

Design Guidelines for Credenza Monument

Table of Content

- Objective
- Global 7000 Information
- Design Input
- Credenza Features
- Customer Requirement
- Design Consideration
- Material Selection
- Panel Edge Fill/Edge closure Cut-out
- Panel Cut-outs and Holes
- Sandwich Panel Joints
- Bonding using two-part epoxy adhesives
- Flat Joining Methods
- Corner Joints(L-Joint)
- Design Consideration of L-Joint
- T-Joint
- Design Consideration of T-Joint
- Design Consideration of Tongue and Groove
- Design Consideration for PINS feature in Panel
- Joining the Panels by Metal Parts



Table of Content

- Design Consideration for Metal Parts
- Part(insert) in Panel
- Parts Bonding to Panels
- Megnet Part Attachement
- Shelves
- Panel Inserts
- Slotted Insert
- Hardware list used in G7000 program
- Cabinet Installation fitting
- Hinge
- Design consideration of Hinge Installation
- Latch
- Design consideration of Latch Installation
- Striker
- Grommet
- POKA-YOKE Design For Manufacturing
- Gapping
- Functional Gapping
- Aesthetic Gapping

Table of Content

- Finishing Material
- Finishing Material Application
- Panels Finshing Method
- Reference Material
- Reference Videos

Objective

Develop Competency level among the engineers regarding design of credenza followed by the Bombardier for G7000/8000 program and also some generic design guidelines which is used across the interior industries.

Well versed with guidelines which help in

- Developing Good design
- Checking Manufacturing feasibility
- Maintainability – removal/Installation of parts from credenza
- Optimum Weight for the Credenza

Global 7000 Information

The Bombardier Global 7000 is ultra long-range corporate and VIP high speed jet aircraft produced by Bombardier Aerospace. The Global 7000 will feature a spacious four-zone cabin. With a volume of 2,637 cu.ft. (74.67 cu.m.), passengers will have 20 percent more living space than the cabin of the current model. The aircraft will have a high-speed cruise of Mach 0.90 and a range of 7,300 nmi (13,520 km) at Mach 0.85.

Global family of aircraft



- **Models:** *Global 5000, Global 6000, Global 7000³ and Global 8000³*
- **Market category:** Large business jets
- **Competitive advantages¹:** The *Global* family of aircraft offers a balance of performance, comfort and productivity for long-range missions. The *Global 7000* and *Global 8000* aircraft are being developed as an extension to the *Global* family of aircraft and are expected to give Bombardier broad market coverage in the upper end of the business aircraft market



Global 7000 Information

Our *Global 7000* and *Global 8000* business aircraft establish a new benchmark



Setting new benchmark in global travel

- The *Global 7000* jet is designed for 7,300 NM (13,520 km) range with 10 passengers at Mach 0.85¹
- The *Global 8000* jet will fly farther than any other business jet, boasting an impressive range of 7,900 NM (14,631 km) at Mach 0.85¹

Bringing home-like feel and comfort to business travel

- The *Global 7000* jet features a spacious four-zone cabin, which is 20% larger than the *Global 6000* jet cabin
- The *Global 7000* and *Global 8000* jets offer large, flexible, comfortable and light-filled living environments establishing industry benchmarks for comfort, style and convenience

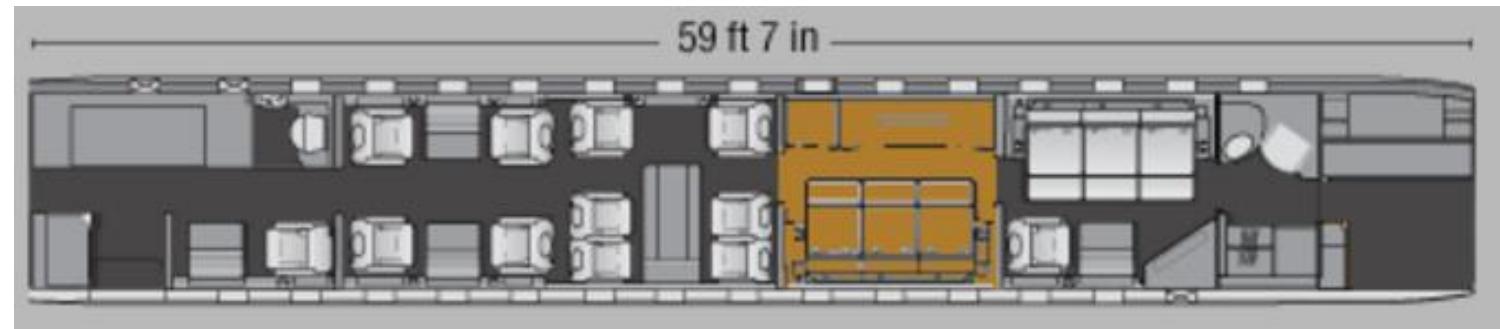
Incorporating the latest technology

- Fly-by-wire technology and breakthrough *Bombardier Vision Flight Deck*
- GE's new Passport 20 engine will set a new standard in performance, efficiency, and reliability for business aviation

Global 7000 Information

Baseline Floor Plan

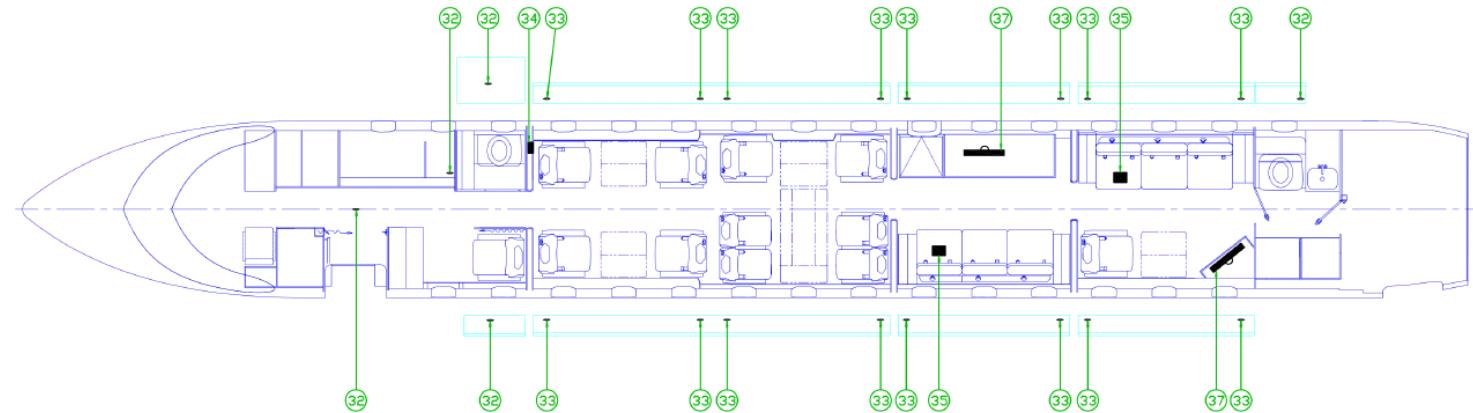
The baseline floor plan on the Global 7000 jet seats 17 passengers comfortably and features a dedicated crew rest area. All seats fully berth to provide bed-like comfort. The unique cabin concept with four living spaces provides individual areas for productivity and creativity. Six-seat conferencing or dining, an expanded galley, closable office space and an ideally located master suite in the aft cabin are among the many new and exceptional features offered by this remarkable business jet.



Design Input

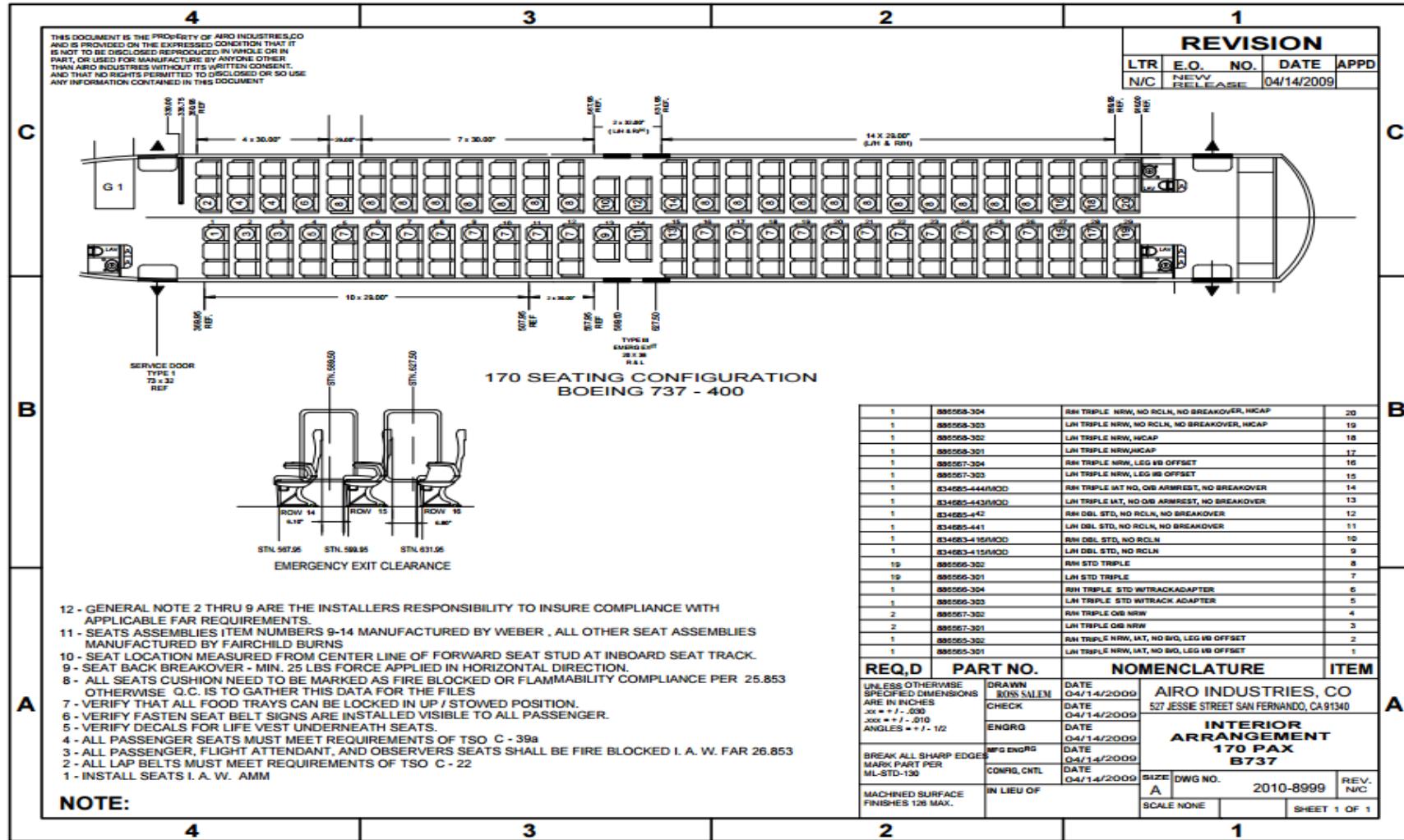
Layout of Passenger Accommodations (LOPA)

Layout of Passenger Accommodations (LOPA) The LOPA is an engineering diagram of the aircraft's cabin interior that includes, but is not limited to, locations of passenger and flight attendant seats, emergency equipment, exits, lavatories, and galleys. It leads the reviewer through the interior design/layout and is the document that certifies the interior components and installation.



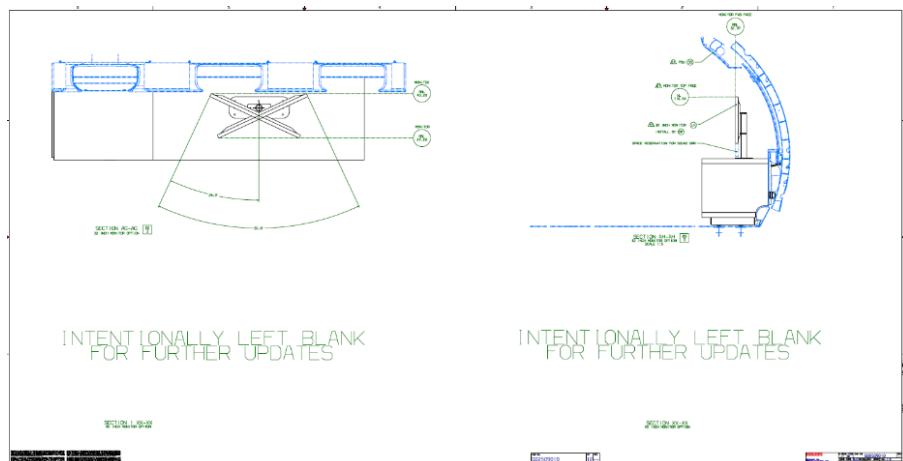
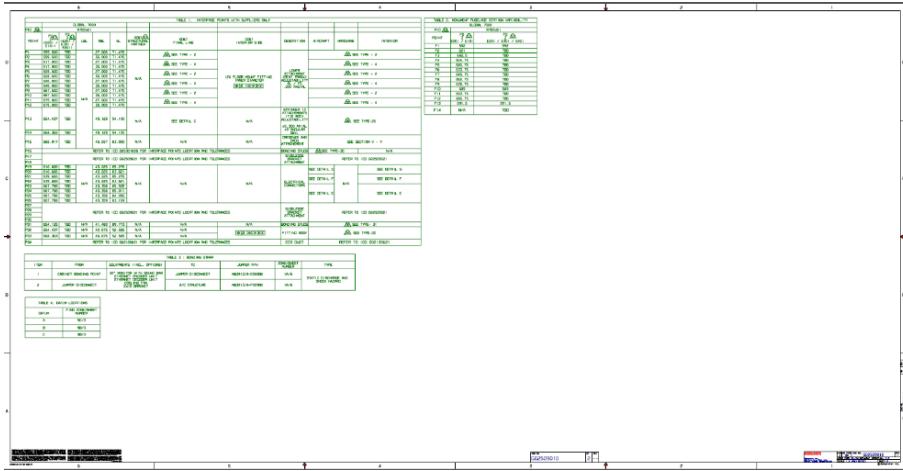
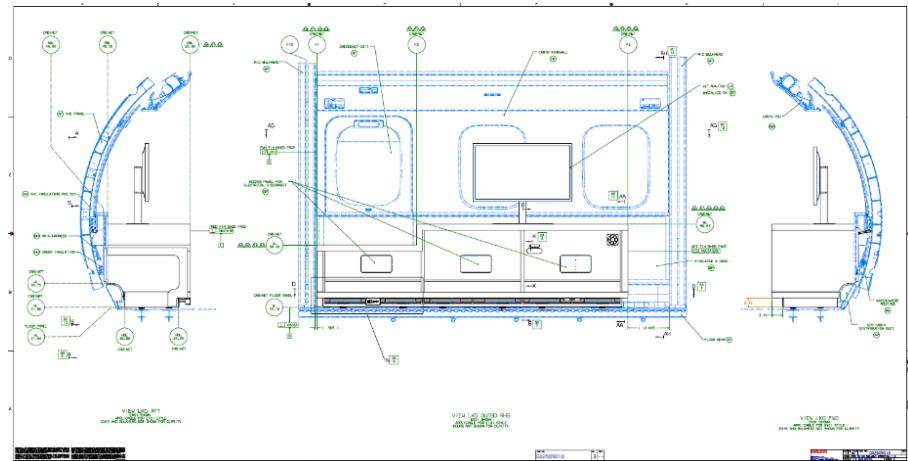
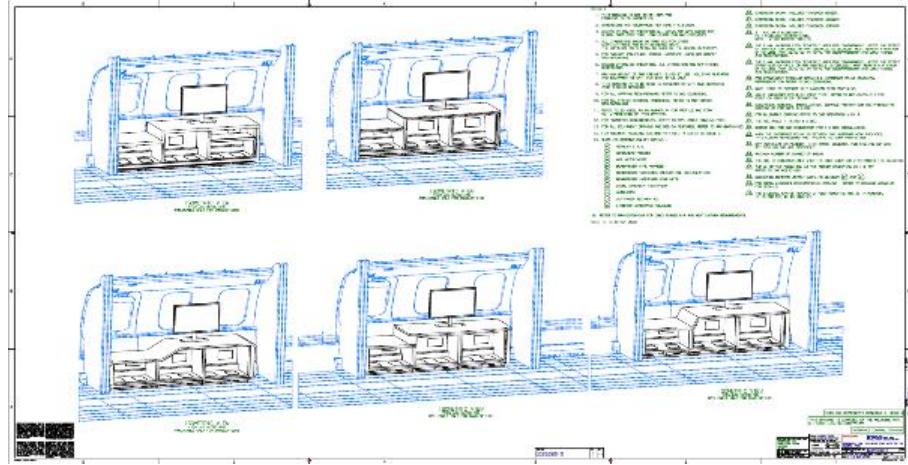
Design Input

Example of LOPA of Boeing 737-400 Seating Configuration



Design Input

Interface Control Drawing of earlier Credenza



Credenza Features

Following are the features that may be available/existing in the generic Credenza

- Flight Entertainment Systems
- LCD Cabin Monitors And A Stereo Speaker System
- A Multi-function Printer
- Coat Keeping Compartment
- Utility Drawer
- Emergency Safety Equipment
- Wireless Local Area Network And Satellite Communications With Wireless Handsets Keep You Connected.
- Choose Our Broad Band Multi-link High-speed Internet System
- Cabin and Mood Lighting Systems
- Medical Equipment Installation

Customer Requirement

- List of Utility needed for the Customer
- Outer Finishing requirement
- Inner Compartment Finishing
- Type of latch(Horizontal or Vertical)
- Type of countertop
- Size of the Credenza
- Number of compartment
- Location of the credenza
- Type of Flight Entrainment unit
- Aesthetical gaping

Design Consideration

- Material Selection
- Thickness of the Panels
- Type of Joint selection
- Gapping dimensions
- Selection of Hinge
- Selection of Latch
- Selection of Finishing material
- Selection of fasteners

Material Selection

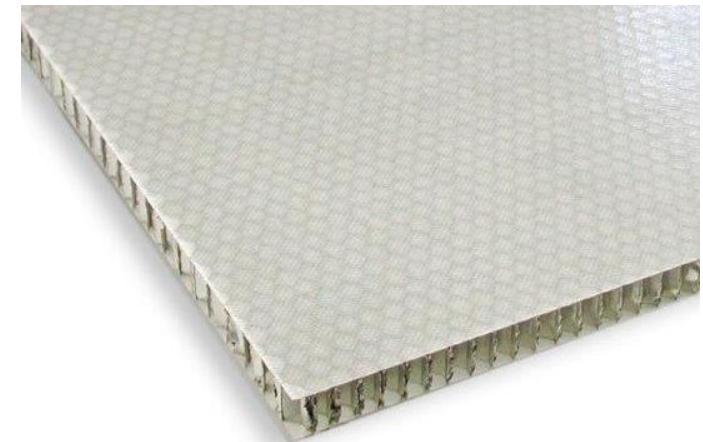
Following are materials used in the extensively in Cabinet Industries



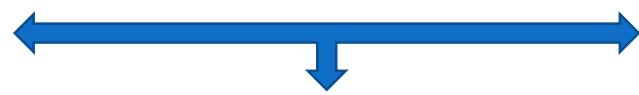
Carbon Sandwich Panel



Glass Sandwich Panel



Aluminum Sandwich Panel



Key advantages:

- High rigidity and strength
- Excellent toughness
- Low weight
- Minimal cost
- Thermoformability
- Improved thermal insulation properties

Key advantages:

- > Made in highly efficient continuous process
- > Reduced production costs vs sandwich panels made with traditional production process
- > High flexural stiffness
- > Low weight
- > High aesthetics
- > High thermal insulation capabilities
- > Eco-friendly and recyclable

Material Selection

Panel Material Characteristics

Standard compositions of honeycomb sandwich panels are as follows:

Panel composition	Key characteristics
Aluminium honeycomb core, aluminium skins.	Medium weight and stiffness at low cost.
Aluminium honeycomb core, woven glass fibre skins.	Lighter and less stiff than aluminium-skinned panels, at lower cost.
Non-metallic Nomex honeycomb core, unidirectional or woven glass fibre skins.	More resilient and higher cost than panels with aluminium honeycomb core. Unidirectional fibres give greater stiffness, at higher cost than woven fibres.
Non-metallic Nomex honeycomb core, unidirectional or woven carbon fibre skins.	The lightest and stiffer panels, which is reflected in their cost.



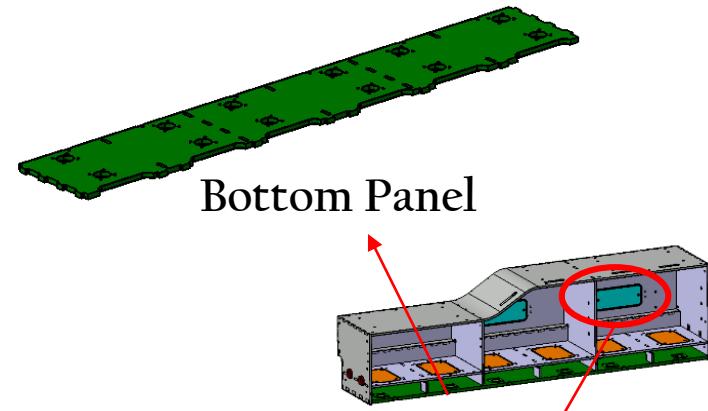
Material Selection

They are two type of Panels are used in the Credenza Interior Design

➤ Structural Composite Panel:-

More Loading carrying panels

Examples:- Bottom Panel which attached to the seat track , countertop Panel. Etc.



➤ Non-Structural Composite Panel:-

Less Loading carrying panels or Aesthetic Panels

Examples:- Access Panel, Side Cap Panels, etc.

General composite sandwich supplier are

- ❖ AAR Corp
- ❖ Nordam
- ❖ Hexcel
- ❖ The Gill Corporation

Access Panel

Material Selection

Business aircraft cabinets are made with various materials and this section identifies the major ones used to build an interior. As one of the main materials in aircraft completions, honeycomb panels are used in the fabrication of interior cabinets as they are light and strong. A honeycomb panel consists of cover sheets called skins and core.

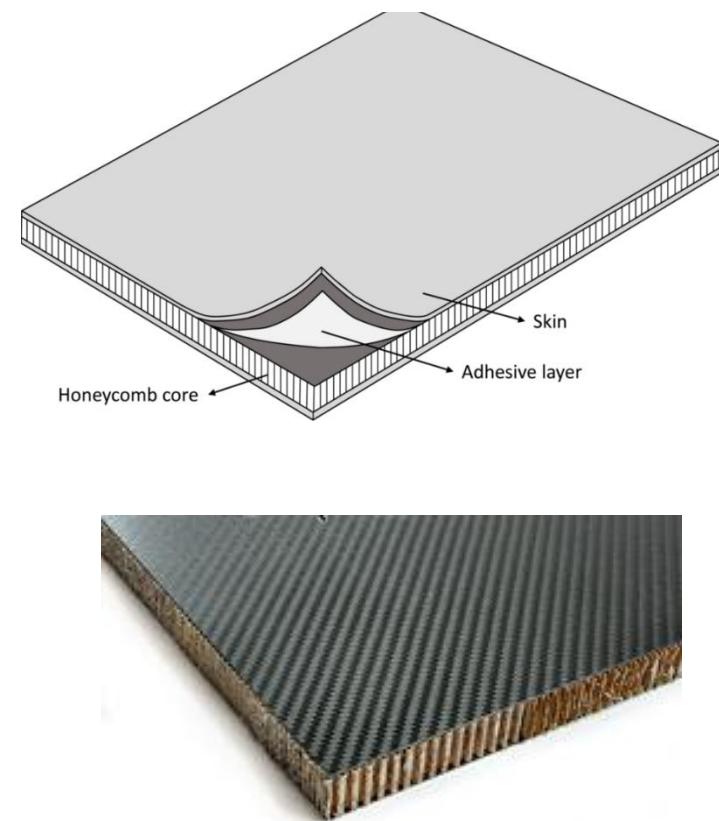
Type and Thickness of Honeycomb panels used by Bombardier are shown below.

	Type	Class	Thickness	Skin Material	Skin Thickness	Core Material	
BAMS 831-004	1	125	0.125	Fiberglass/Epoxy	1 ply	Aramid	
		250	0.250				
		375	0.375				
		500	0.500				
		750	0.750				
	2	125	0.125		2 ply		
		250	0.250				
		375	0.375				
		500	0.500				
		750	0.750				
BAMS 831-010		250	0.250	Aluminium	N/A	Aluminium	
		500	0.500				
		750	0.750				
		1250	1.250				
BAMS 831-011		375	0.375	Aluminium	N/A	Aluminium	

TABLE 1 – LIST OF HONEYCOMB PANELS

Material specified on Engineering data shall be shown as follow with x = Type (1 or 2) and y = class indicated in [Table 1](#):

- BAMS 831-004 TYx CLy
- BAMS 831-010 CLy
- BAMS 831-011 CLy



Panel Edge Fill/Edge closure Cut-out

Sandwich Panel Edge Closure Design

When designing of sandwich panels it may be necessary to consider methods of closing or sealing the edges. Open edges on sandwich panels can be sealed to prevent moisture ingress and Exposed edge areas are a potential weakness in the design as they may be susceptible to local impact Or environmental damage. Edge closures may also provide local reinforcements. attachment points, or simply meet aesthetic requirements.

