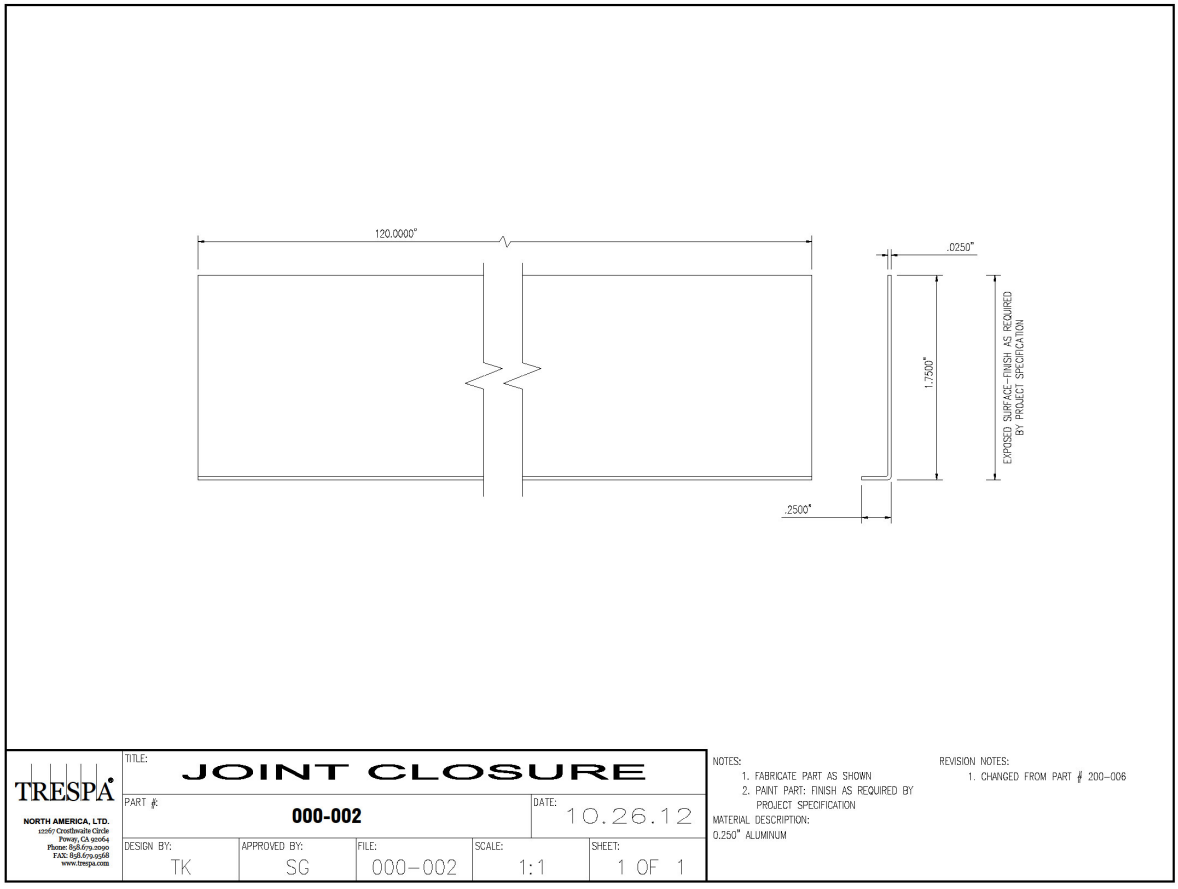
TRESPA®

## FIGURE 6



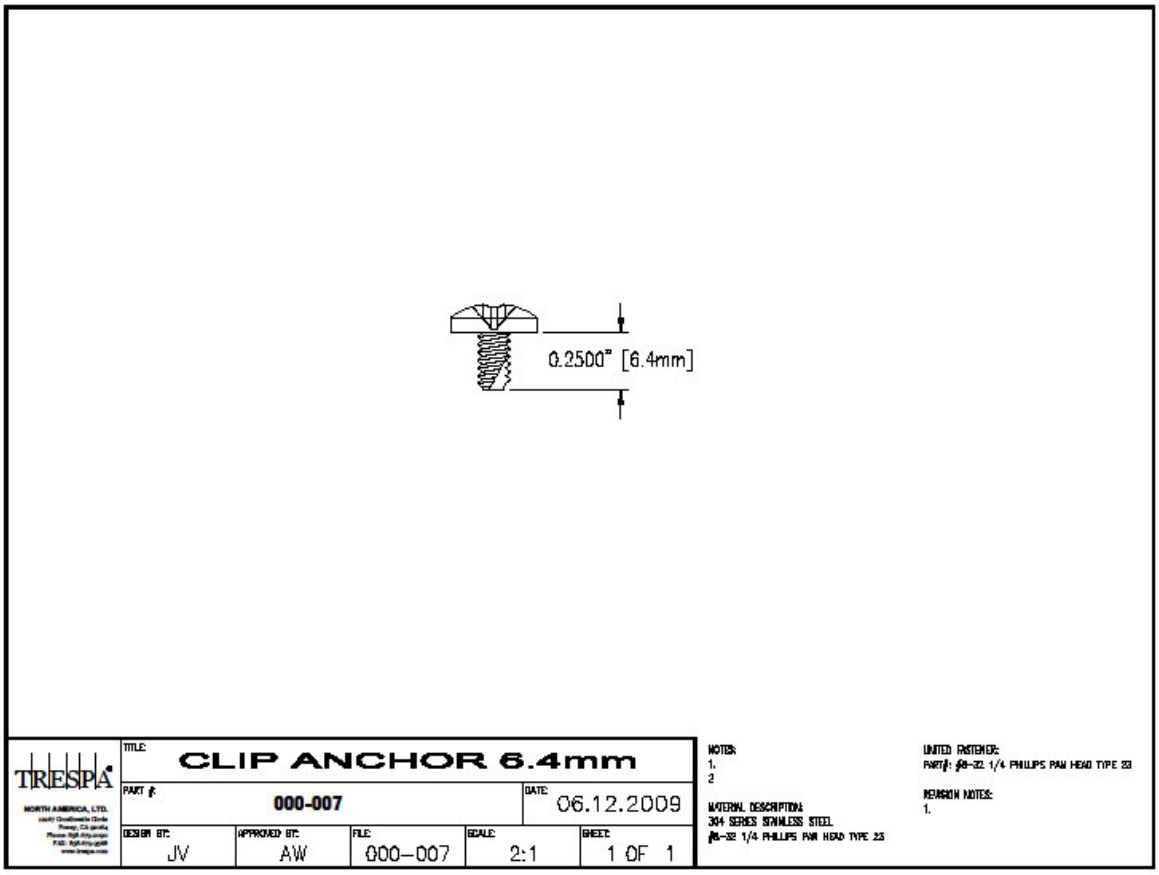
TRESPA®

## FIGURE 7



TRESPA®

## FIGURE 8



TRESPA®

## FIGURE 9