Edge protection is provided to,

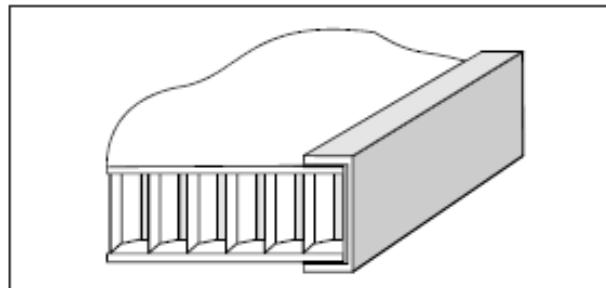
- Prevent Moisture ingress (environmental damage).
- Enhance appearance.
- Avoid damages from external material (local impact).

Based on the requirement, two types of edge protections used for sandwich panel depending on the visibility of the edges,

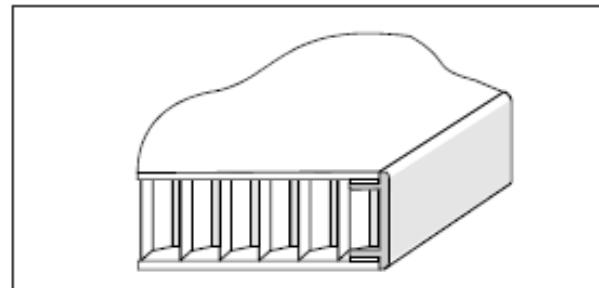
- “Edge epoxy filler” where the edges are not visible
- “Aluminum Edge protector” where the edges are visible

Panel Edge Fill/Edge closure Cut-out

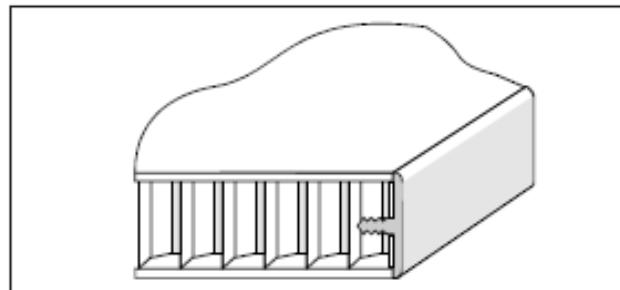
Illustrated are a number of methods commonly used to close sandwich boards



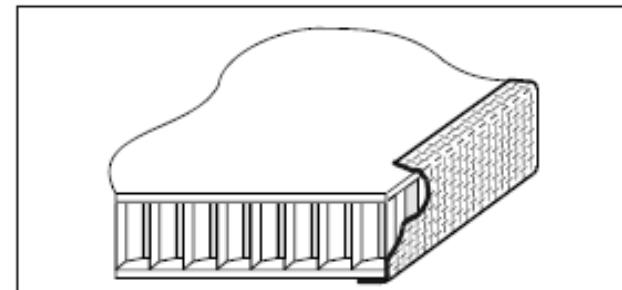
■ Bonded 'U' section



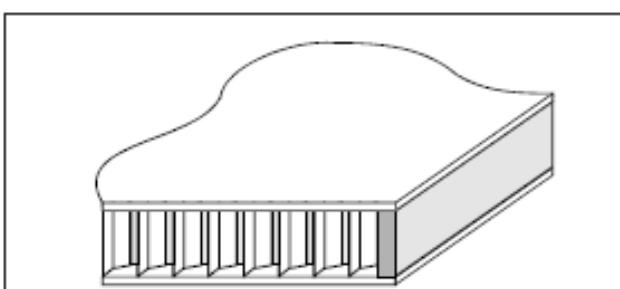
■ Bonded edge closure section suitable for thicker panels



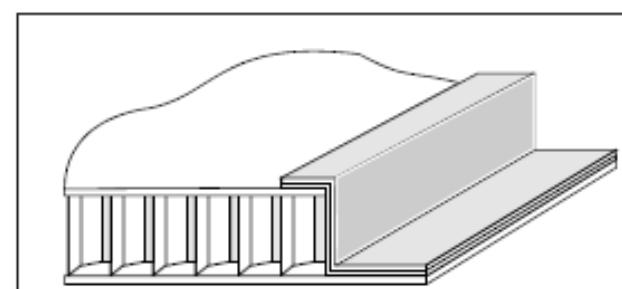
■ Press fit edge closure section, suitable for thinner panels



■ Durable self adhesive tape



■ Edge filler



■ Bonded Z² section

Panel Edge Fill/Edge Closure Cut-out

Bombardier uses edge filling and sealing per BAPS 720-002 type 4a in most of the sandwich composite panels

INTERIOR AIRCRAFT, SEALING, POTTING AND FILLING OF COMPOSITE PANELS

TABLE 1 – EDGE FILLING AND SEALING MATERIALS

TYPE	PART	MATERIAL	USE [1]
TYPE 2	CARBON FIBER FLOOR	ARALDITE 252	F [3]
TYPE 3	ALUMINUM FACING / ALUMINUM CORE	ARALDITE 252	F [3]
	ALUMINUM FACING/BALSA CORE		
TYPE 4	GLASS FIBER FACING / NOMEX CORE	EY-2536A/B	F [3]
	KEVLAR FACING/NOMEX CORE		
TYPE 4A	ALL COMPOSITE SANDWICH PANELS	EC-3505 B/A FR	F
TYPE 5 [2]	BAGGAGE COMPARTMENT (TORONTO PARTS ONLY)	EPOCAST 8623 A/9861, CG 1305 A/B, DYNAMOLD SF14	F
TYPE 6	STRUCTURAL EDGE SEALING, REPAIRS AND SURFACING	ATR-1000	F
TYPE 7	PHENOLIC PART	M603-4108	S
NOTES:			
[1] Resin intended use: F= Filling Agent, S= Sealing Agent			
[2] Refer to BAPS 156-006 for process application			
[3] Product obsolete, do not use for new or revised designs.			

Panel Edge Fill/Edge Closure Cut-out

BAPS 720-002 Type 4a refer to EC-3505 B/A its information given below

3M™ Scotch-Weld™ Structural Void Filling Compound EC-3505 B/A FR

Product Description

3M™ Scotch-Weld™ Structural Void Filling Compound EC-3505 B/A FR is a two-part, low-density, flame-retardant epoxy compound that can be stored, applied and cured at room temperature.

Scotch-Weld EC-3505 B/A FR Compound is a non-sag, non-brittle compound designed for void-filling, edge-sealing/close-out, corner reinforcement, local reinforcement for mechanical fixation and complex gap-filling in honeycomb sandwich structures. The cured materials meet 14 CFR 25.853 (a).

Scotch-Weld EC-3505 B/A FR Compound is available in dual-chamber cartridges and bulk kits for use with pneumatic dispensers and bulk pumping equipment.

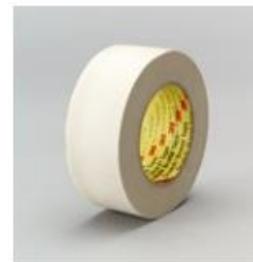
Note:- All 3M products spec and information are available in 3M website



3M™ Glass Cloth Tape
361 White, 1/2 in x 60 yd
7.5 mil, 72 per case Bulk



3M™ Glass Cloth Tape
361 White, 1-1/2 in x 60
yd 7.5 mil, 24 per case
Bulk



3M™ Glass Cloth Tape
361 White, 12 in x 60 yd
7.5 mil, 1 per case Bulk



3M™ Glass Cloth Tape
361 White, 2-1/2 in x 60
yd 7.5 mil, 3 per case



3M™ Glass Cloth Tape
361 White, 6 in x 60 yd
7.5 mil, 8 per case



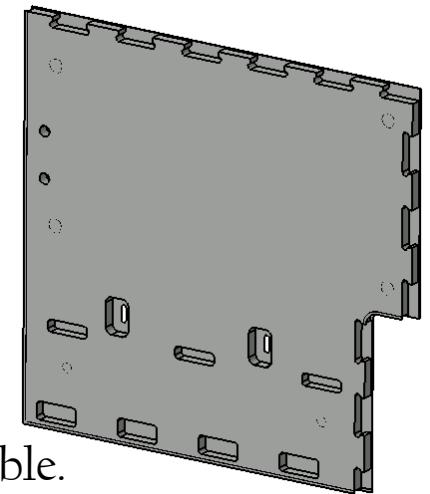
3M™ Thermosettable
Glass Cloth Tape 365
White, 1 in x 60 yd 8.3
mil, 36 per case bulk

Panel Cut-outs and Holes

General Cut-out Rules

The following dimensions (in INCHES) are minimum requirement to meet design.

- Cut-out to edge of panel: Minimum 2"
- Distance between 2 inserts: Minimum 1.25" center to center.
If inserts are not for structural purposes, then 0.85" center to center is acceptable.
- Distance between edge of panel and center of insert: Minimum 0.75"
- The designers shall keep in mind when creating cutouts in panel that the radius should be as great as possible to avoid stress issues.
- Decompression cutout: Cut-out for decompression on the floor and back panel toe kick level use min radius 0.125".

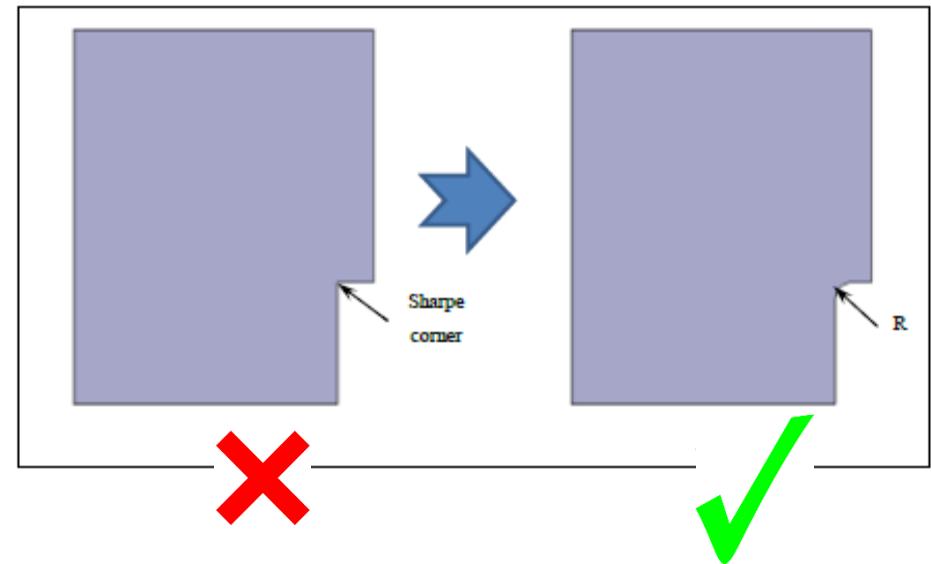
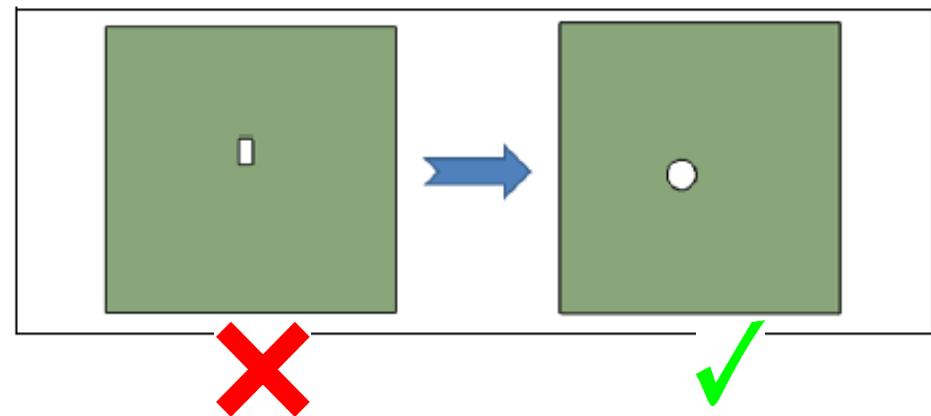
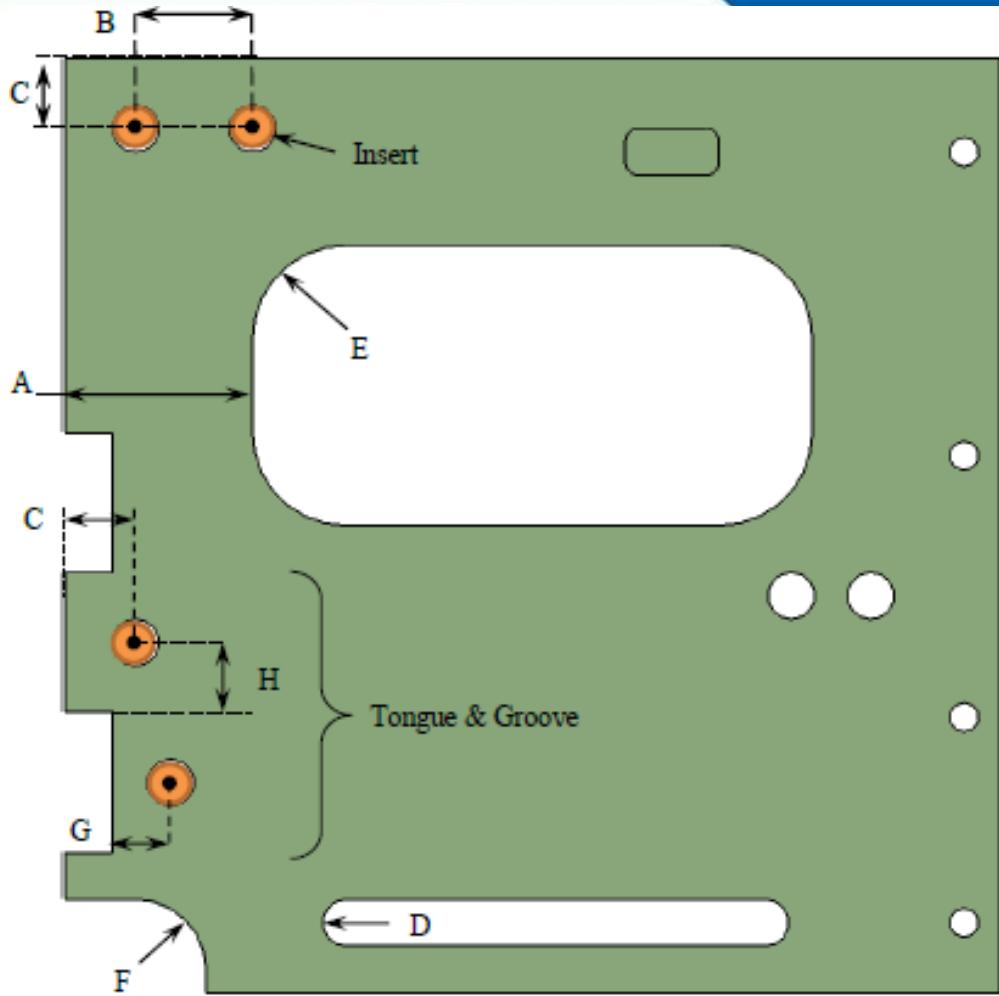


Panel Cut-outs and Holes

- Cut-out in the structural panel (Ex: back panel): min 1" radius.
- Cut-out in the nonstructural panel: min 0.125" radius to ease manufacturing process and meet stress requirements
- Toe-kick panel: Cutout should be oblong whatever possible. If not, a 0.125" cutout is accepted.
- Do not design panels with sharp inner corners.

Also for finished panel, in order to limit Veneer cracking, it is preferred to define cutouts with a minimum 0.250" radius. Minimum inner radius in Veneer can be 0.125" exceptionally.

Panel Cut-outs and Holes



	A	B	C	D	E	F	G	H
Structural	2"	1.25"	0.75"	Min 0.125"	Min 1"	1"	0.625"	0.625"
Non structural		0.85"			0.125"			

Sandwich Panel Joints

Honeycomb sandwich panels are joined using a variety of methods, some of which are listed below:

- Bonding using two-part epoxy adhesives(its can “T” or “L” joints)
- Flat Joining Methods
- Corner Joints(L-Joint)
- 'T' Joints

Bonding using two-part epoxy adhesives

Procedures to be used in the process control of joining panel edges by bonding. The process is specifically for assembly honeycomb Nomex core panels with fiberglass facing.

INTERIOR AIRCRAFT, PANEL EDGES JOINING BY BONDING PROCESS

Edge preparation

Prior to edge preparation, ensure that edges to be joined are free of edge filler.

Panels shall be cleaned as per BAPS 180-009

Panel 1: remove one skin and core of panel by the thickness of panel 2.

For the short edges (shorter than 6 inch long), drill two (2) holes 0.118 + .010 inch diameter at 0.75 inch of edge distance.

For the long edges (longer than 6 inch long), drill holes 0.118 + .010 inch diameter.

The first hole is located one (1) inch from both edges and then a three (3) to four (4) inch pitch.

Panel 1+2: crush core a 1/16 inch deep maximum along the joining edge. Remove the debris & dust using the vacuum device.

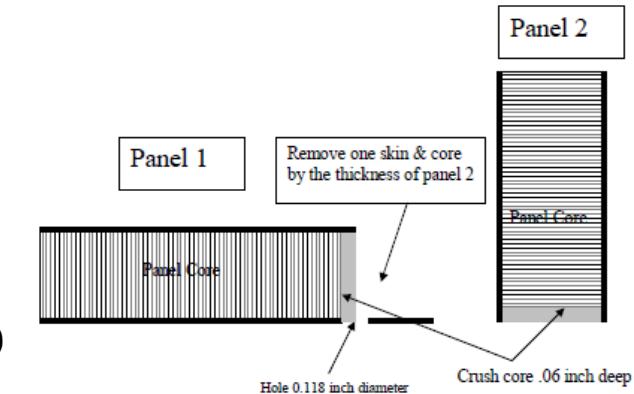


FIGURE 1 – EDGE PREPARATION

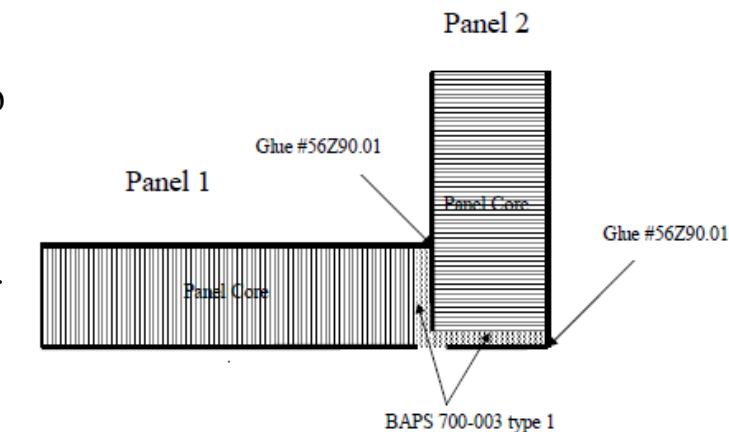
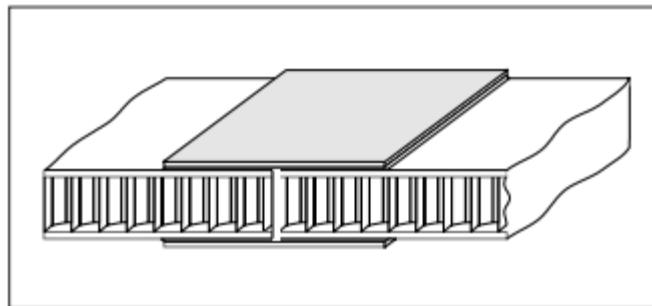


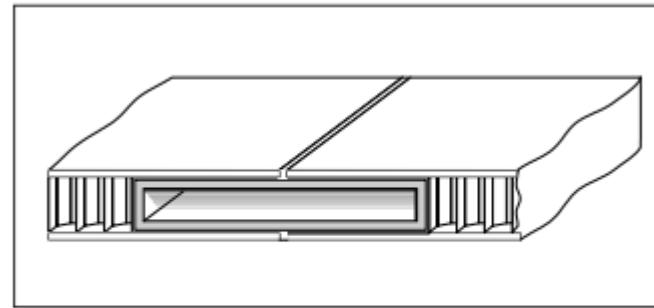
FIGURE 2 – JOINING PROCESS

Flat Joining Methods

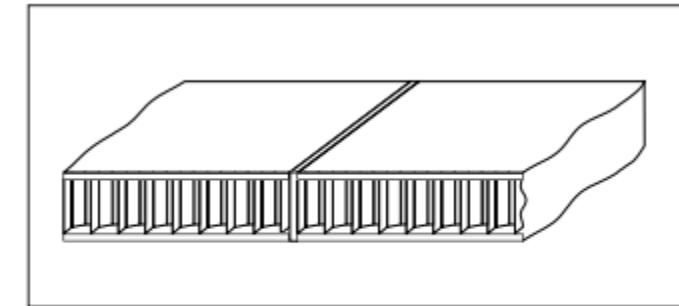
Honeycomb sandwich panels are Flat joined using a variety of methods, some of which are illustrated:



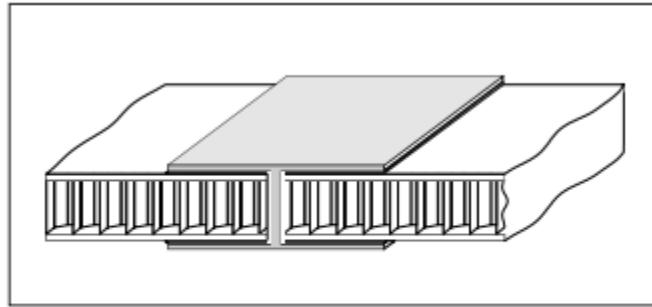
■ Bonded face supported butt joint.



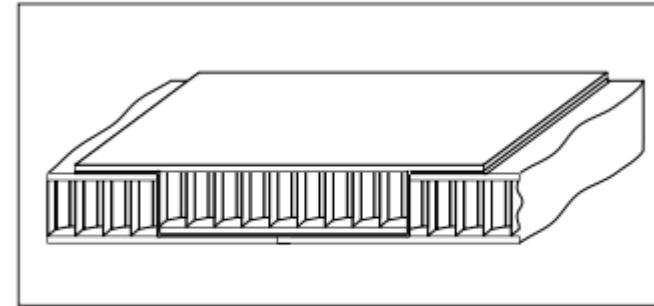
■ Flush faced bonded joint, supported by a special internal extrusion (or wood block) - for volume production.



■ Flush faced all bonded butt joint - for non-structural applications. Care must be taken to ensure flatness across the joint.



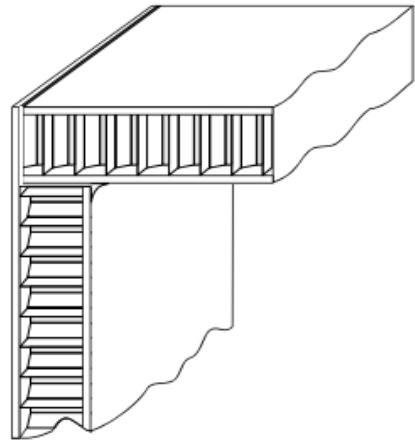
■ Bonded butt joint using 'H' section extrusion for volume production.



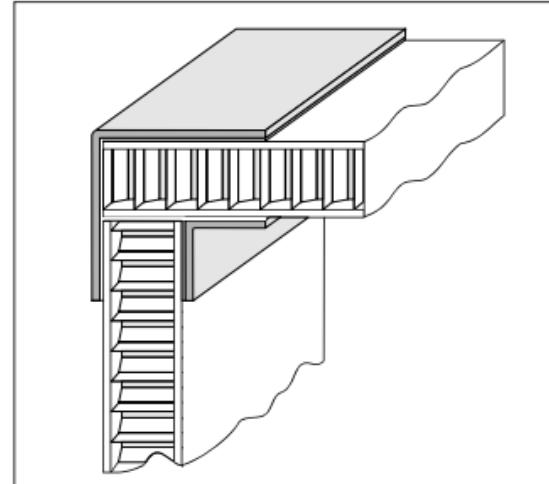
■ Panel section insertion method, using same panel material.

Corner Joints(L-Joint)

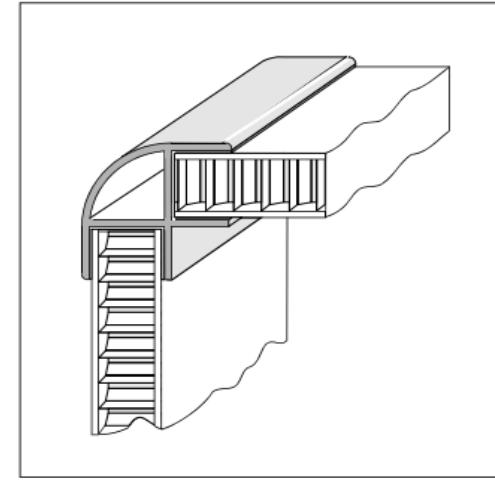
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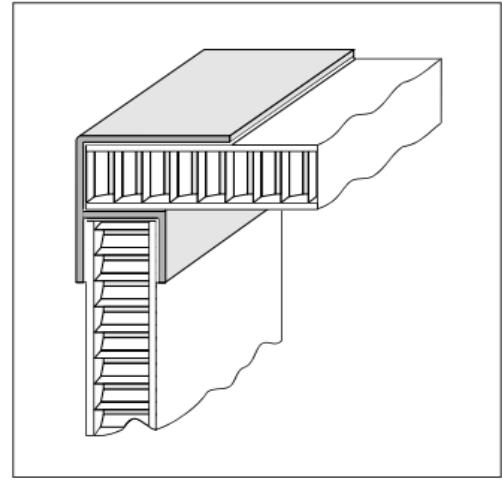
■ Rebated and bonded. Low strength, and can be difficult to



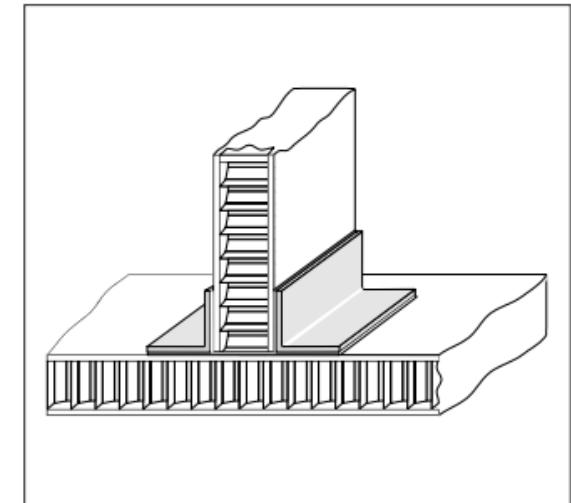
■ Supported by bonded L-section extrusions.



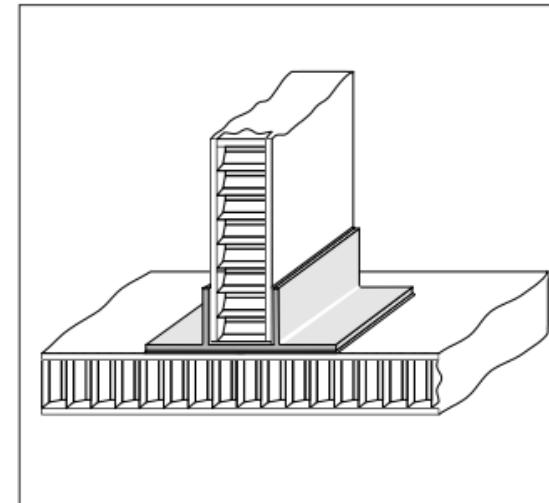
■ Use of special extrusion, for volume production of rounded corners



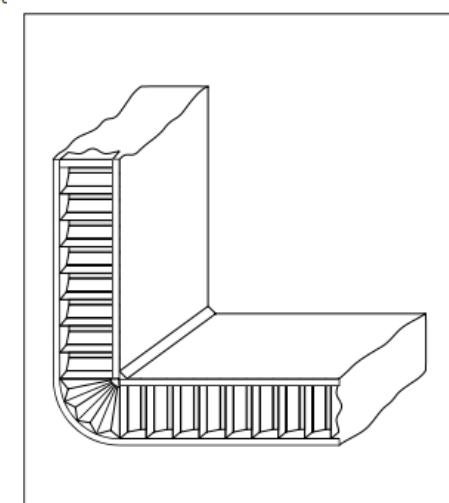
■ Use of special extrusion, for volume production of square corners



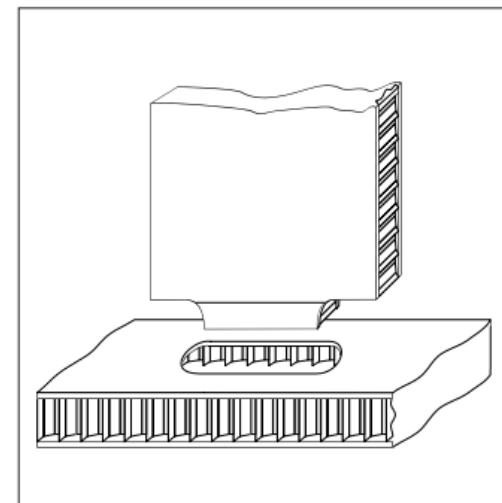
■ Joint supported by bonded L-sections.



■ Joint supported by special bonded extrusion - for volume production.



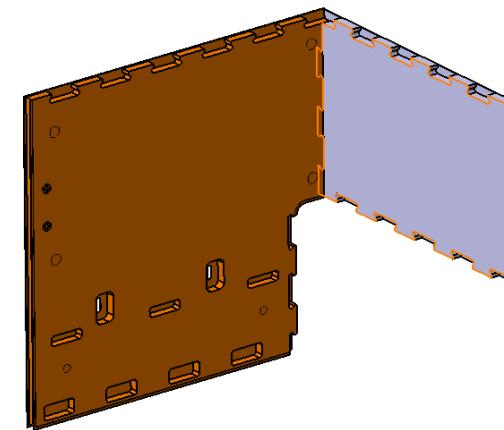
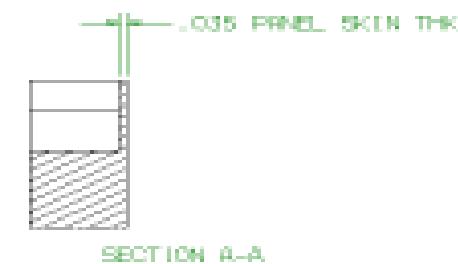
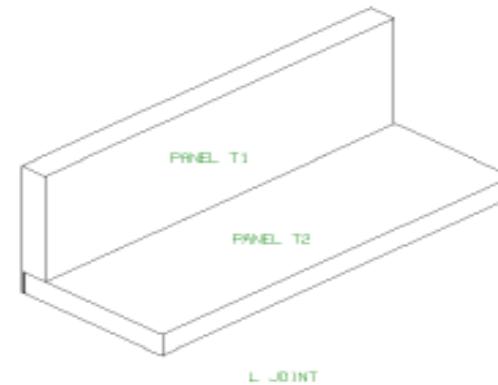
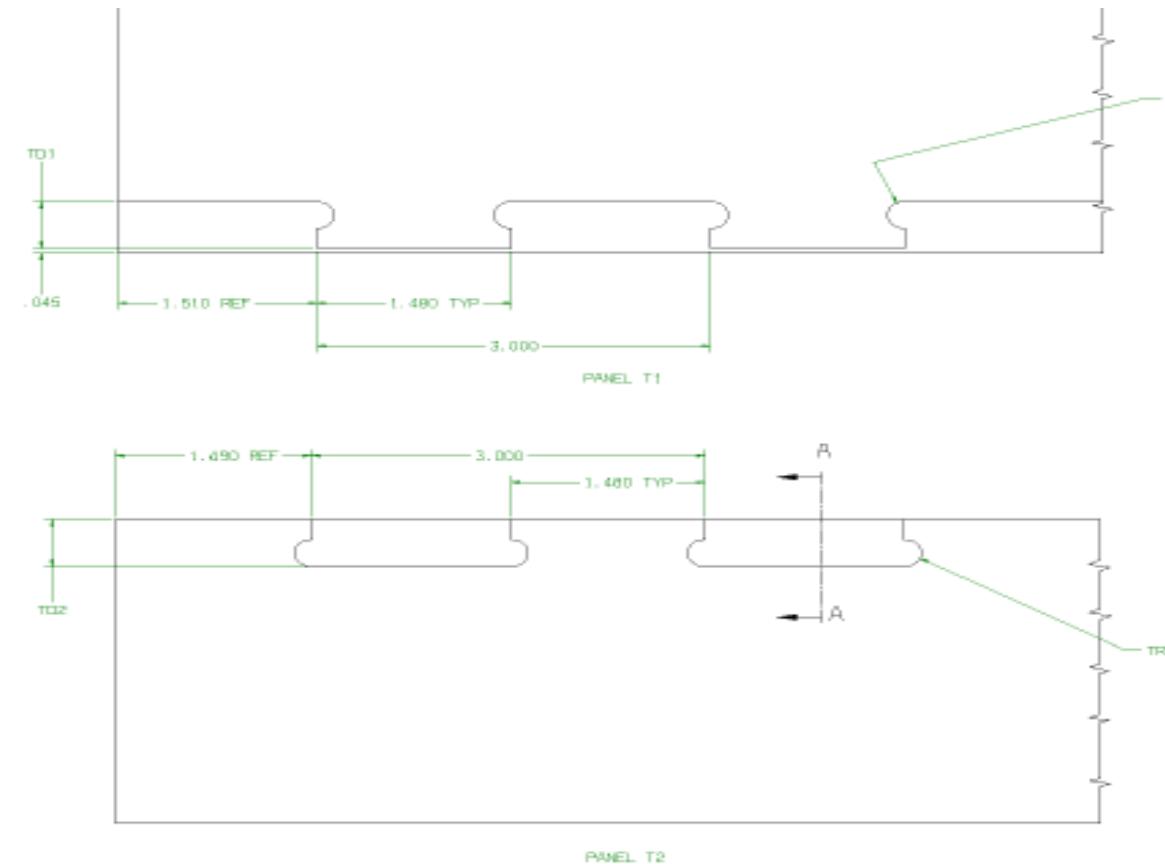
■ Cut, folded and bonded corner joint for clean radius edges.



■ Self jigging "tongue and groove" method joint.

Design Consideration of L-Joint

Deisgn Consideration for T&G feature in Panel



PANEL T1 PARAMETERS
TD1 = TENON DEPTH
TR1 = TENON RADIUS

= NOMINAL THICKNESS OF T2 PANEL = .035 INCH
= .130 INCH WHEN PANEL T2 THICKNESS > .250 INCH
= .065 INCH WHEN PANEL T2 THICKNESS ≤ .250 INCH

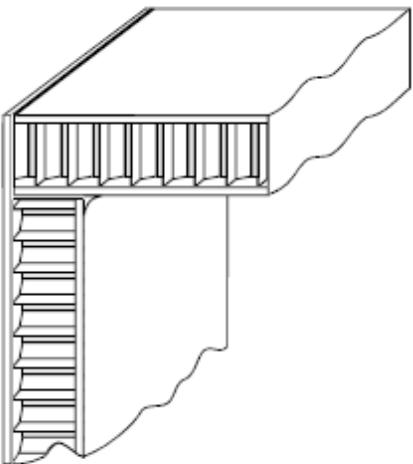
PANEL T2 PARAMETERS
TD2 = TENON DEPTH
TR2 = TENON RADIUS

= NOMINAL THICKNESS OF T1 PANEL = .035 INCH
= .130 INCH WHEN PANEL T1 THICKNESS > .250 INCH
= .065 INCH WHEN PANEL T1 THICKNESS ≤ .250 INCH

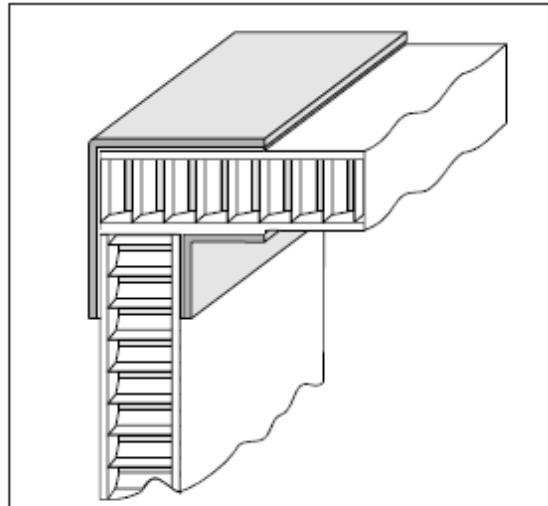
ALL TOLERANCES ARE ±0.010 INCH

'T' Joints

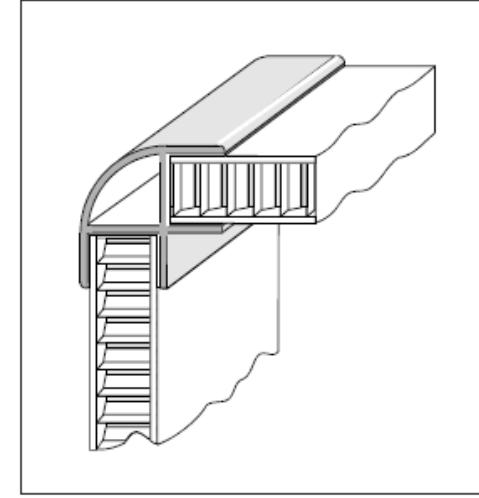
Honeycomb sandwich panels are T- joined using a variety of methods, some of which are illustrated:



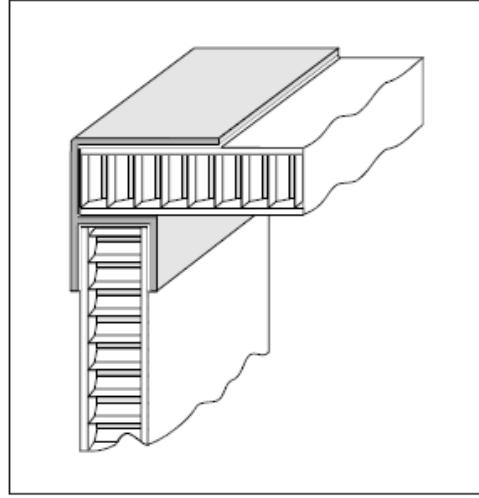
■ Rebated and bonded. Low strength, and can be difficult to make square.



■ Supported by bonded L-section extrusions.



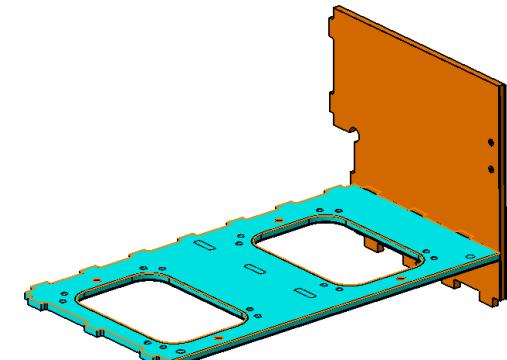
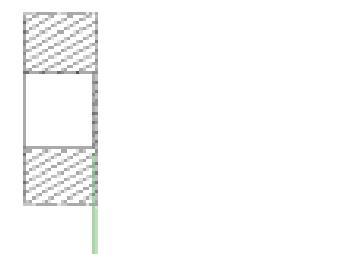
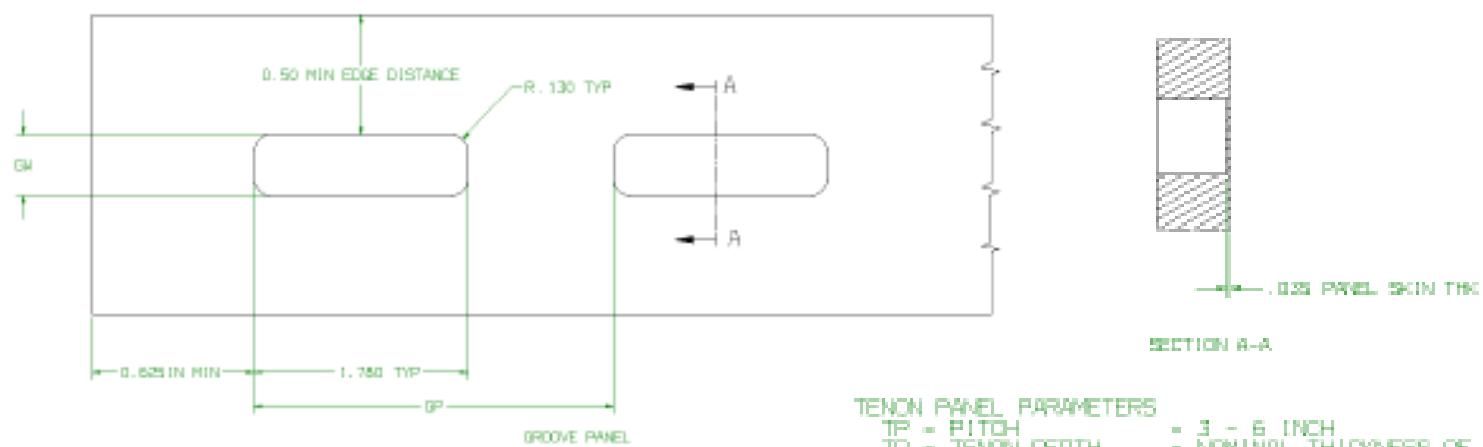
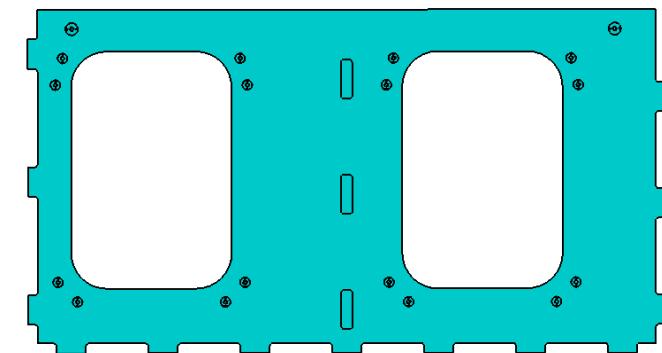
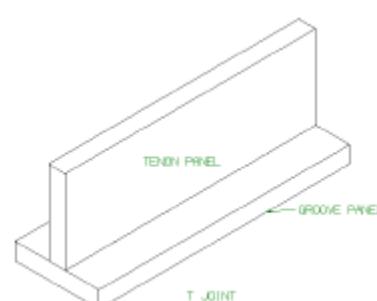
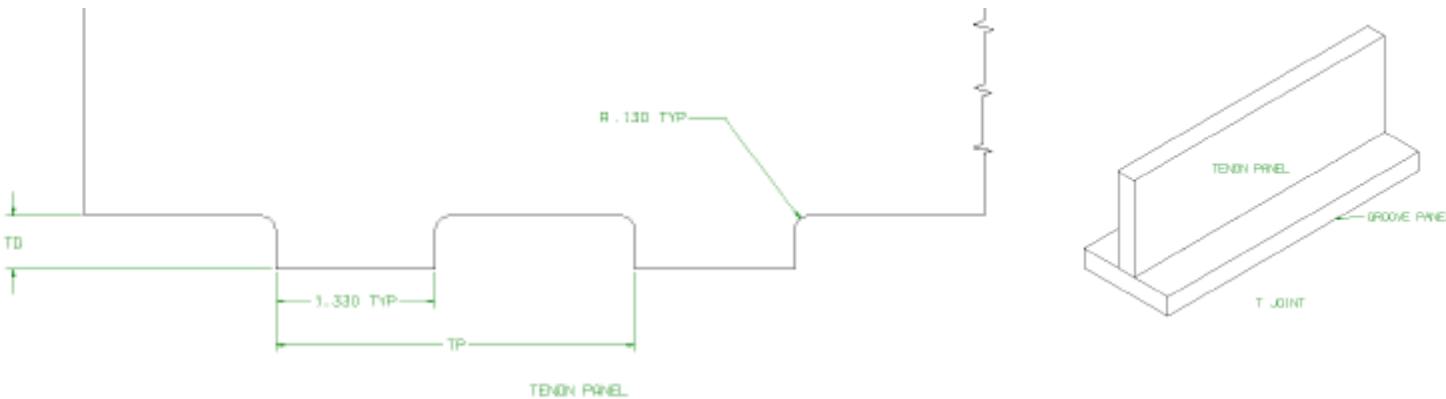
■ Use of special extrusion, for volume production of rounded corners.



■ Use of special extrusion, for volume production of square corners.

Design Consideration of T-Joint

Deisgn Consideration for T&G feature in Panel



TENON PANEL PARAMETERS

- TP = PITCH = 3 - 6 INCH
- TD = TENON DEPTH = NOMINAL THICKNESS OF GROOVE PANEL + 0.010 INCH

GROOVE PANEL PARAMETERS

- GP = GROOVE PITCH = 3 - 6 INCH
- GW = GROOVE WIDTH = NOMINAL THICKNESS OF TENON PANEL + 0.010 INCH

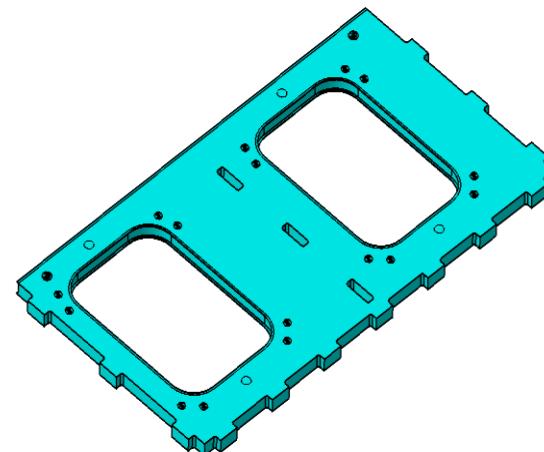
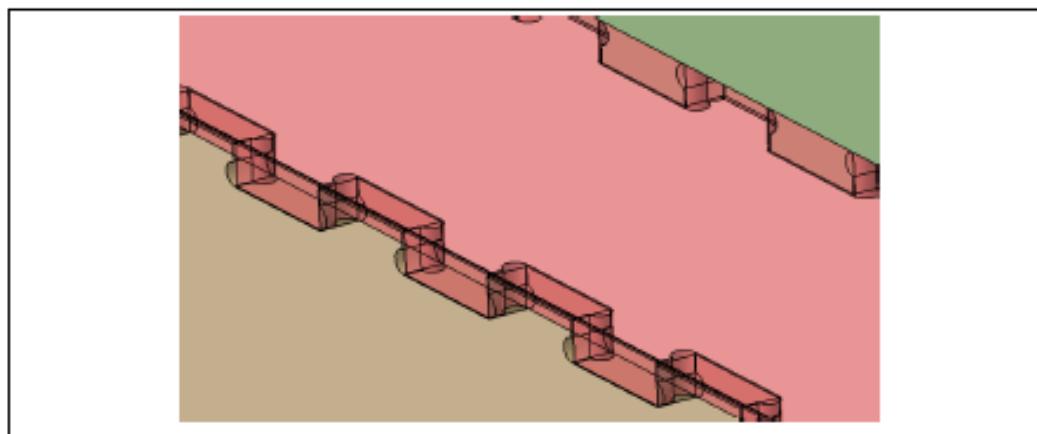
ALL TOLERANCES ARE ± 0.010 INCH

Design Consideration of Tongue and Groove

The tongue & groove joint is the preferred process to bond panels together. Use the Tongue & Groove (T&G) tools for 3D definition.

Before using tongue & groove, the designer shall take into consideration several rules:

- The width of the panel cannot be less than 3". Use pins under 3" width of panel
- Only perpendicular joints can use T&G process. Angled joints must use pins.
- Finish materials such as veneer, laminate, etc. shall not be included in T&G joints.



Design Considerations of Tongue and Groove

Note :- Assemble the panels and secure in place. Ensure the panels are bottomed out against one another as shown in Figure 4. A maximum gap of 0.005" is permissible between the panels provided engineering and drawing tolerances and dimensions are met.

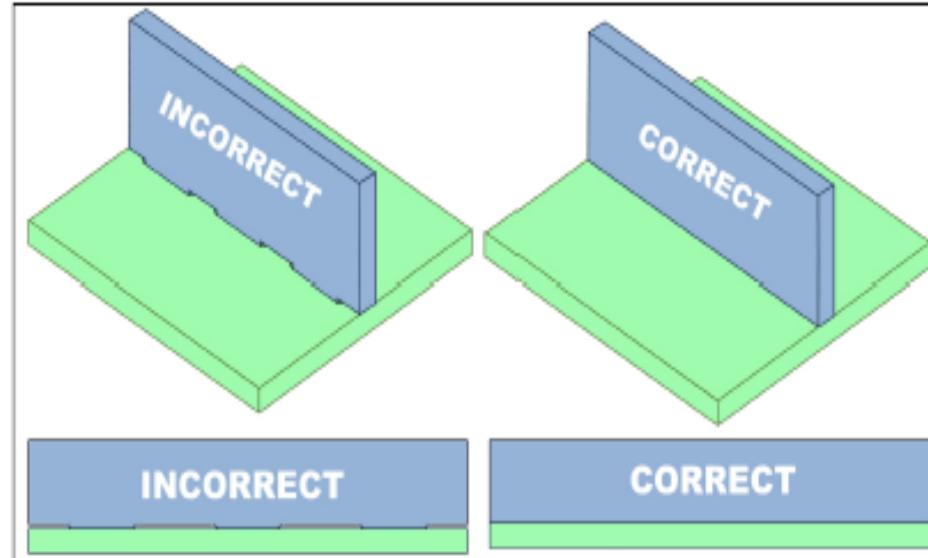
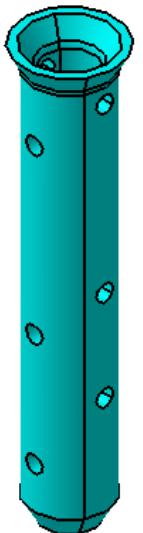


FIGURE 4 – PANEL ASSEMBLY

Design Consideration for PINS feature in Panel

Pins are used to joint panels together when Tongue & Groove is not appropriate, such as for angled joints and narrow panels (width ≤ 3in). When using pins to attach panels, the pin shall always be selected according to inner panel thickness.

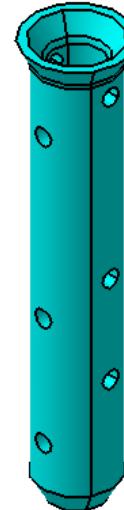
The following rules should be respected for composite panel's pin installation:



- A pilot hole of 0.098" must be represented in 3D
- For panel's lengths greater than 6", the edge distance should be 1" for blue and gold pin and 1.25" for red pin.
- The pitch between centers of two consecutive pins is 4" to 5".
- For panel's lengths between 2.5" and 6" only two pins should be installed with a minimum edge distance of 0.75".

Design Consideration for PINS feature in Panel

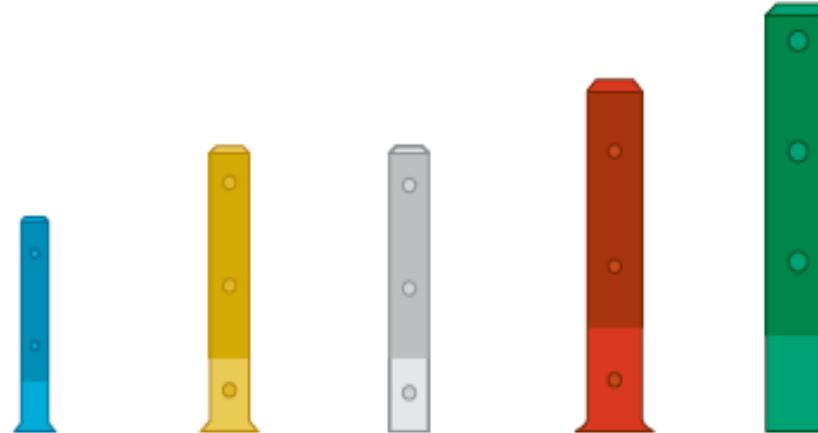
- The minimum distance between the center of pin and the center of insert shall be 1.25" (C in Table 10) when pin and insert are on the same plane.
- The minimum distance between the center of pin and the center of insert shall be 1" (D & E in Table 10) when pin and insert are perpendicular plane.
- The pin shall always be parallel to the inner panel skin.



Design Consideration for PINS feature in Panel

PINS information from ATR Spec

Selector Guide

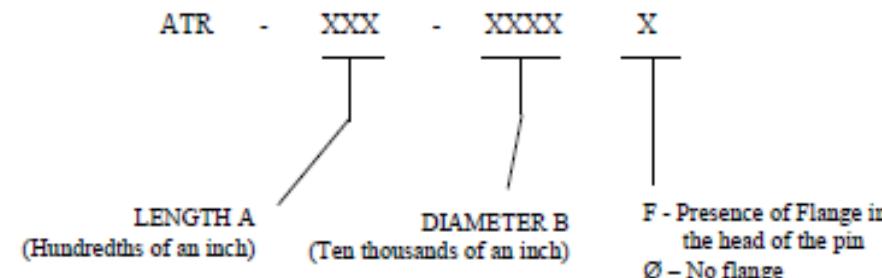


Part Number	ATR-150-1875F	ATR-200-3125F	ATR-200-3125	ATR-250-4375F	ATR-300-5000
Length	.15"	2"	2"	2.5"	3"
Diameter	.1875"	.3125"	.3125"	.4375"	.5"
Wall Thickness	.035"	.035"	.035"	.065"	.065"
Material	6061-T6	6061-T6	6061-T6	6061-T6	6061-T6
Weight lbs.	.0022	.0057	.0097	.0175	.0287
Installed Weight lbs.	.210	.0372	.0412	.0705	.0897
Panel Thickness Range	.25" through .43"	.5" through 1"	.5" through 1"	.75" through 1"	.43" through 1"
Inset Part Number	None	None	ATR-TI-40	None	ATR-TI-50
Inset Material	N/A	N/A	Stainless Steel	N/A	7075-T6
Insert Thread Size	N/A	N/A	-4 is -4	N/A	-3 is 8-32
					-4 is 10-32
					-5 is 1/4-28
Hole Size	.1875"	.3125"	.3125"	.4375"	.5"
Drill Bit Size	3/16"	5/16"	5/16"	7/16"	1/2"
Test Pin Number	PPT-210-104-101	PPT-210-103-101	N/A	PPT-210-103-101	N/A
Minimum Edge Distance	.75"	.75"	.75"	1.25"	1.25"
Recommended Adhesive	ATR-525	ATR-525	ATR-525	ATR-525	ATR-525
Quantity 8 oz. Tubes/100	3.75 – 8 oz. Tubes	6.3 – 8 oz. Tubes	6.3 – 8 oz. Tubes	10.6 – 8 oz. Tubes	12.2 – 8 oz. Tubes

Design Consideration for PINS feature in Panel

ATR PINS Information

9.2.2 ATR Pins Parts Numbers Nomenclature



Example: ATR - 200 - 3125F

Flanged pin, .3125 inch diameter, 2.00 inch long.

9.2.3 Dimensions

Scheme and dimensions of fasteners are shown in Figure 2, Figure 3 and Table 1.

FIGURE 2 PANEL PINS SCHEMES

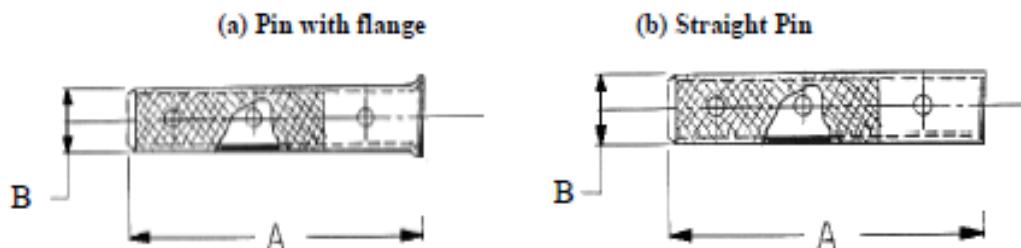


FIGURE 3 INSERT SCHEMES



TABLE 1 FASTENER DIMENSIONS

TYPE	PART No	COLOR	MATERIAL	DIMENSIONS (inch)	
				A	B
Pin	ATR-150-1875F	BLUE	Aluminum 6061-T6	1.500	0.187
	ATR-200-3125F	GOLD		2.000	0.312
	ATR-200-3125			2.500	0.437
	ATR-250-4375F	RED		3.000	0.500
	ATR-300-5000	GREEN			
Insert	ATR-TI-40-4 ⁽¹⁾	BLACK	Hardened Steel	0.625	0.217
	ATR-TI-50-X ⁽²⁾	(2)	Aluminum 7075-T6	0.625	0.343

⁽¹⁾ Inside Thread is 8-32
⁽²⁾ X refers to inside thread: -3 is 8-32 (Blue)
-4 is 10-32 (Gold)
-5 is 1/4-28 (Red)

NOTA:

Hard anodized panel pins may also be used for graphite panels

- STD-910-010-101 is hardcoated version of ATR-150-1875F
- STD-910-010-011 is hardcoated version of ATR-200-3125F

Design Consideration for PINS feature in Panel

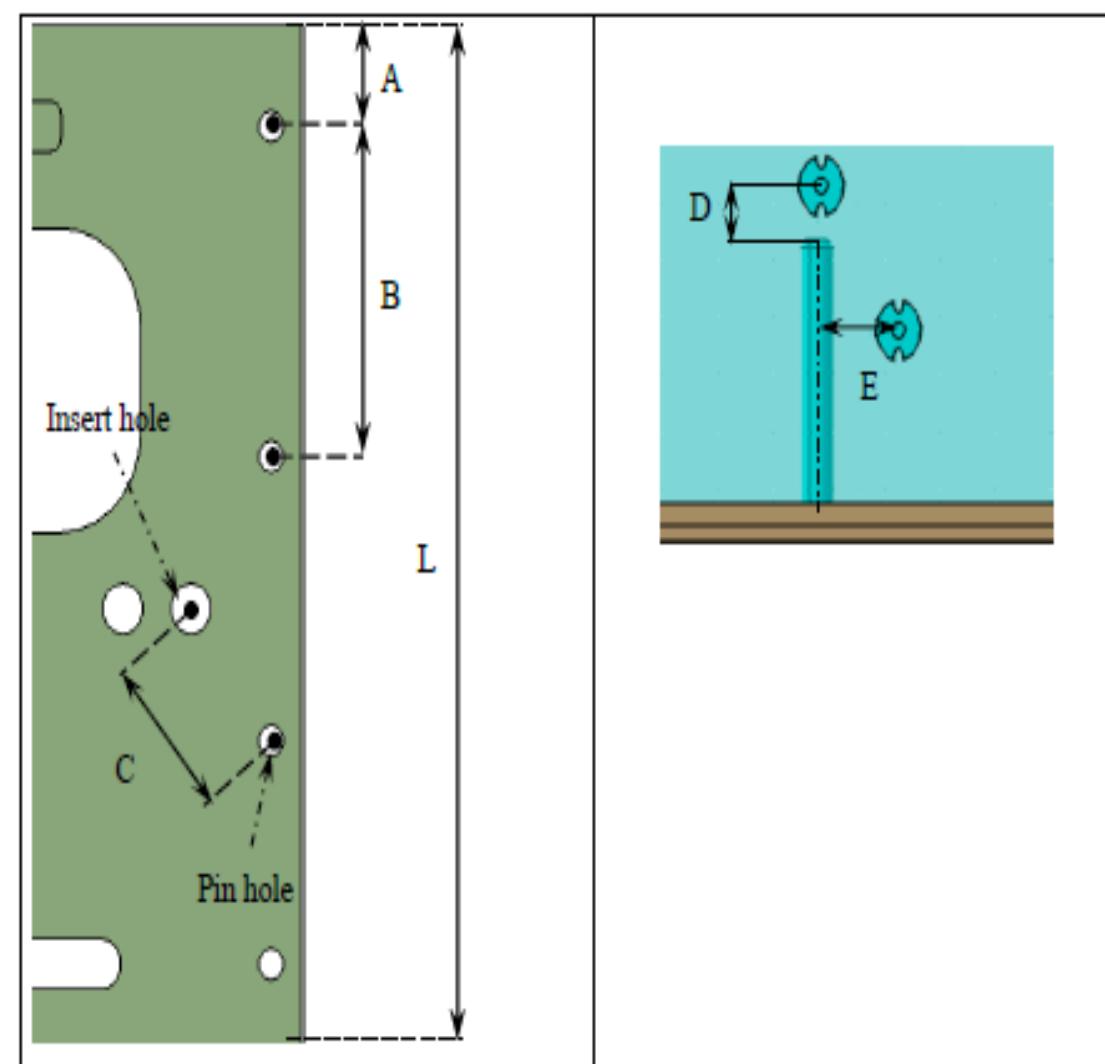
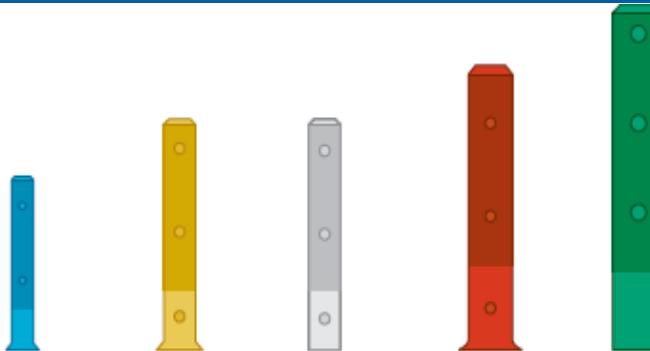


FIGURE 30 – PIN INSTALLATION



PIN TYPE	PART NUMBER	PIN TYPE	
Blue	ATR-150-1875F	Red	ATR-250-4375
Gold	ATR-200-3125	Pin-Insert	ATR-2003125

TABLE 6 – PIN SELECTION

Panel length	Pin	A	B	C	D	E
$L \geq 6"$	Blue	Min 1"	4 to 5"	1.25"	1"	1"
	Gold					
	Red					
$2.5" \leq L \leq 6"$	Blue	Min 0.75"	Max 2 pins	1.25"	1"	1"
	Gold					
	Red					

TABLE 10 – PIN INSTALLATION

Design Consideration for PINS feature in Panel

Pins Selection

9.2.4 Pin selection

The choice of the pin in an assembly is determined according to the INNER panel no matter the configurations of panels as shown in Figure 4 and Table 2.

FIGURE 4 INNER PANEL VS JOINT INSTALLATION

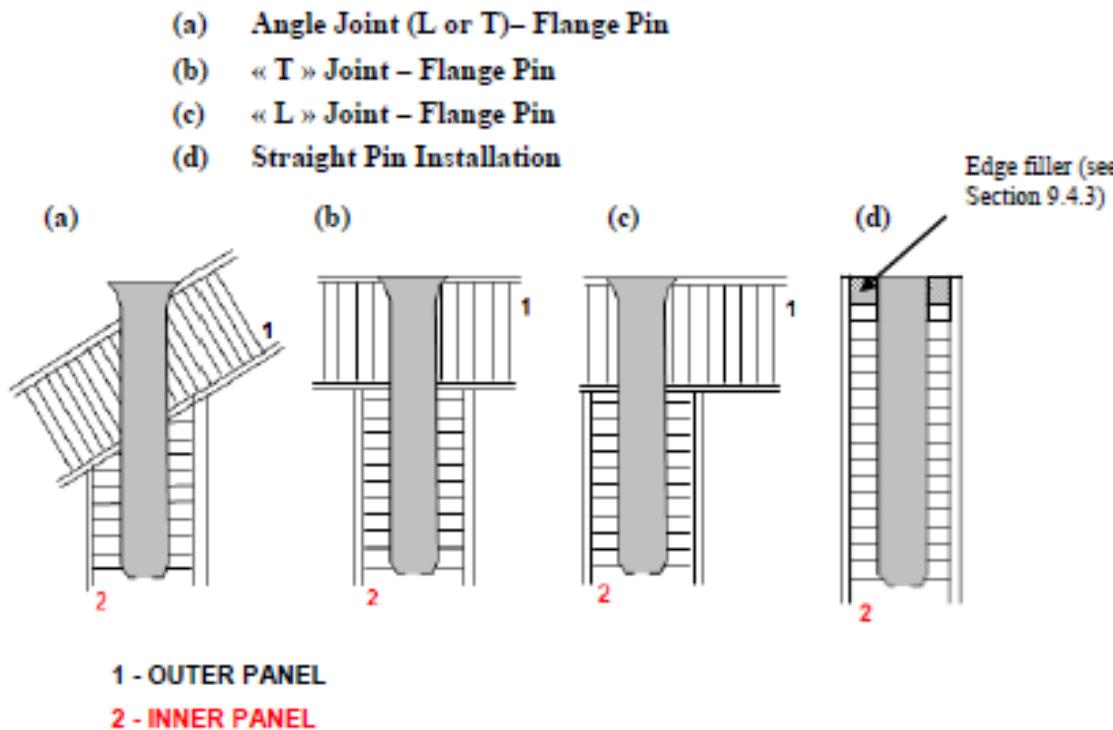


TABLE 2 SELECTION PIN IN ASSEMBLY

PART NO	THICKNESS OF INNER PANEL (inch)
ATR-150-1875F	0.250 - 0.499
ATR-200-3125F	0.500 - 0.749
ATR-200-3125	
ATR-250-4375F	0.750 - 1.000
ATR-300-5000	

Joining the Panels by Metal Parts

Metal parts are used for connecting elements together as well as for aesthetical purposes. The main metal used is aluminum alloy 2024 under different shapes (sheet, extrusion, plate) but aluminum alloy 6061 and 7075 can be used for specific applications. When creating a metallic part such as a bracket, it is preferred to use sheet metal part rather than an extrusion for cost purpose.

Stainless steel, brass, copper and titanium can also be used in some particular cases.

The Table 2 and Table 3 gives information regarding metal to be used in cabinets.

Form	Alloy	Final Condition	Material Specification
Sheet	2024	T3	AMS QQ-A-250/5
	6061	T6	AMS 4027
Extrusion - Angle	2024	T3511	AMS QQ-A-200/3
Extrusion - Bar	2024	T3511	AMS QQ-A-225/6
Plate	2024	T351	AMS QQ-A-250/4
Structural metallic part	7075	T7351	AMS-QQ-A-250/12
	7475	T7351	AMS 4202

TABLE 2 – PREFERRED ALUMINUM

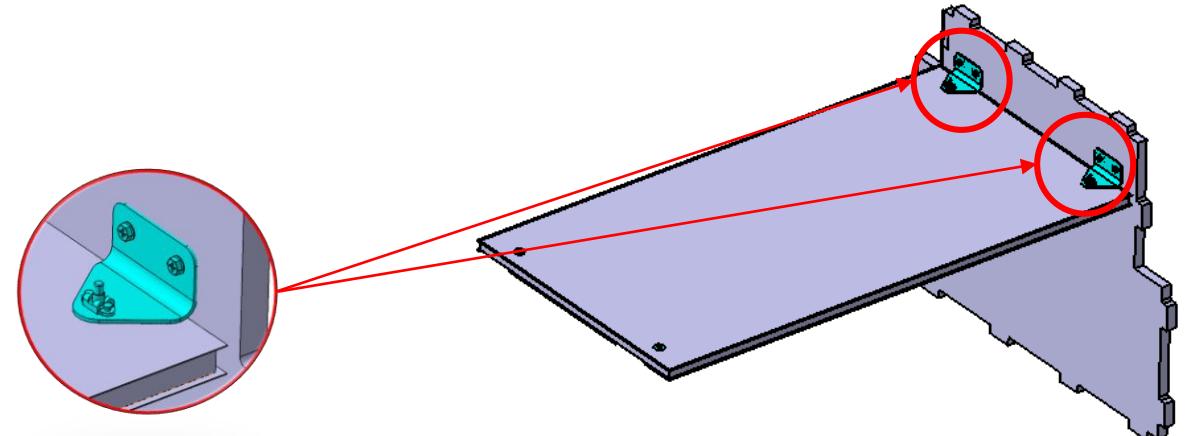
Steel, Low Alloy	Product name	Material spec	Additional info
Steel Sheet, Strip, and Plate 0.95Cr - 0.20Mo (0.28 - 0.33C) (SAE 4130) - UNS G41300	AMS 6350	AMS 6348	Can be ordered normalized or tempered to specified Tensile strength per BAPS 168-014
Steel, Bars 0.95Cr - 0.20Mo (0.28 to 0.33C) (SAE 4130) Normalized - UNS G41300			
Corrosion resistant steel Alloys			
CRES 321 (Bar/ Wire)	AMS 5645	AMS 5510	For general purpose
CRES 321 (Sheet/ Plate)	AMS 5901		
CRES 301 (Annealed), 75 ksi (Sheet/ Plate)	AMS 5659	AMS 5862	Where "spring effect" is required For magnetic applications
CRES-PH 15-5 (Bar)	AMS 5862		

TABLE 3 – PREFERRED STEEL

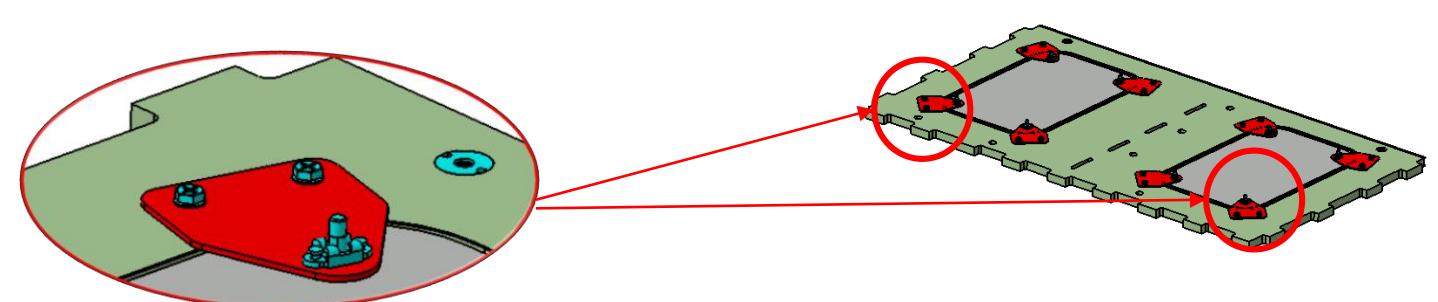
Note :- All metal parts must be designed in order to satisfy technical requirement but also with a focus on weight reduction. For sheet metal parts, it is highly recommended to use 0.040" or 0.050" thick sheet metal.

Joining the Panels by Metal Parts

- L-Angle used to join two panel



- Flat Sheetmetal part used to join two Panels



Design Consideration for Metal Parts

4.2.7 Metal part - edge distance & hole size

4.2.7.1 Edge Distance

For metallic parts, edge distance shall be respected when a hole is drilled to install a fastener, either a screw or a rivet.

D = hole diameter	Screw	Rivet
A	2D	
B (pitch)		Min 4D , Max 6D

TABLE 12 – METAL PART EDGE DISTANCE

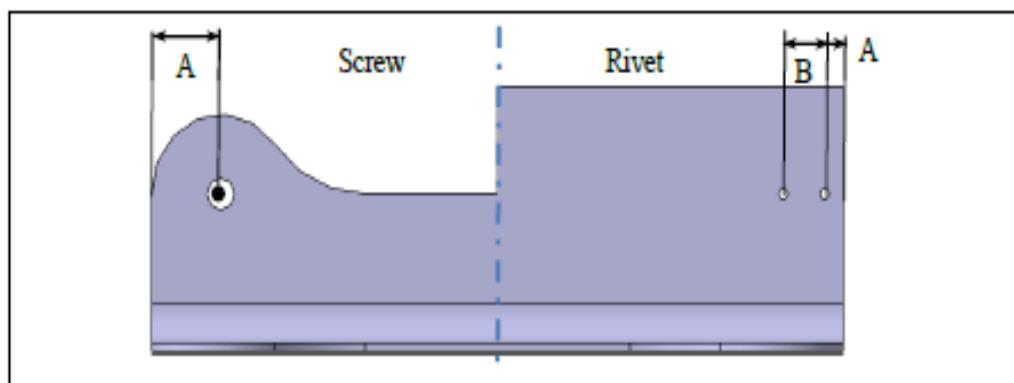


FIGURE 19 – METAL PART EDGE DISTANCE

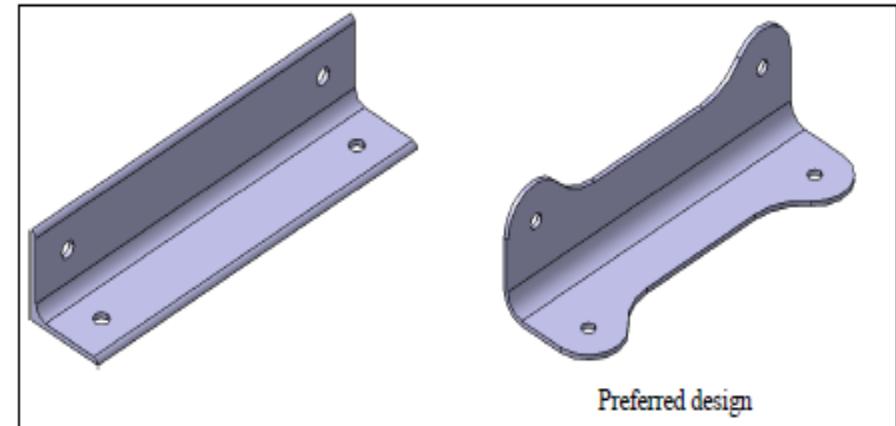


FIGURE 20 – PREFERRED DESIGN FOR A BRACKET

When designing sheet metal part, make sure to properly set the flange definition as most of Bombardier parts are brakeformed.

Part(insert) in Panel

When a part needs to be inserted inside a panel between two skins or with one skin removed, the thickness of the inserted part should be as per Table IV:

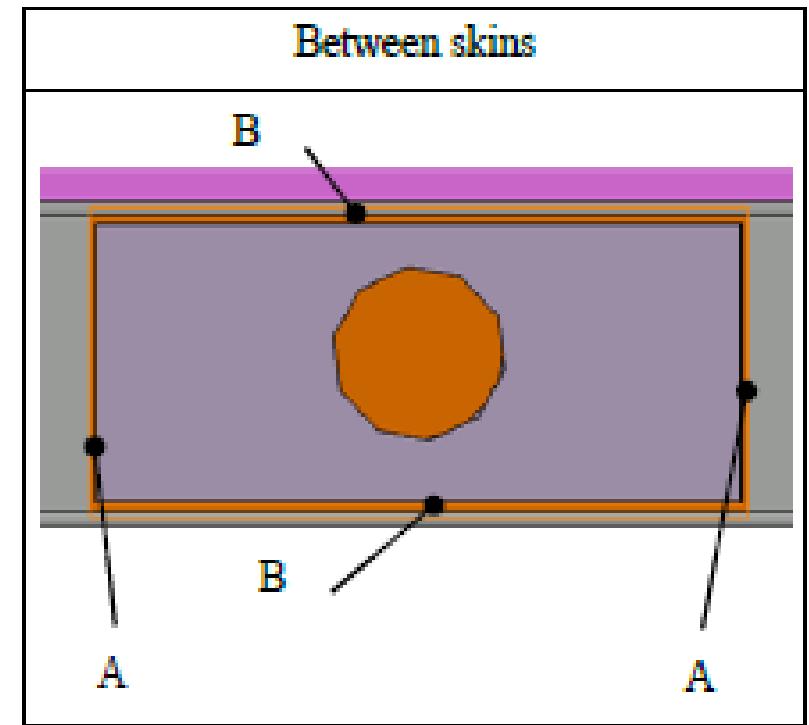
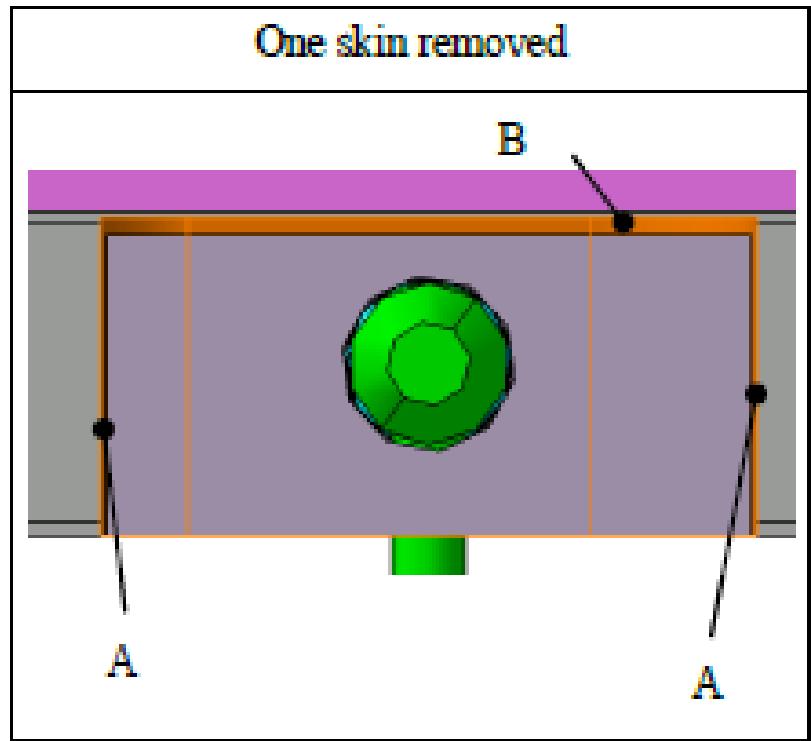
	Between two skins	One skin removed
Panel	<u>BAMS 831-004 Type 1</u>	Panel thk – 0.070"
	<u>BAMS 831-004 Type 2</u>	Panel thk – 0.035"
	<u>BAMS 831-010</u>	Panel thk – 0.085"

TABLE IV – CUTOUT FOR INSERTED COMPONENT IN HONEYCOMB PANEL

The inserted part can be a metallic part or made from PEI (BAMS 860-001) or foam (BAMS 832-001) shall be bonded as defined in section 4.1.3.

Part(insert) in Panel

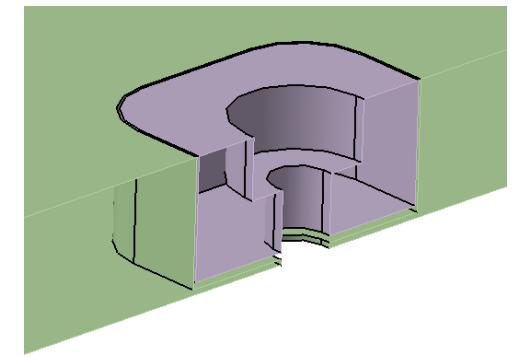
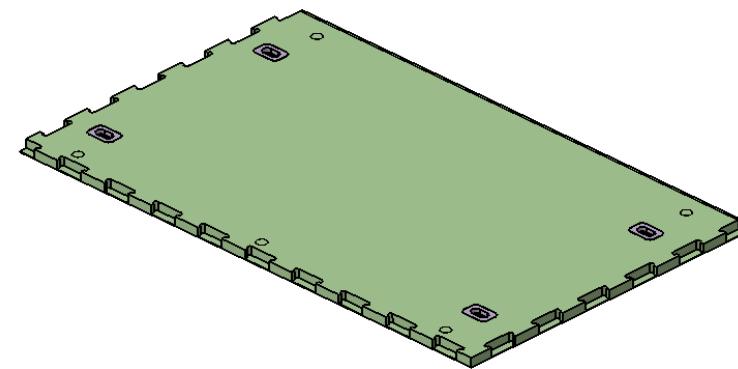
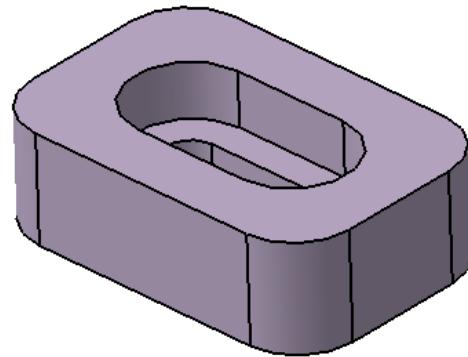
3D representation should be as follow with a gap “A” equal to 0.010” and gap “B” indicated in Table IV.



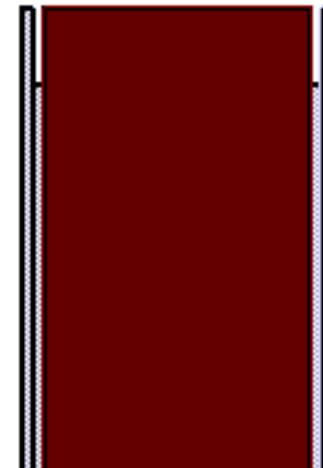
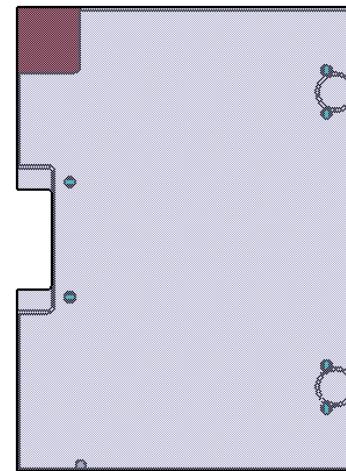
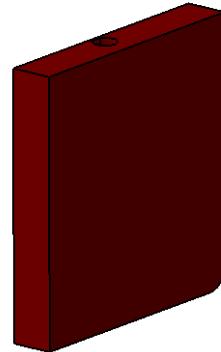
Part(insert) in Panel

Example of Part(insert) in Panel

One skin removed



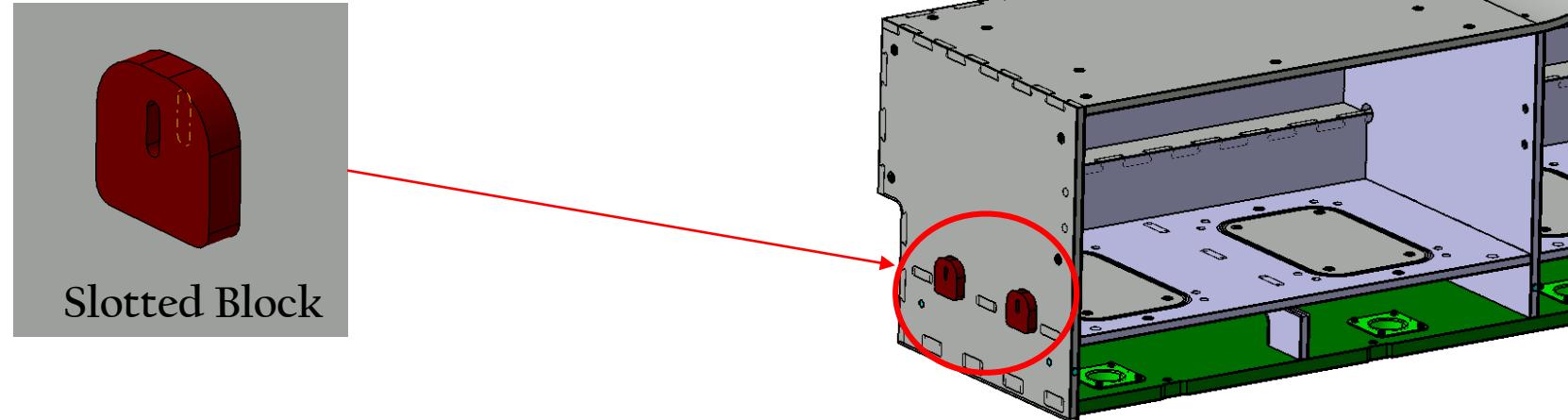
Part Between skins



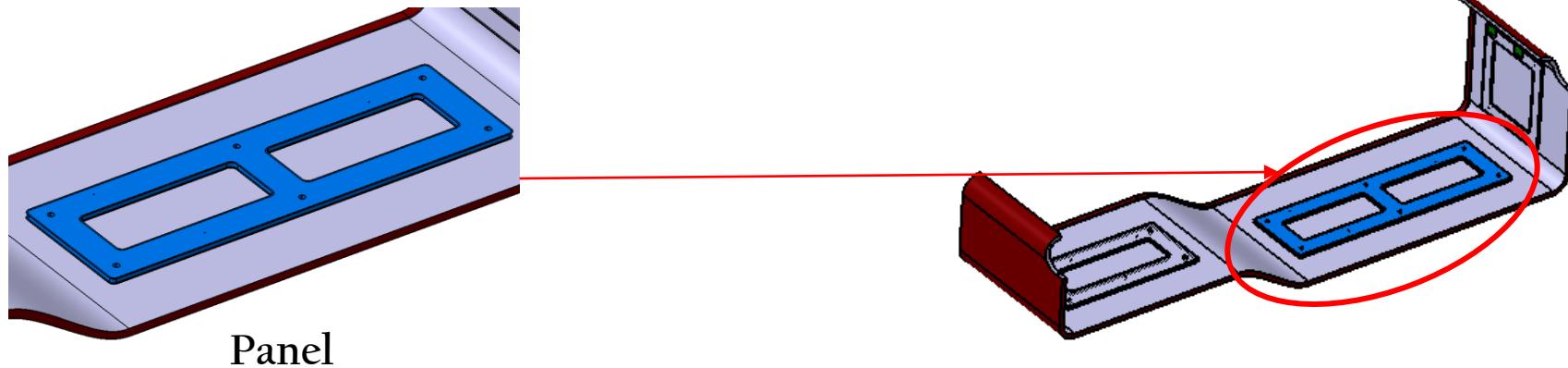
Parts Bonding to Panels

Below is an example where Glue or Adhesive is used to join Slotted Block and composite panel or between two composite panels.

Example 1

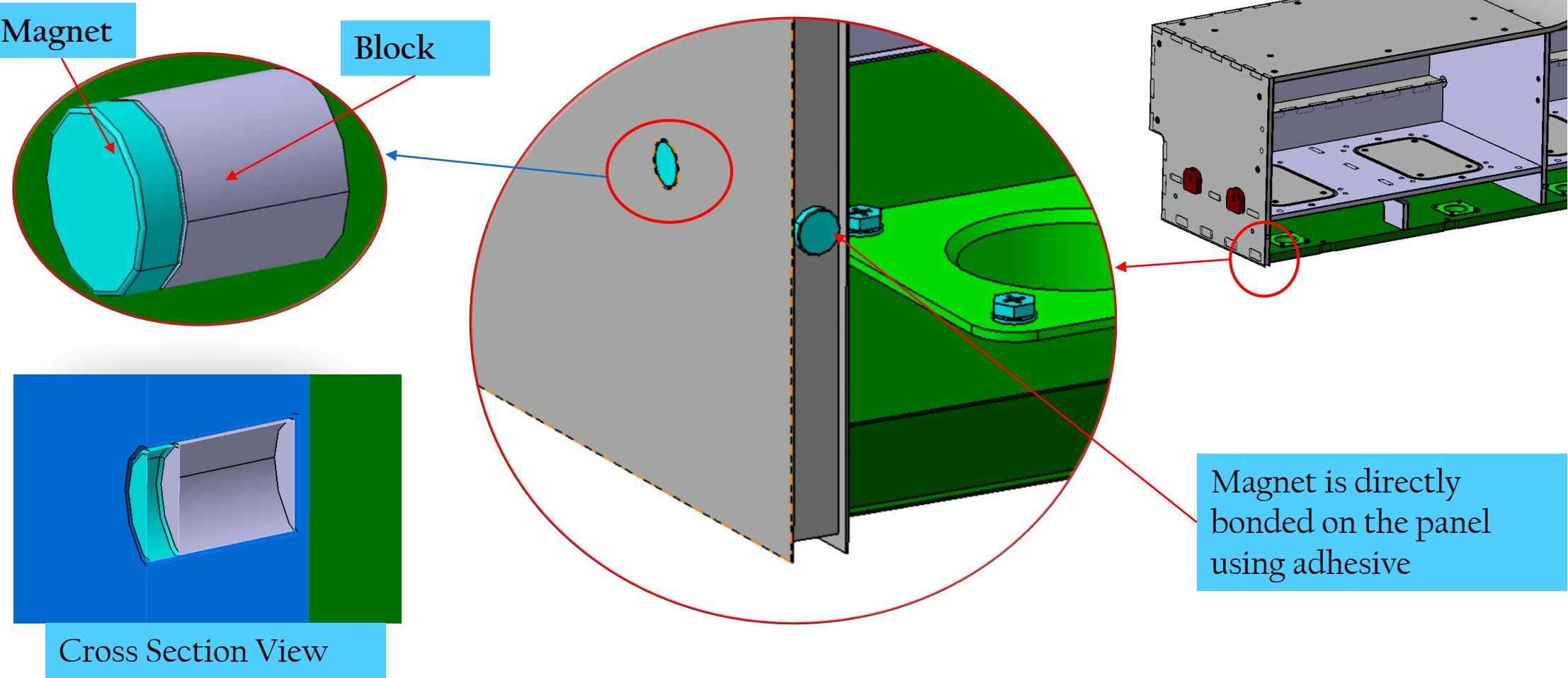


Example 2



Magnet Part Attachment

Magnets are attached to Composite Panel by means of glue by directly applying glue on the Panel or by using a Block as support to hold the Magnet(See Below images)



Shelves

There are two Types of Shelves. One is Adjustable Shelf and other one is Removable Fix Shelf

- Adjustable Shelves

An adjustable shelf is composed of a panel with a removable molding and latches. This assembly can be relocated at preset locations in the cabinet.

The sides and top of the adjustable shelf which are highlighted are covered in finish material while the bottom of the panel is painted.

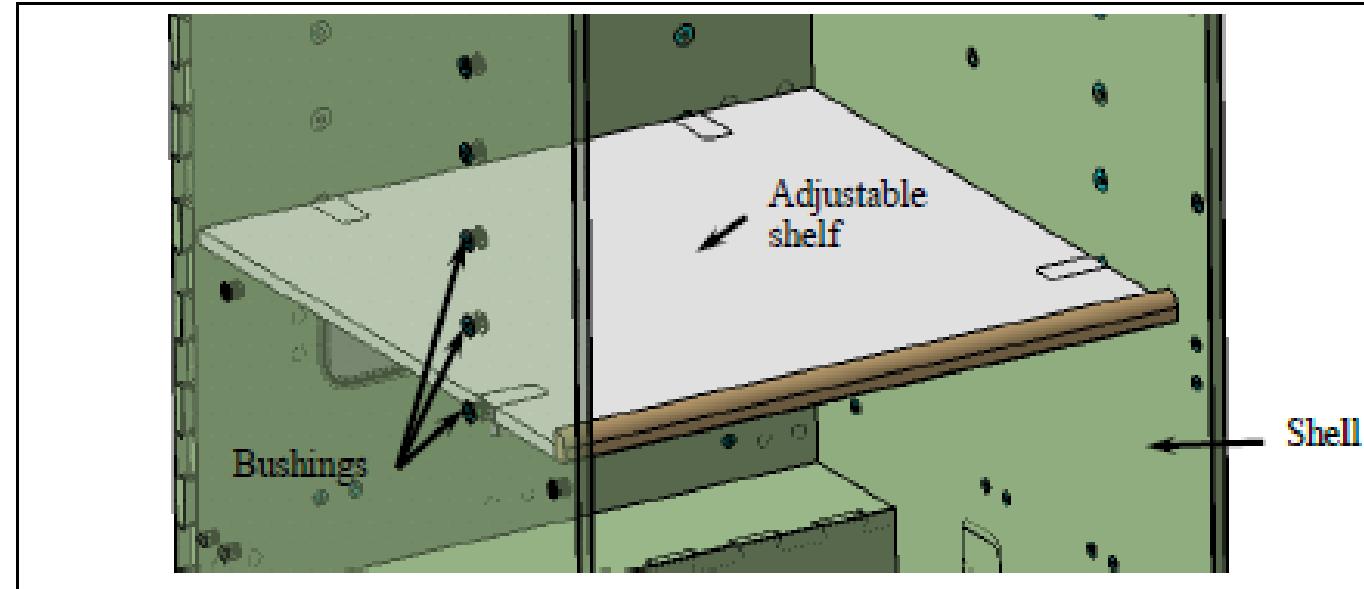


FIGURE 72 – ADJUSTABLE SHELF IN CABINET SHELL

Shelves

➤ Adjustable Shelves

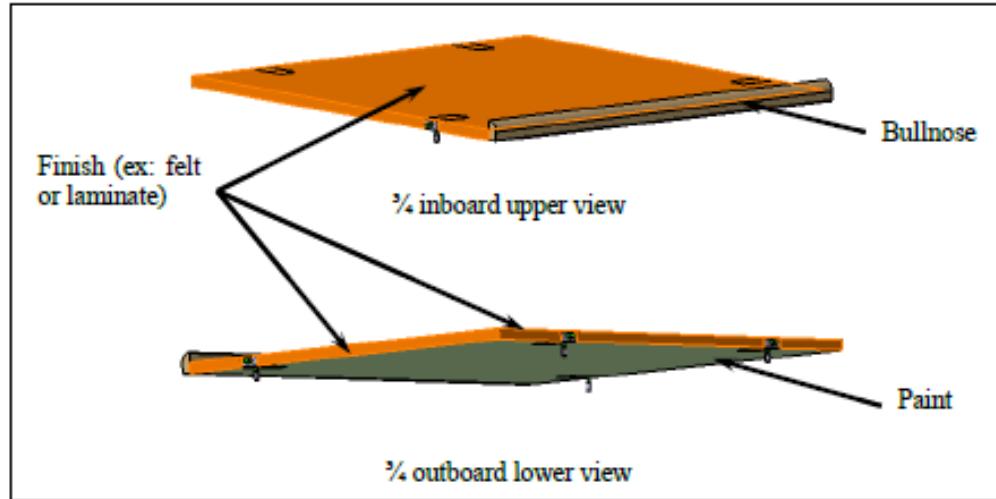
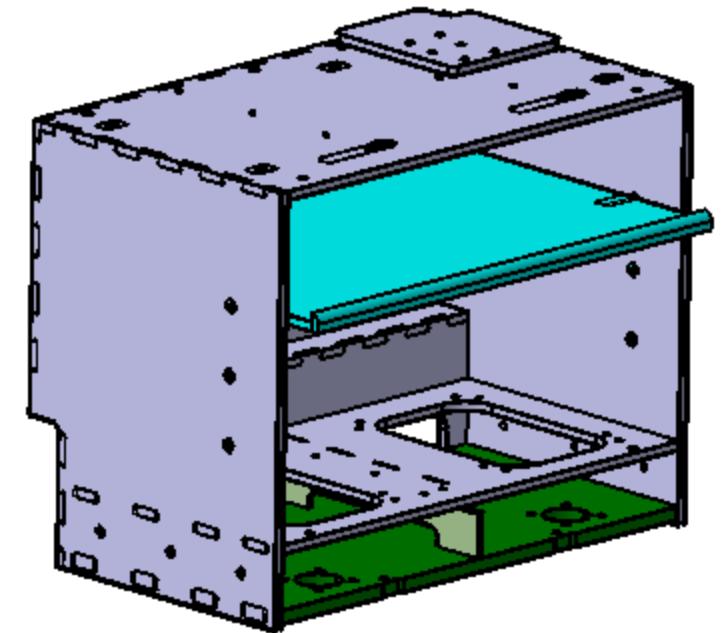
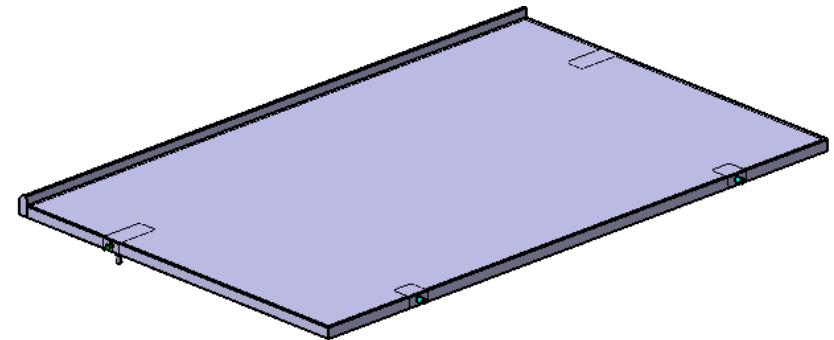


FIGURE 73 – ADJUSTABLE SHELF FINISH

Gapping of adjustable shelf is defined in paragraph [4.4.1](#). Bullnose and finish are flush as shown with [Figure 74](#).



FIGURE 74 – ADJUSTABLE SHELF – TOP VIEW SHOWING PANEL & BULLNOSE FLUSHNESS



Shelves

➤ Removable Fix Shelves

Removable fix shelf refers to a shelf composed from a panel with bullnose and connected to a shell with brackets and hardware. This assembly is set in one position only and cannot be manipulated by the client. Same principle applies as the adjustable shelf except that no finish is applied on panel edge as shown on Figure 75 and Figure 76.

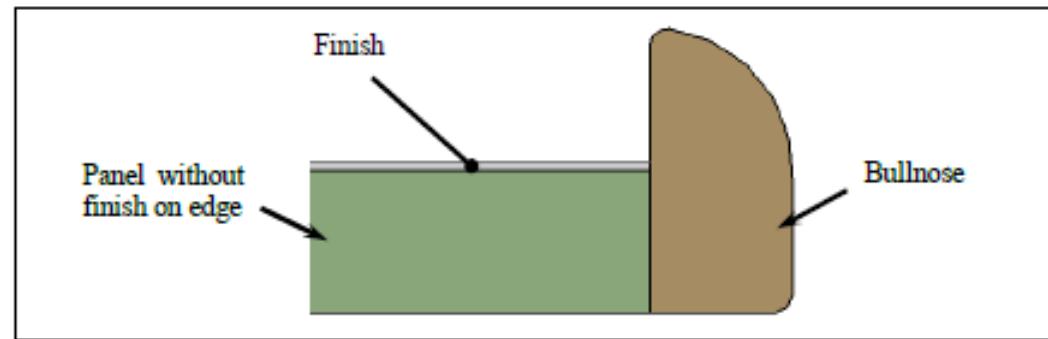


FIGURE 75 – REMOVABLE FIX SHELF FINISH

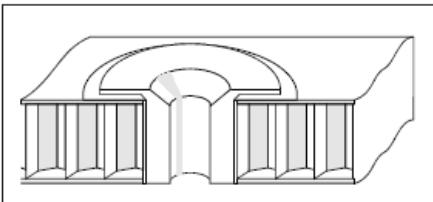


FIGURE 76 – REMOVABLE FIX SHELF – TOP VIEW SHOWING PANEL & BULLNOSE FLUSHNESS

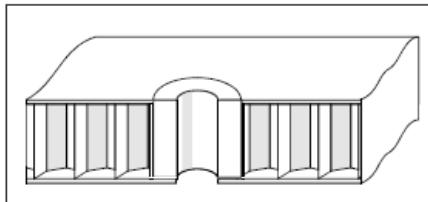
Panel Inserts

TYPICAL PANEL FIXINGS

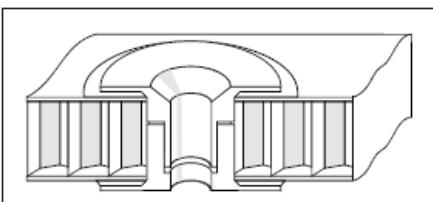
Mechanical fixing to panel faces is achieved in a variety of ways. The choice of method depends on the desired strength, the finish required and the quantity to be produced. To obtain the full strength potential it is necessary to achieve a bonded shear connection to both facing skins.



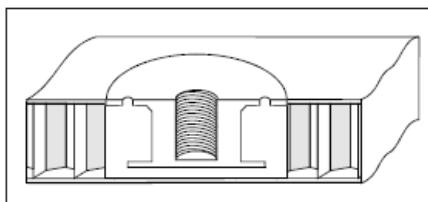
■ Single part ferrule



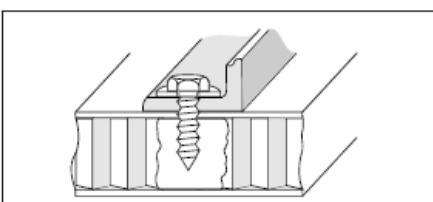
■ Distance tube



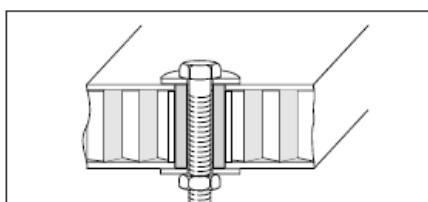
■ Two part ferrule



■ Threaded insert



■ Resin potted area



■ Through panel distance tube using penny washer

HONEYCOMB SANDWICH PANEL FINISHING METHODS

Hexcel Composites panels can, if required, be finished or protected by a wide variety of methods.

PAINT FINISHING	For aluminium face skin panels: Degrease. Self etch prime followed by standard paint specification treatment.	For woven and UD fibrous faced panels: Degrease, lightly abrade surface and fill to obtain a smooth finish as required, followed by standard paint specification treatment.
DECORATIVE FINISHES: e.g. - MELAMINE - WOOD VENEER - TEDLAR® - FABRICS - LEATHER - STONE	Degrease all surfaces to be bonded with an approved degreasing solvent which will not damage the material surfaces. Filling of fibrous faced panels may be necessary if thin decorative finish materials are to be used. Light abrading is recommended. Care must be taken not to abrade severely as this could damage the surface fibres. Ensure that all surfaces are dust free. A second degreasing process is advisable. Bond decorative finish to panel face using epoxy, polyurethane or resorcinol adhesive systems as appropriate. Bond under warm press pressure if possible. Porous or absorbent decor materials can be bonded using rubber based or polyurethane adhesive systems.	

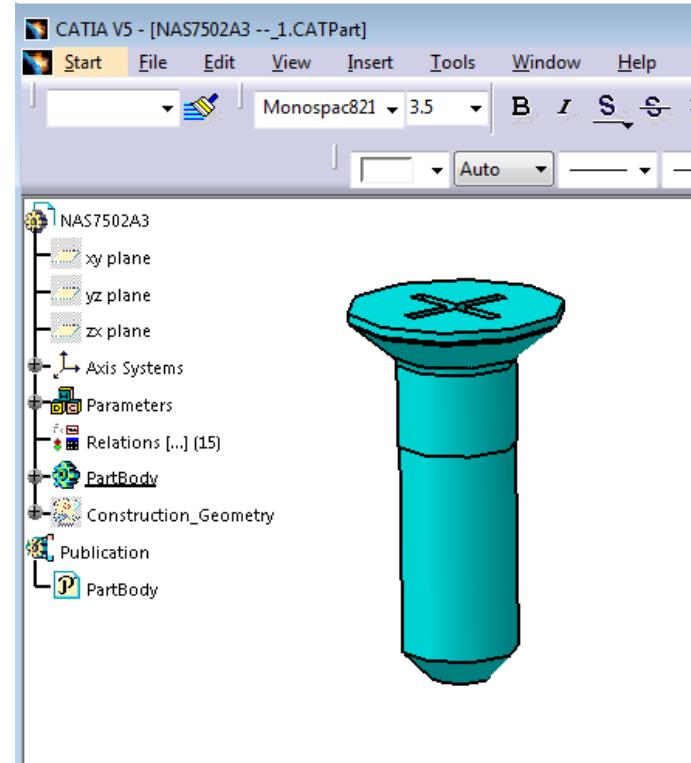
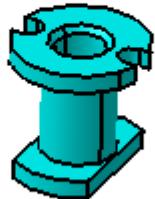
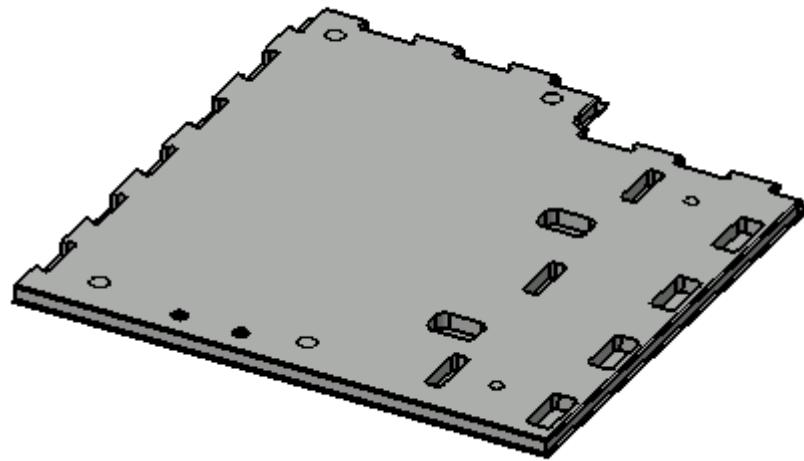
The production of a test piece is advisable before completing any finishing operation, follow the adhesive manufacturer's recommendations.

WARNING: If decorative surfaces are to be applied to sandwich panels with contact adhesive, use ONLY petroleum or emulsion based adhesives. DO NOT use adhesives based on ketones or esters (acetates).

Hexcel Composites Technical Support can offer advice on suitable adhesives for sandwich panel fabrication (contact details are included on the back cover of this brochure).



Panel Inserts



Panel Inserts

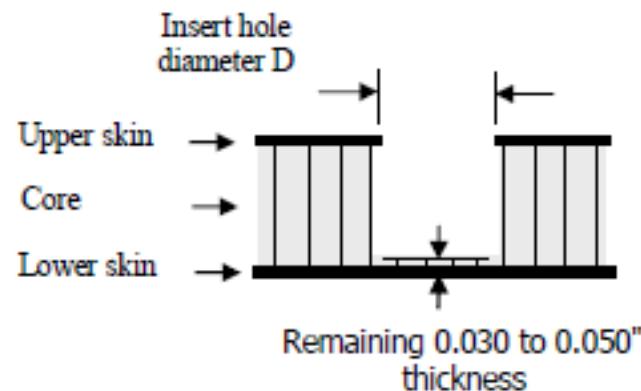
9.2.3 Blind Insert

Hole drilling shall be performed on upper skin as per Figure 9.

For reverse installation, hole drilling shall be performed similar to Figure 7.

Dimensions shall be in accordance with section 9.2.1.

FIGURE 9 – DRILLING HOLE FOR BLIND INSERTS



Exception

It is permissible to install two blind inserts in one panel, preparation of panel shall be performed similar to through insert as shown in section 9.2.2.2.

Panel Inserts

9.1.1.1 NAS and TYE inserts

These types of inserts have fill/vent holes for injecting adhesive and venting air. A tab shall be used to hold the insert in place during the installation process.

FIGURE 1 – GENERAL DESCRIPTION OF POTTING TYPE INSERTS

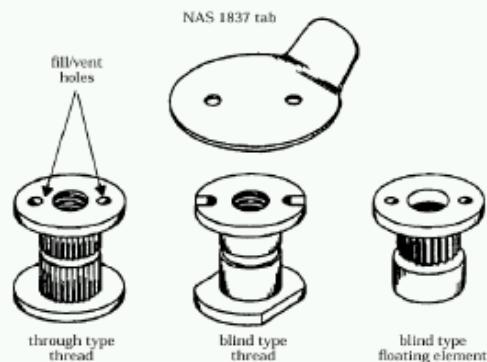


TABLE 2 – NAS 1800 SERIES HOLE SIZE

THREAD SIZE	NAS1800 TYPE		
	1832 ^[1] , 1833 ^[2] , 1834 ^[3]	1835 ^[4]	1836 ^[1]
06 (0.1308")		-	
08 (0.1640")	0.561" – 0.566"	0.686" – 0.691"	0.452" – 0.457"
3 (0.1900")			
4 (0.2500")	0.686" – 0.691"	0.749" – 0.755"	0.499" – 0.504"
5 (0.3125")		0.811" – 0.817"	-
6 (0.3750")	0.842" – 0.847"	0.874" – 0.880"	-

[1] Blind Threaded Insert [3] Countersink and Through clearance hole Insert
 [2] Through Threaded Insert [4] Blind Threaded, Floating Insert

9.1.1.2 400 series

The 400 series are made in two parts defined as the body manufactured in aluminum and the nut in carbon steel, stainless steel or aluminum.

FIGURE 2 – EXAMPLE OF FLOATING INSERT

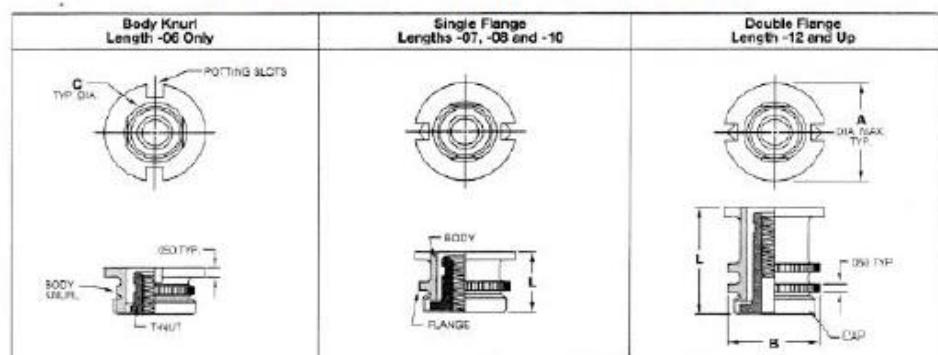


TABLE 3 – TYE SERIES HOLE SIZE

SIZE	TYE SERIES TYPE			
	2001 ^[1]	2003 / 2004 / 2007 / 2024 / 2334 / 2068 ^[2]	2043 / 2046 ^[3]	2054 ^[2]
04 (0.1120")			0.311" – 0.317"	.342" – .348"
06 (0.1350")		0.452" – 0.457"	0.562" – 0.565"	
08 (0.1640")			0.342" – 0.348"	.392" – .397"
3 (0.1900")			0.392" – 0.397"	.452" – .457"
4 (0.2500")	0.499" – 0.504"	.686" – .691"	-	.561" – .565"

[1] Blind Threaded Insert [2] Blind Threaded, Floating Insert
 [3] Through Threaded Insert

Slotted Insert

9.1.1.3 Slotted insert

These inserts (mount and stone) are manufactured from thermoplastic materials with 30% fiberglass (Ultem 2300). In order to prevent the fasteners from moving within the slot, the inserts are fitted out with a toothing as shown in Figure 3 and 4.

FIGURE 3 – EXAMPLE OF SLOTTED INSERTS

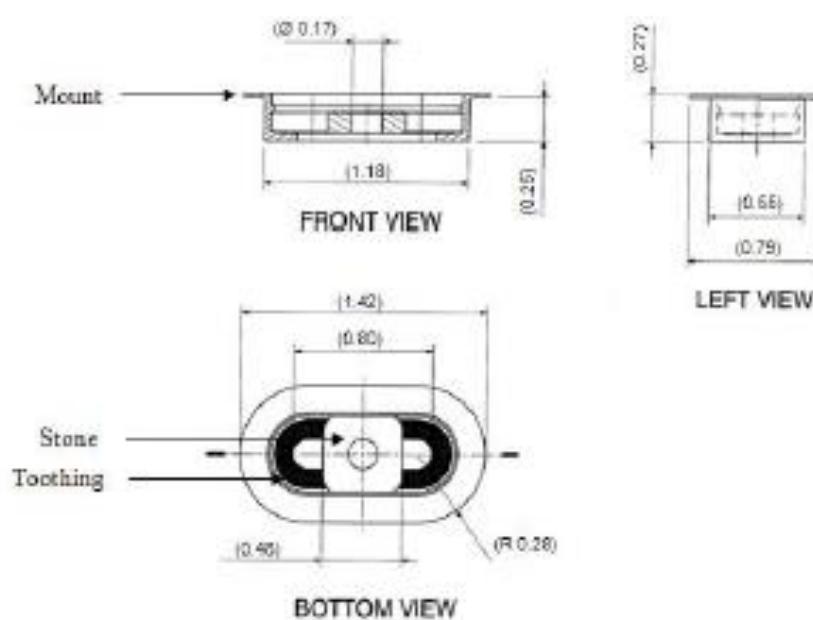
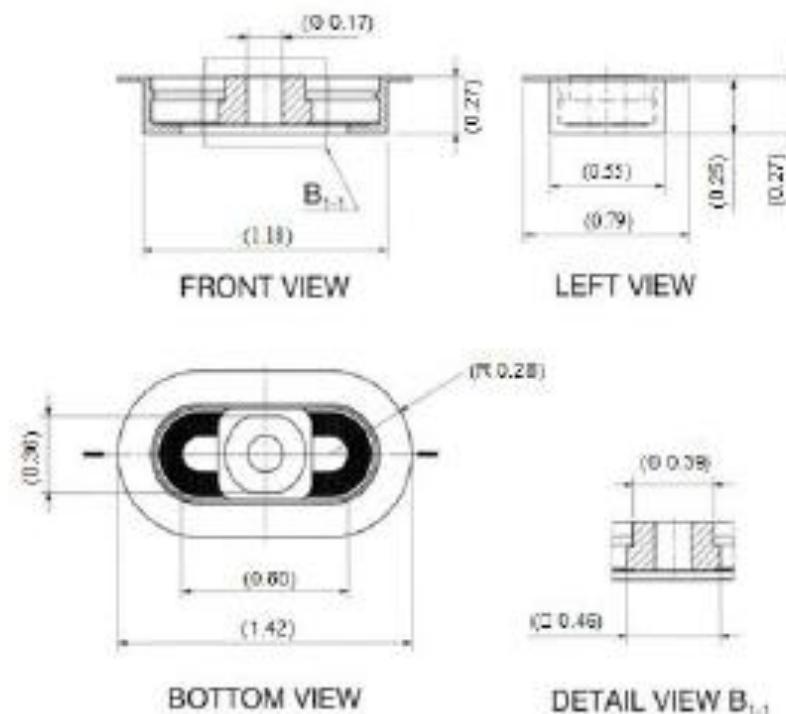


FIGURE 4 – EXAMPLE OF SLOTTED INSERTS



Slotted Insert

FIGURE 5 – SLOTTED INSERT HOLE SIZE

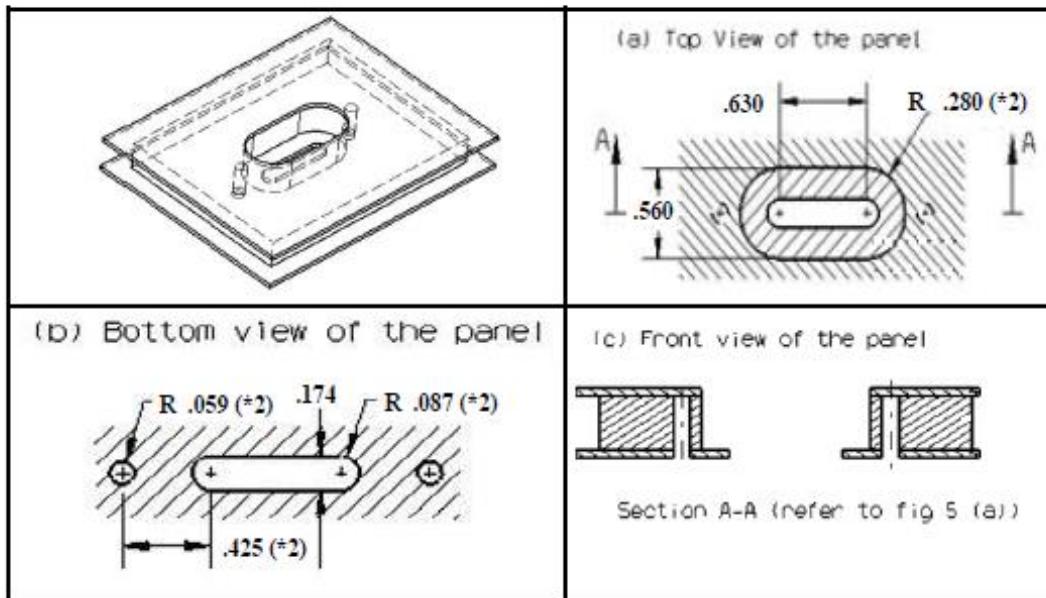
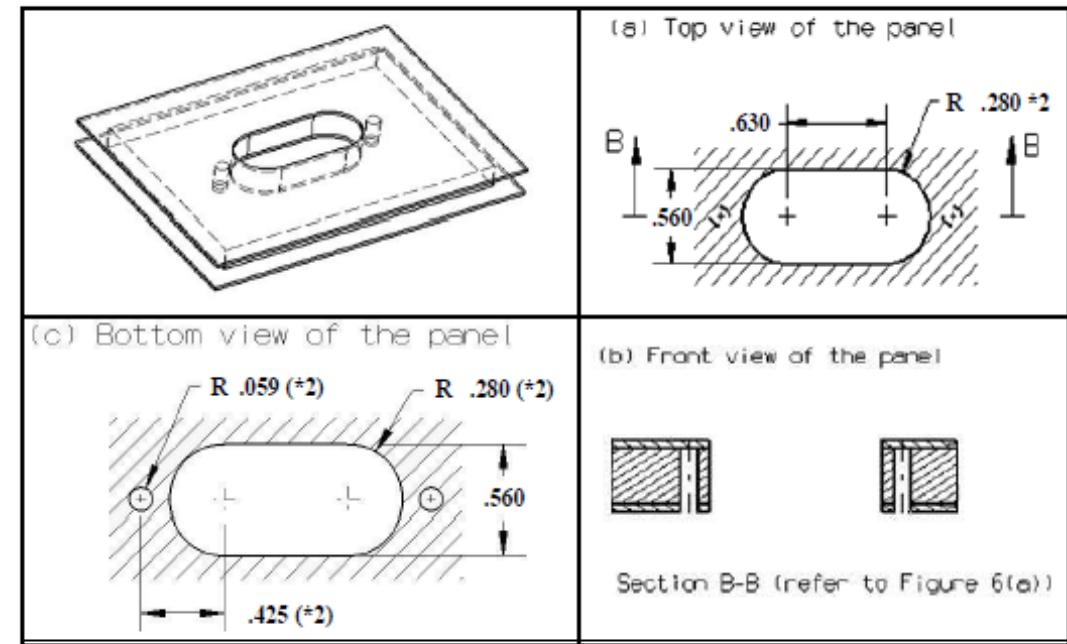


FIGURE 6 – SLOTTED INSERT HOLE SIZE THROUGH BOTH SKINS



Hardware list used in G7000 program

4.1.5 Hardware

The following list indicates the preferred hardware to be used:

Item	Part number	Part description
Insert	MS21209	Helical coil insert, screw thread, coarse and fine, screw locking, cres
Insert	TYE2001A/TYE2001A()X97	Insert: molded in, blind threaded, lightweight, self-locking, sandwich panel
Insert	TYE2003A	Insert: molded in, clearance hole, sandwich panel
Insert	TYE2004A	Insert: molded in, clearance hole, countersunk, sandwich panel
Insert	TYE2007	Insert: molded in, thru threaded, self-lock, sandwich panel
Insert	TYE2043A	Insert: molded in, clearance hole, lightweight, sandwich panel
Insert	TYE2054A	Insert: molded in, clearance hole, countersunk, lightweight, sandwich panel
Insert	TYE2168A/TYE2168A()X97	Insert: molded in, clearance hole, double lock, lightweight, sandwich panel
Insert	TYE2334	Insert: potted in, blind threaded, floating, sandwich panel
Nut	B0204077	Nut self-locking anchor two lug floating cres al coated basket
Nut	MS21083	Nut self-locking hexagon nonmetallic insert low height
Nut	B0204083	Nut, anchor, self-locking, reduced rivet spacing, side by side, floating, cres, aluminum coated, 160 ksi.
Nut	B203064	Nut, cres, 12 point, self-locking, aluminum coated captive washer, 160 ksi
Nut	B0204090	Nut, self-locking, two lug, floating, hi-reuse, special .1900-32 thread
Nutplate	B0204080	Anchor nut, 2 lug, floating, miniature, cres, aluminum coated basket
Nutplate	B0204076	Anchor nut, self-locking, floating, one lug, cres, aluminum coated basket, 160ksi
Nutplate	B0204091	Nut plate, 2 lug, hi-float, cres
Nutplate	B0204089	Nut plate, rivetless, cres
Washer	NAS620	Washer flat reduced outside dia
Washer	B0202013	Washer plain special application
Washer	B0202033	Washer, flat, cres, aluminum coated, zinc nickel plated
Washer	B0202032	Washer, nominal, 1st and 2nd oversize, countersunk and plain

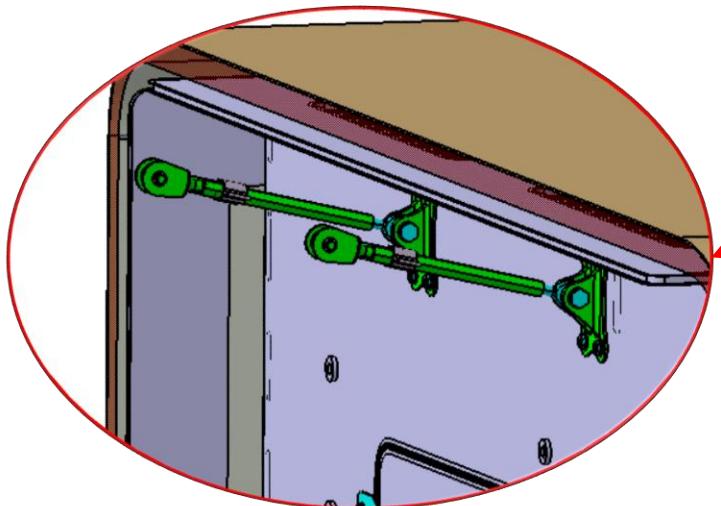
TABLE 7 – LIST OF INSERTS, NUTS, NUTPLATES & WASHERS

Item	Part number	Part description
Bolt	NAS7500-7516	Bolt shear, 100° flush head, cres
Bolt	B0201082	Bolt, 100° flush head, cruciform 95 ksi, close tolerance
Bolt	B0201074	Bolt, 12 point, 220 ksi tensile strength, nickel alloy 718 (nominal & oversize)
Bolt	B0207043	Bolt, blind, high strength, protruding tension head, friction thread lock, titanium and a286, 95 ksi shear.
Bolt	NAS6703-6720	Bolt, hex head, long thread, cres. Self or non-locking
Bolt	B0207035	Titanium blind bolt fastener, 100° flush head, titanium stem
Bolt	B0207036	Titanium blind bolt fastener, protruding head, titanium stem
Rivet	B0207017	Rivet blind, 100° flush head, non-structural applications
Rivet	NAS9308	Rivet, blind, 100° csk head, mech locked spindle, bulbed type, monel
Rivet	NAS9309	Rivet, blind, 100° csk reduced head, mech locked spindle, bulbed type, monel
Rivet	NAS1720	Rivet, blind, protruding head, wire draw. (mbc type)
Rivet	B0205017	Rivet, solid, 100° csk head, close tolerance
Rivet	MS20426	Rivet, solid, csk, 100° precision head
Rivet	B0205218 or NAS1097	Rivet, solid, csk, reduced head, 100° precision head
Rivet	MS20470	Rivet, solid, universal head, structural.
Screw	NAS1101	Screw machine flat fillister head, full thread
Screw	NAS8402-8404	Screw machine washer head full thread cres
Screw	B0201047	Screw machine-flat 100° head, cross recess, full thread, 160 ksi, cres
Screw	NAS7800-7806	Screw pan head tit alloy full thread
Screw	B0201081	Screw, hexagon head, cruciform recess, full thread
Screw	NAS1190	Screw, self-locking, pan head, full thread, cruciform and offset cruciform recess

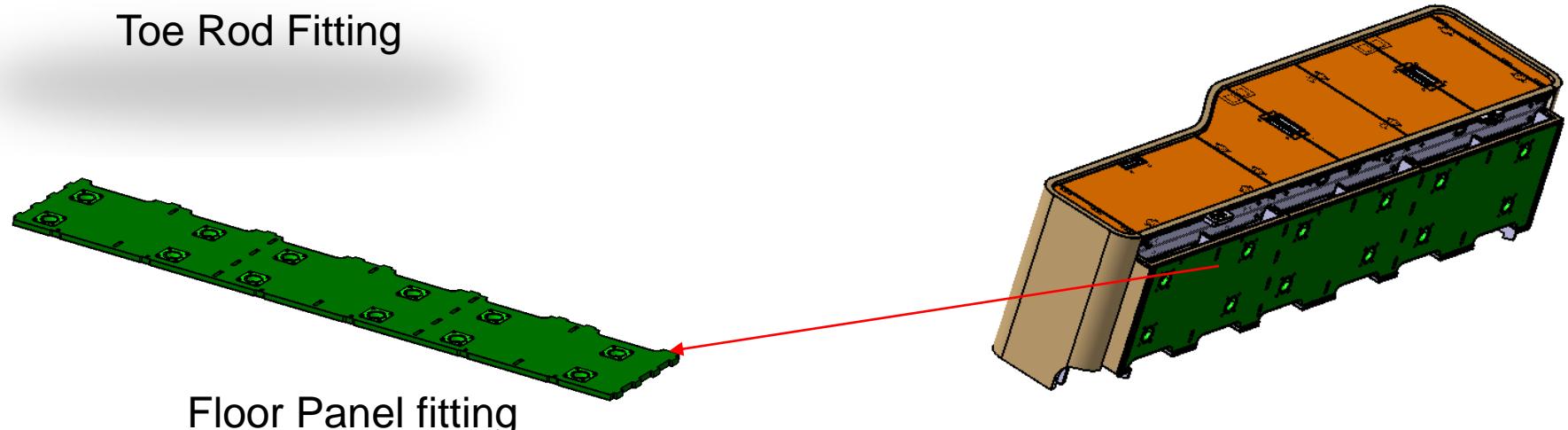
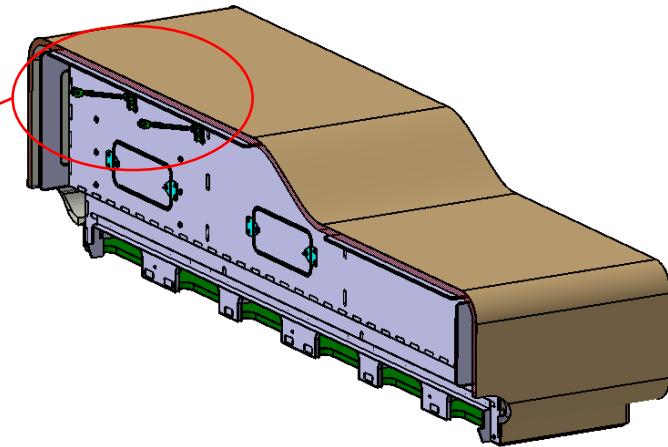
TABLE 8 – LIST OF BOLTS, SCREWS & RIVETS

Cabinet Installation fitting

Toe rod is used to attach Credenza to the Aircraft Frame Structure and Bearing assembly is used to attach Credenza to the Floor Seat track of the Structure.



Toe Rod Fitting



Floor Panel fitting

Cabinet Installation fitting

The seat tracks are medium duty for cabinet installation and heavy duty for Seat & Divan. The seat track length is 5" min and fastened to the floor beam with at least 3 screws. The pitch between the screws is 2".

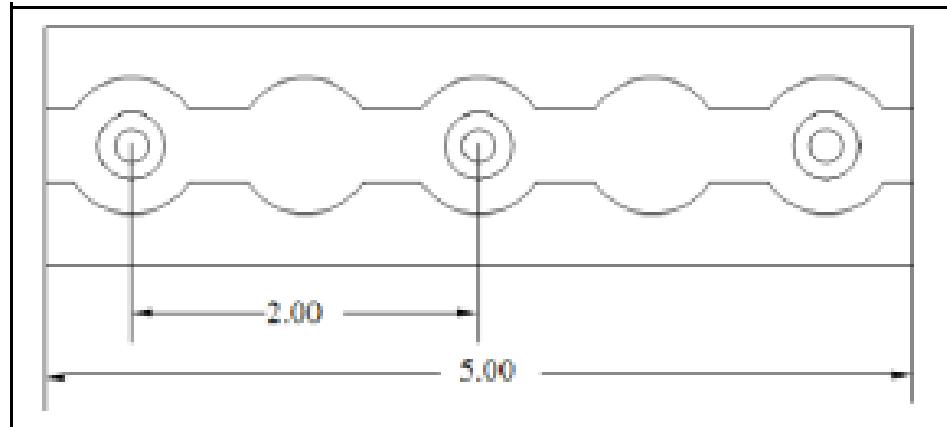


FIGURE 80 – SEAT TRACK DEFINITION



Cabinet Installation fitting

Single lug installation

The maximum load for a single lug is 1600lbs. Figure 81 shows the preferred configuration.

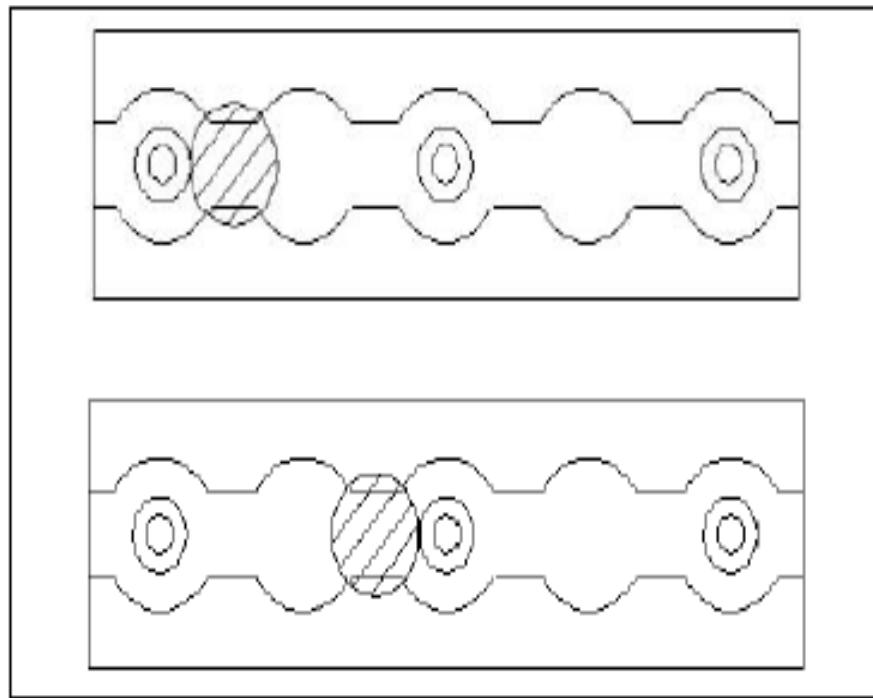


FIGURE 81 – SINGLE LUG INSTALLATION, PREFERABLE CONFIGURATION

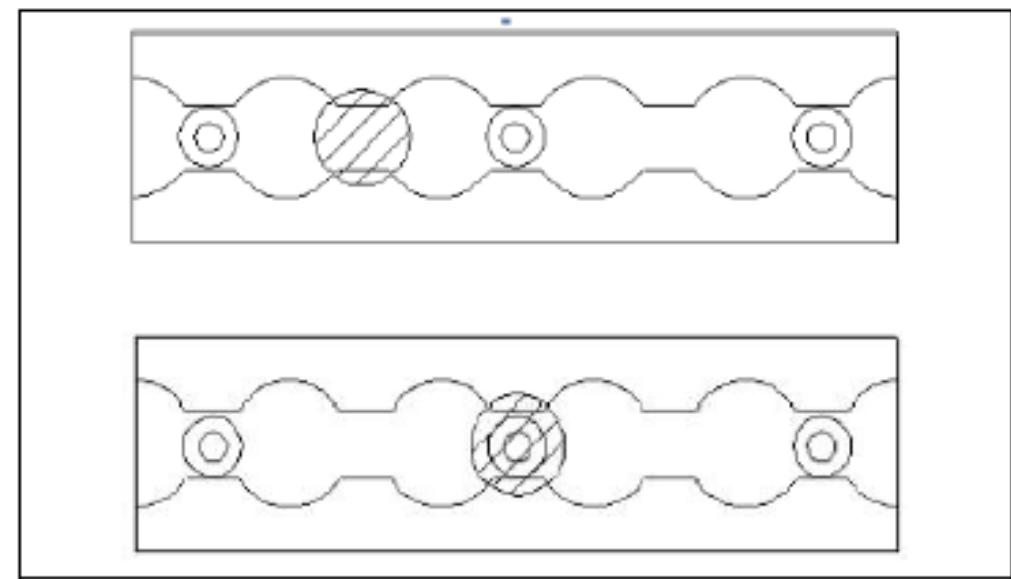


FIGURE 82 – NOT RECOMMENDED CONFIGURATION



Cabinet Installation fitting

Double lug installation

The maximum load for a double lug is 2400lbs. Figure 83 shows the preferred configuration.

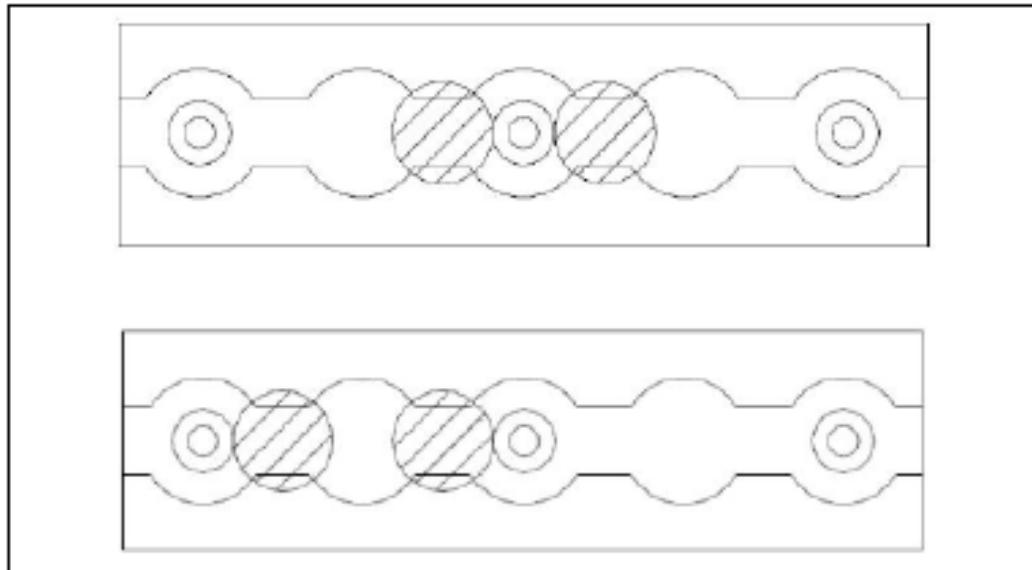


Figure 83

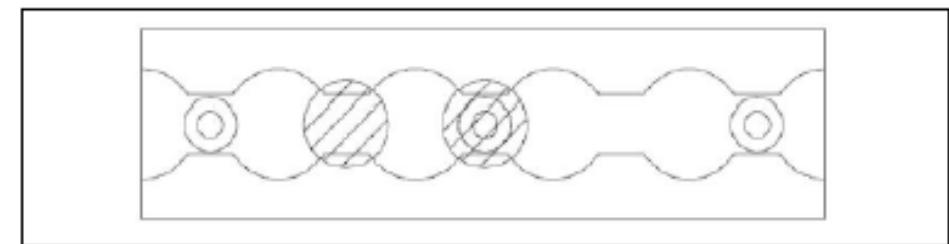


FIGURE 84 – DOUBLE LUG INSTALLATION. NOT RECOMMENDED CONFIGURATION

Do not use the configuration shown on [Figure 85](#).

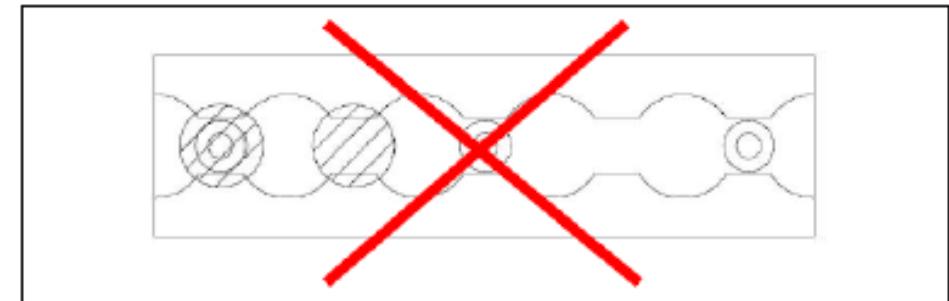
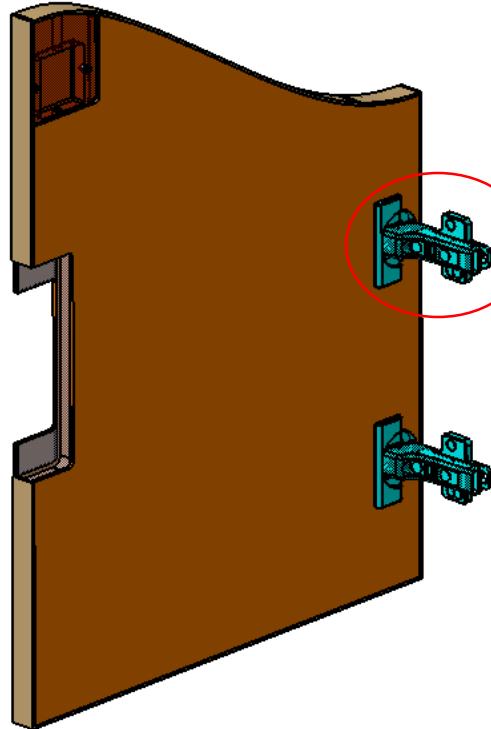


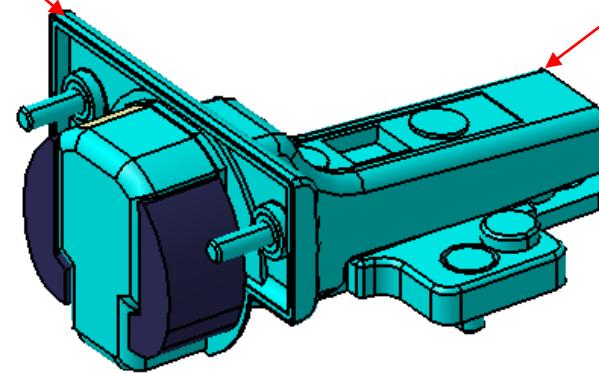
FIGURE 85 – DOUBLE LUG INSTALLATION, UNACCEPTABLE CONFIGURATION

Hinge

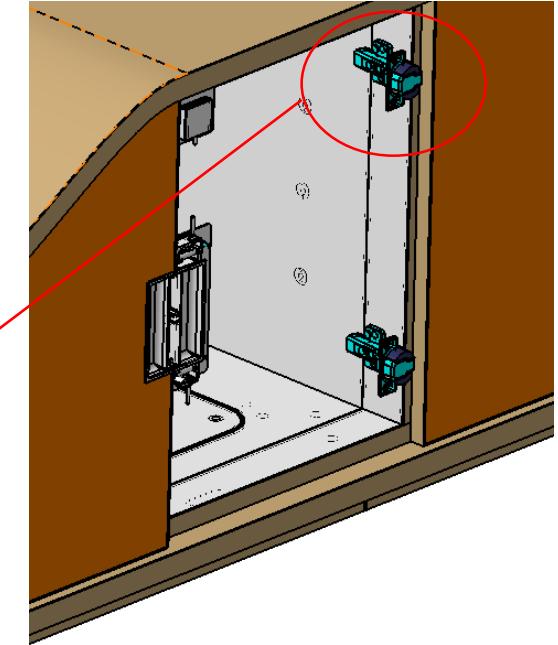
Hinges are connected to both Door and Frame/Shell/Cabinet Assembly for easy rotational Movement of the Door.



Door



Hinge



Frame/Shell/Cabinet Assembly

Design consideration of Hinge Installation

Multiple types of Blum hinges are used for the Global 7000 & 8000 as indicated in Table 23 depending on door position in relation to fixed panel in which the hinge is installed.

Door Configuration	Arm + Boss	Mounting Plate	Cap Cover	Arm Cover	Damper
Overlay door with open storage	7183550	173H7130	70T3504	70.1663	-
Overlay twin door open storage	7183650	-		70.1503	
Overlay door with molding and with open storage	7189550	173H7130		70.1663	
Overlay door with drawer	71T7500N	173H7130			
Flush door application	7989550	173H7100			
Inset door with open storage (95°)	7189750	173H7100			
Inset door with open storage (110°)	7183750	173H7100			
Inset door with open storage (170°)	71T6650	175H7190		70.7503	973A6000

TABLE 23 – BLUM HINGE COMPOSITION

Additionally, if door panel + outboard finish is less than 0.510" thick, Hinge Cup Spacer 70T3507.21 needs to be used in order to clear the latch from the inboard skin of the door panel.

Design consideration of Hinge Installation

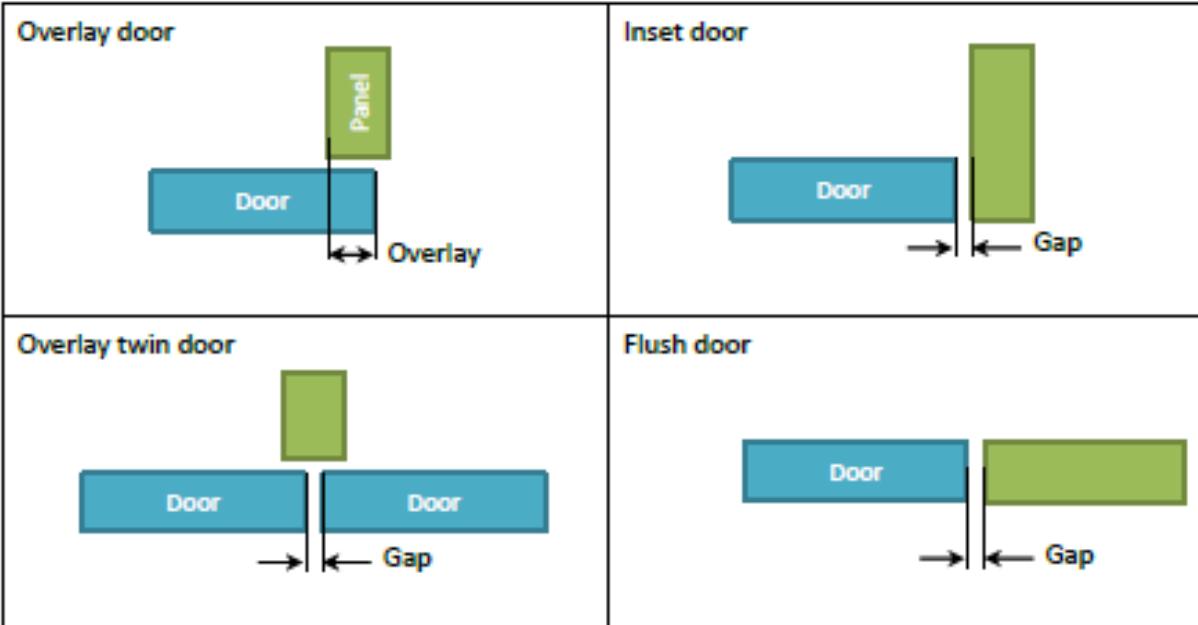


FIGURE 69 – DOOR CONFIGURATION

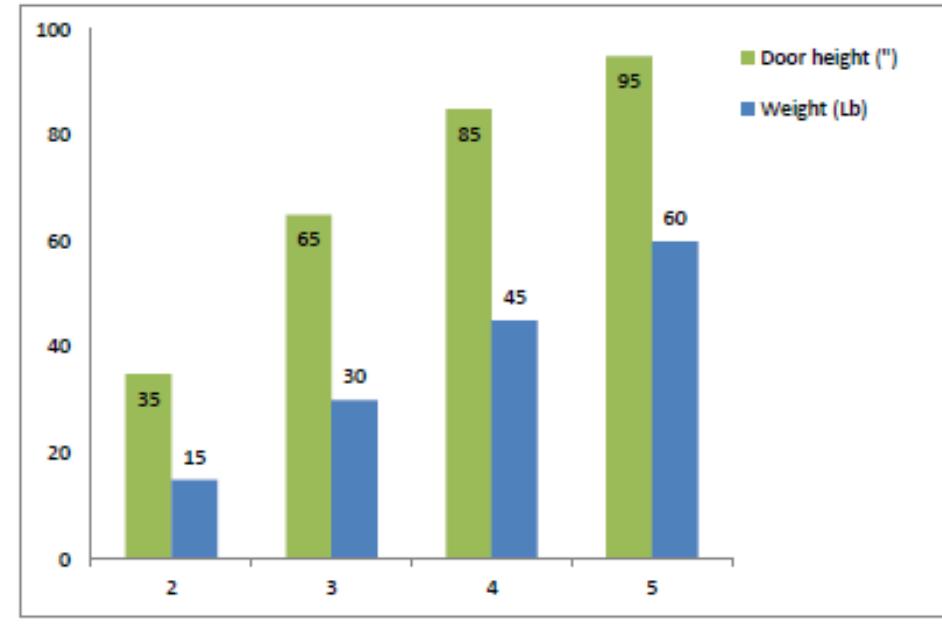


FIGURE 70 – HINGES PER DOOR IN RELATION TO DOOR HEIGHT AND WEIGHT

The number of hinges per door is defined by the height and weight of the finished door as shown in Figure 70. For most application, and as a general rule, two (2) hinges will be needed with exception for the large doors on wardrobes where three (3) hinges are required.

Design consideration of Hinge Installation

As per Blum recommendation, the distance between the top and bottom hinges must be greater than the width of the door.

Mounting plates from the 173H series are installed with two (2) screws B0201047-08-8K and two (2) inserts TYE2001A08-14BRX97. Mounting plates from the 175H series needs additional hardware with one (1) TYE2334-08 insert and one (1) screw B0201047-08-8K.

All hinges are set in the door panel using two (2) screws B0201047-06-8K and two (2) inserts TYE2001A06-14BRX97

The installation pattern for both mounting plate and hinges is shown in Figure 7l.

Notes: B0201047 are Flat 100° head screws, Blum hinges dimension are in metric and therefore countersunk angle is 90°. Even this is not mechanically correct, using Flat 100° head screws with a 90° countersunk angle will be acceptable for this application.

Design consideration of Hinge Installation

Dimensions in Table 24 & Table 25 are given from panel edges (door without trims) for gap recommendation

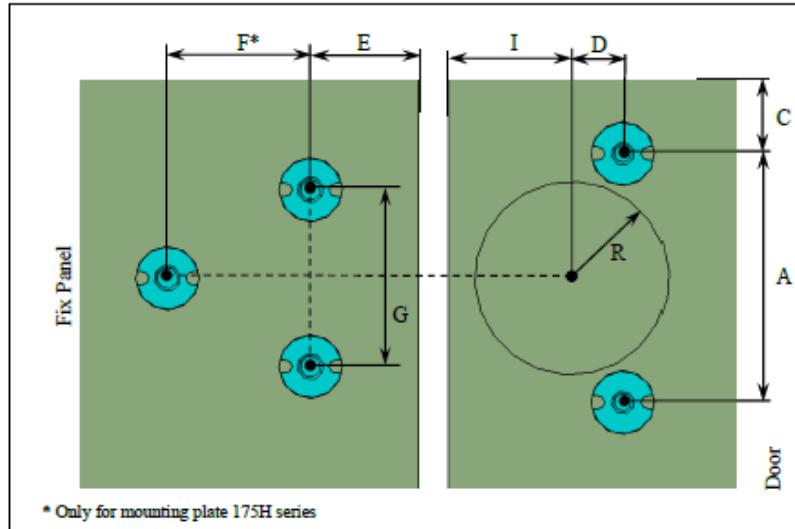


FIGURE 71 – BLUM HINGE AND MOUNTING PLATE INSTALLATION

Distance between panel edge and bore center (I) given in Table 25 is related to different parameters such as door configuration (Table 23), gap and trim thickness. Therefore, if any of the aforementioned parameters differ for the assumptions indicated, this distance must be calculated by using calculation file Blum Hinges Calculator.

Hinge	A	C	D	R	E	F	G
71B3550					37mm ~1.457"		
71B3650							
71B9550							
71T7500N	45mm ~1.772"	Refer to C in Table 9 & Figure 25	9.5mm ~0.374"	18.5mm ~0.689"	T + 38.5mm T + ~1.516"		32mm ~1.26"
79B9550							
71B3750							
71B9750							
71T6650						26mm ~1.023"	

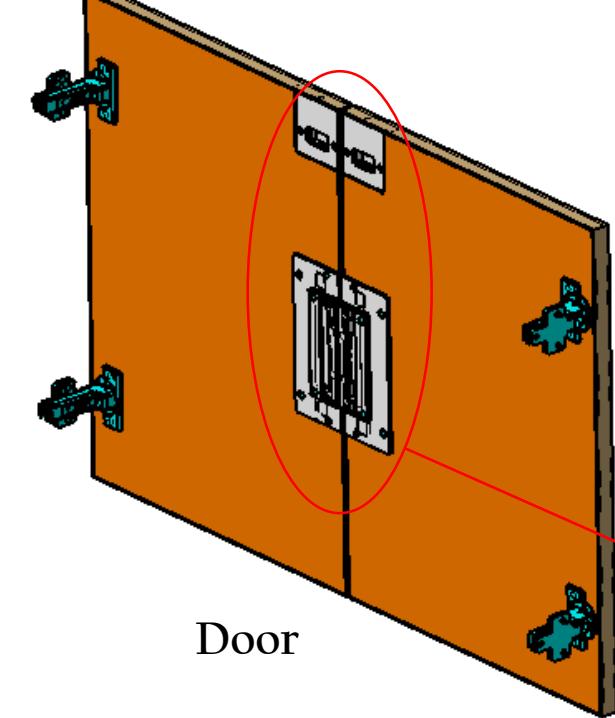
TABLE 24 – BLUM HINGE AND MOUNTING PLATE CUTOUT LOCATION & DIMENSION

Hinge	I	Additional assumptions
71B3550		
71T7500N	18.771mm / ~0.739"	Overlay (0.44") = Thk (0.5") – gap (0.06")
71B9550		
71B3650	19.683mm / ~0.775"	Panel thk = 0.5"
71B3750	21.071mm / ~0.830"	
71B9750		
71T6650	21.571mm / ~0.849"	
79B9550	22.071mm / ~0.869"	

TABLE 25 – BORE CENTER TO PANEL EDGE

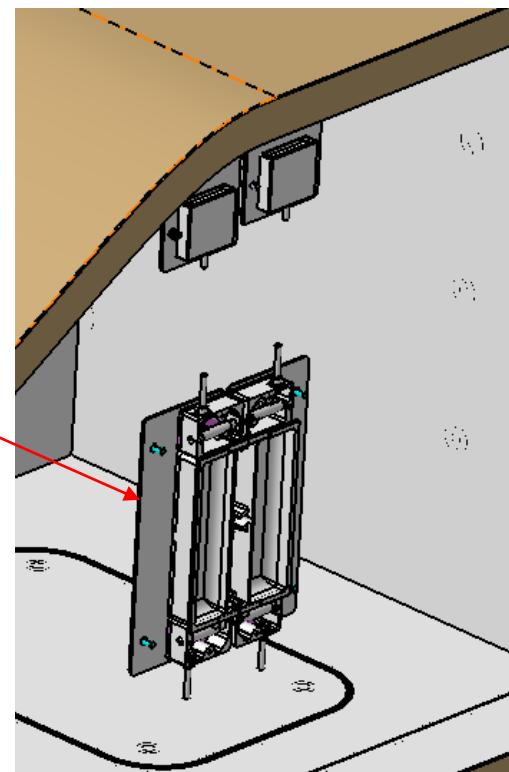
Latch

Latch is locking mechanism for Door and Frame/Shell/Cabinet Assembly.

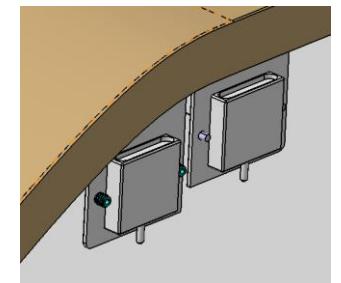
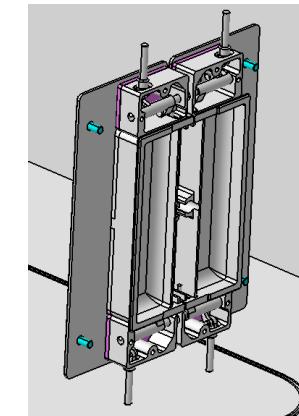
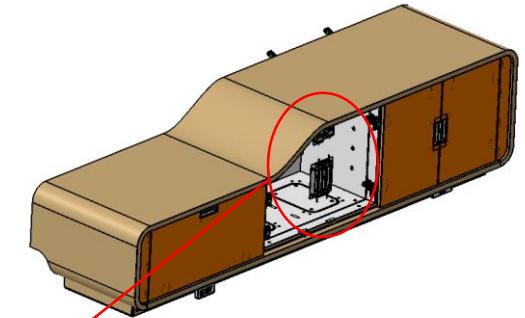


Door

Latch



Frame/Shell/
Cabinet Assembly



Design consideration of Latch Installation

The installation and cutout dimensions can be chosen from Table 22 on the Global7000/G8000.

One point latch

One-point latches are used on drawers and they are installed with two (2) inserts TYE2001A08-14BRX97 and two (2) screws NAS7502. Dimensions for cutout are as per Table 22.

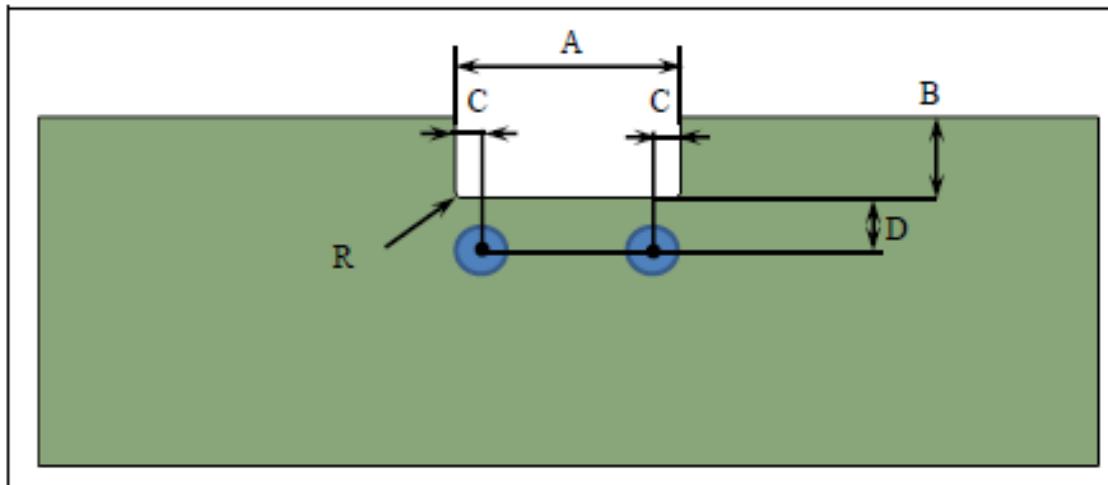
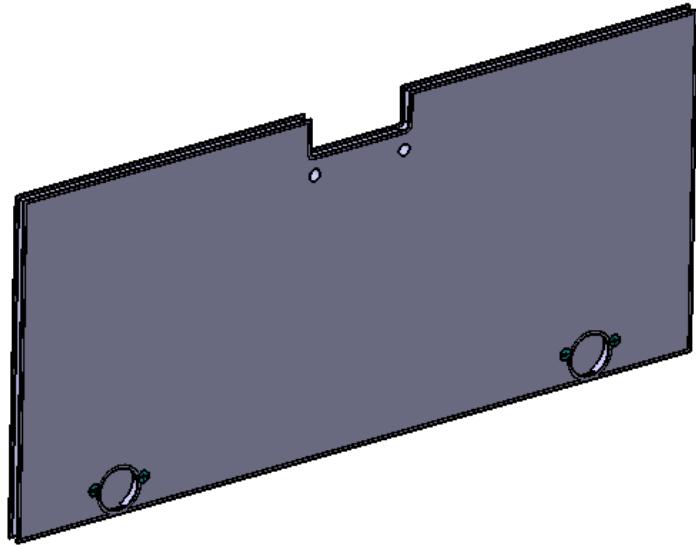


FIGURE 68 – ONE-POINT LATCH CUTOUT IN FAÇADE OF EXPOSED DRAWER

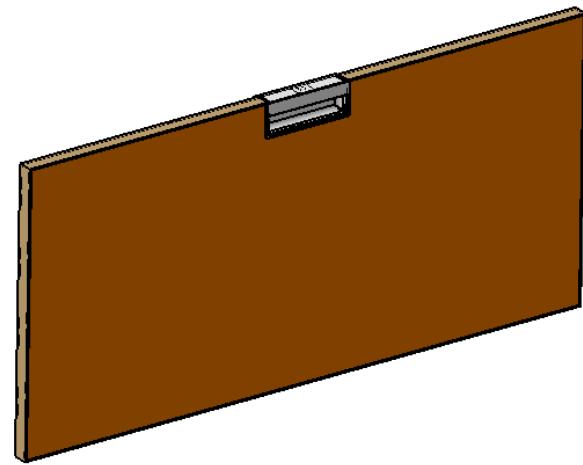
Dimension	Value	Comments
A	4.12"	Latch must be centered on drawer facade
B	1.45"	Make sure latch is flush with edge trim
C	0.185"	
D	0.75"	
R	0.125"	

TABLE 22 – ONE-POINT LATCH CUTOUT DIMENSION

Design consideration of Latch Installation

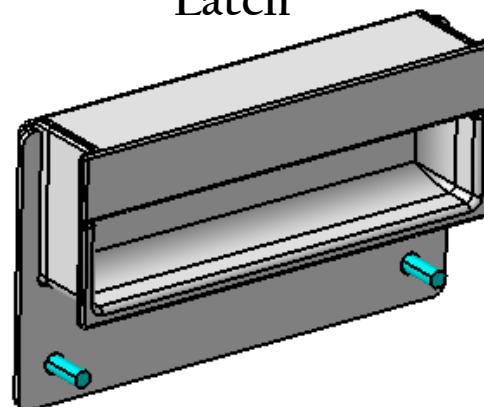


Door Panel



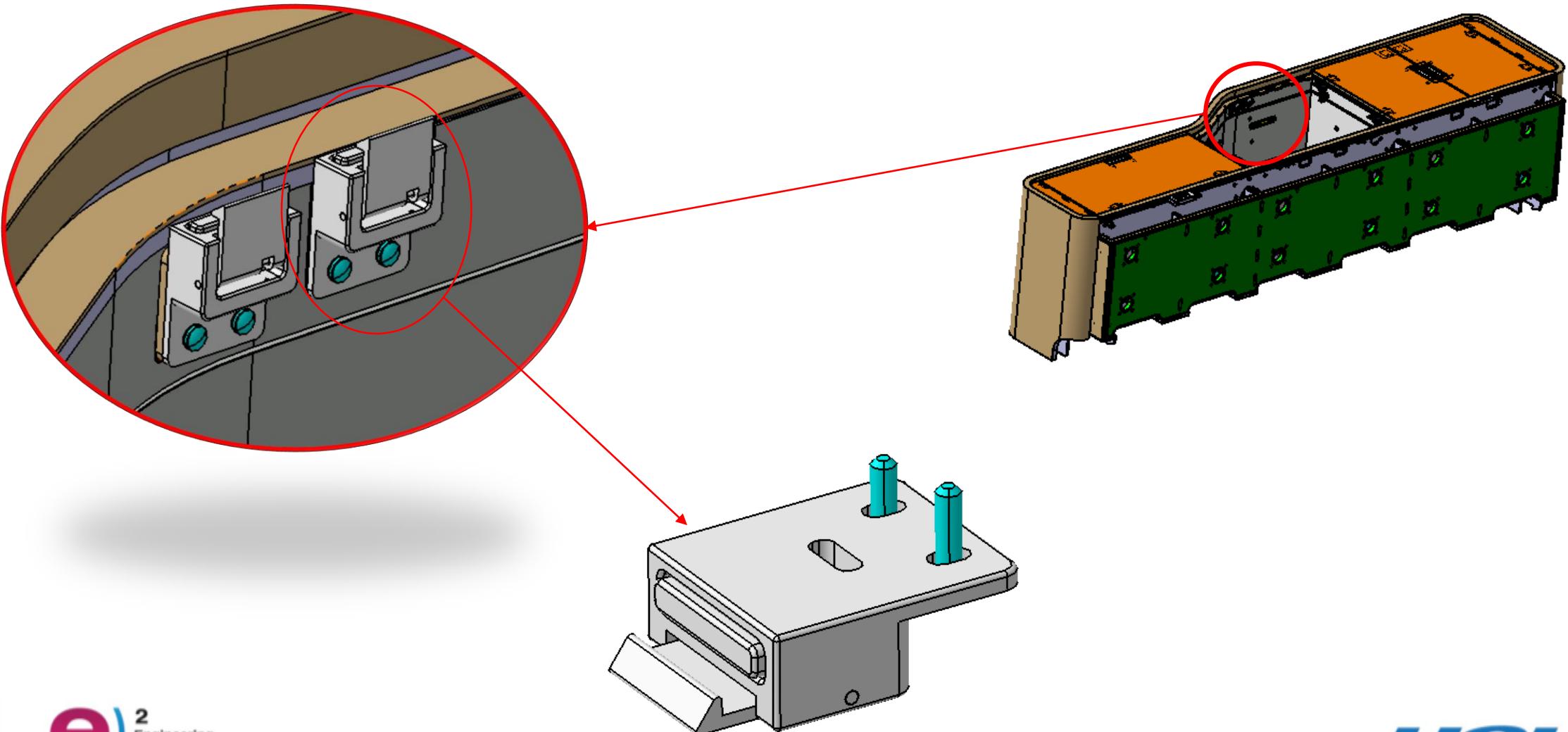
Door Assembly with Latch

Latch



Striker

Striker is used to lock the Door



Grommet

Grommets are used to protect the wires from chafing along an edge. The wire in 3D may appear to have sufficient room but with aircraft vibration and insulation pressing down on the wire, the possibility of damaging the wire still exists.

Grommets are bonded to the panels.

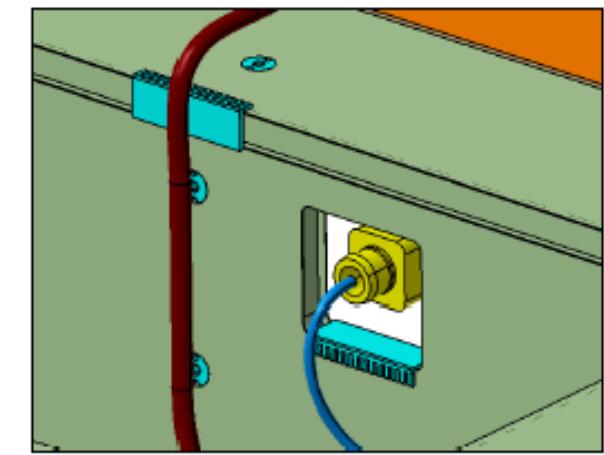
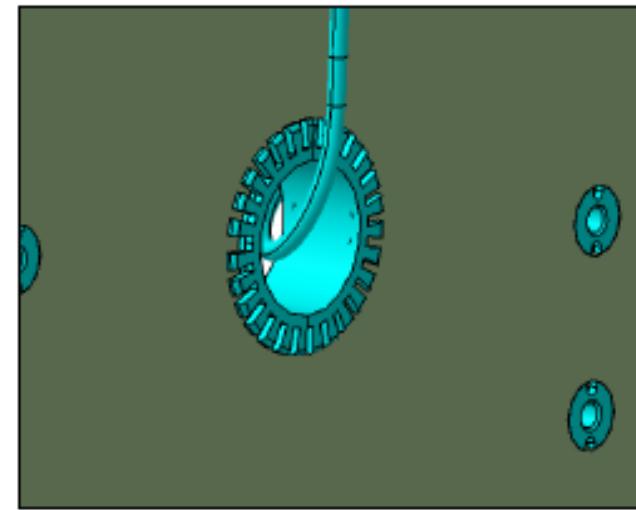
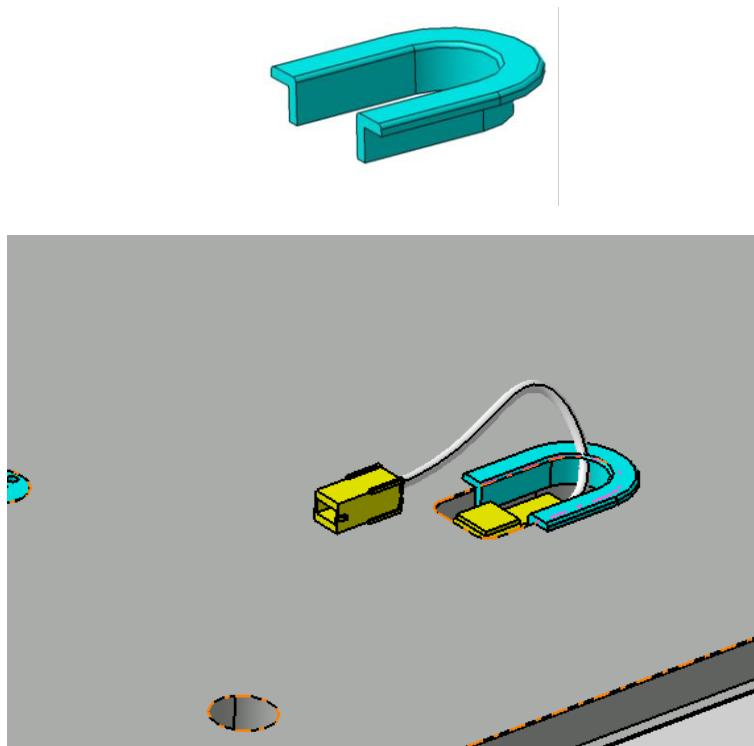


FIGURE 77 – GROMMET INSTALLATION, EXAMPLES

POKA-YOKE Design For Manufacturing

Poka-yoke is a Japanese term that means “mistake-proof”, a lean manufacturing process designed to prevent incorrect installation by manufacturing. These types of features can be easily incorporated into the design of new parts/assemblies.

Examples:-

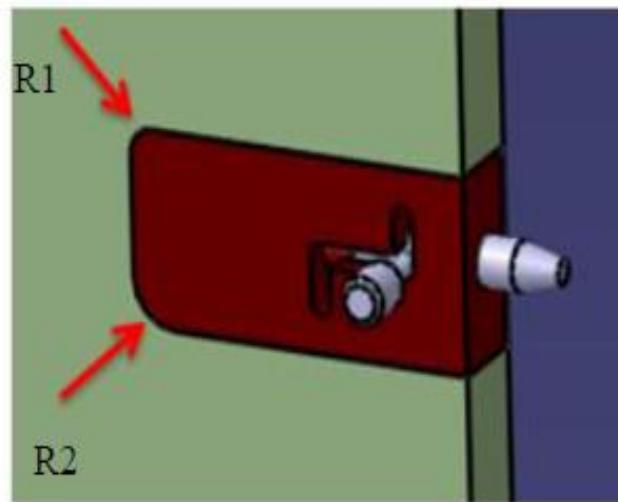


FIGURE 78 – POKA YOKE DESIGN

Note that insert block has one radius bigger than the other. Therefore there is only one possible way to install the latch in the cutout.

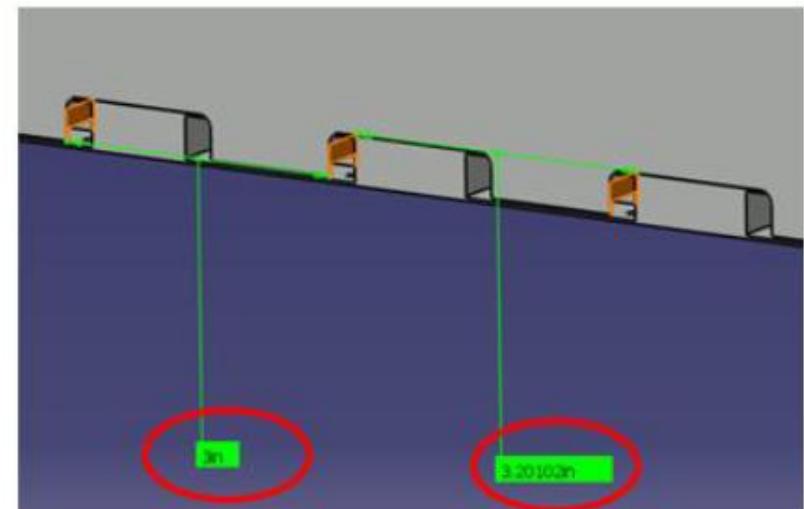


FIGURE 79 – T&G POKA YOKE

Installation can be prevented by having different pitches between the tongue & grooves.

Gapping

There are two types of Gapping. One is Functional Gapping and other is Aesthetic Gapping

- Functional Gapping

Functional gap is the dimension between finished material and finished material including varnish.

	Shell	Drawer	Door
Shell			
Drawer	0.06"	0.06"	
Door	0.06"	0.06"	0.06"
Adjustable shelf	0.03" (*)		
Access Panel, screwed	0.06" (*)		
Access Panel, hinged	0.06" (*)		

*: all around

TABLE 16 – FUNCTIONAL GAPPING

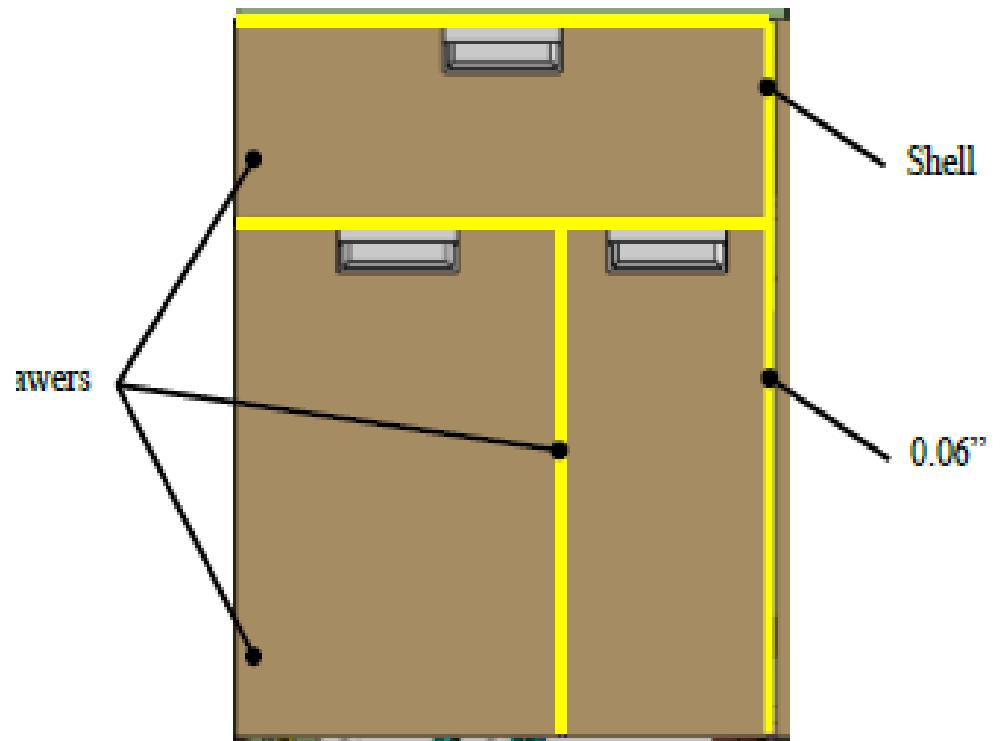


FIGURE 45 – GAPPING DRAWER-DRAWER AND SHELL-DOOR

Functional Gapping

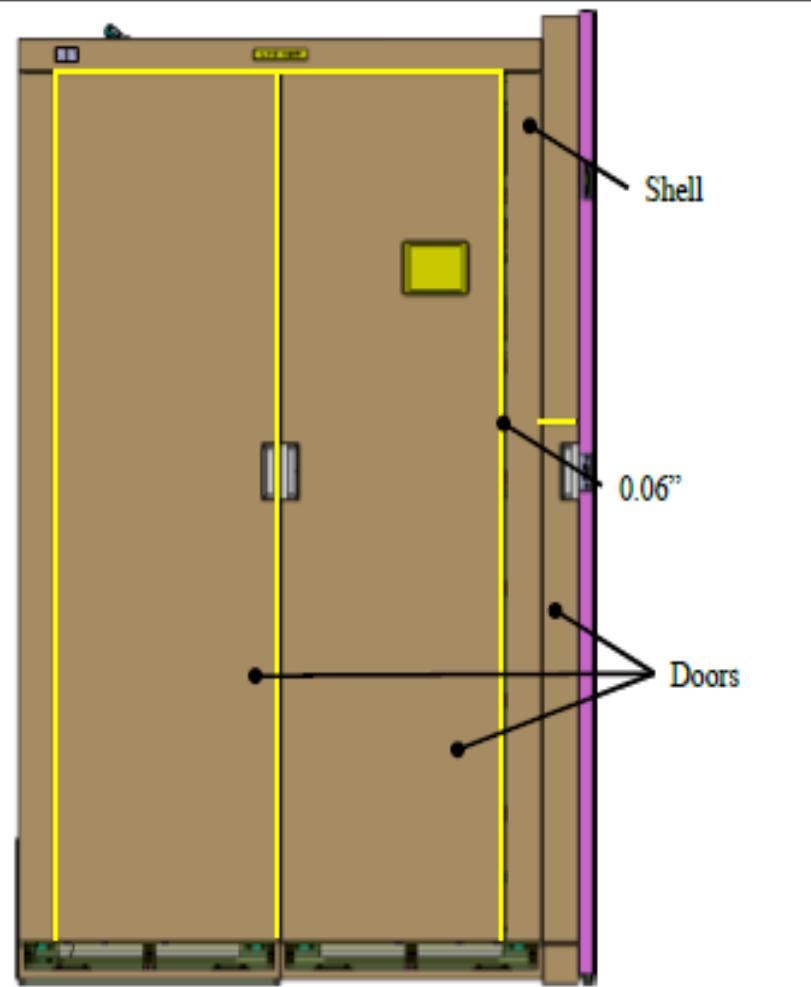


FIGURE 46 – GAPPING DOOR-DOOR AND SHELL-DOOR

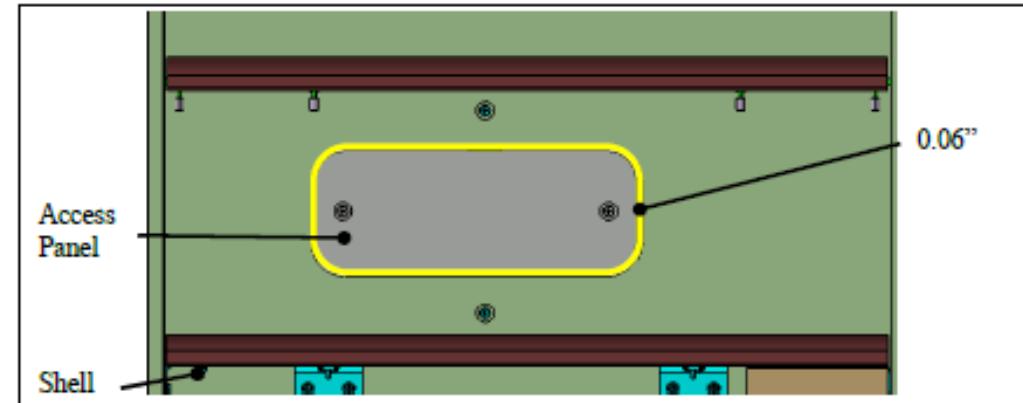


FIGURE 48 – SHELL-ACCESS PANEL

For equipment such as switch or outlet, a gap of $0.030''$ – finish considered if any – is needed in order to allow proper fit.

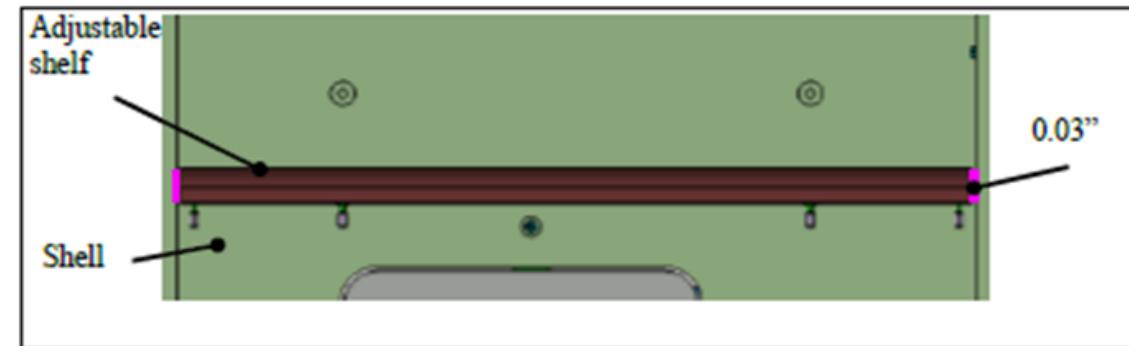


FIGURE 47 – SHELL-ADJUSTABLE SHELF

Aesthetic Gapping

➤ Aesthetic Gapping

The cabinets' façades (exposed drawers, doors, partitions, etc.) is designed with a 0.0625in gap for aesthetics purposes and to allow proper opening for moving items.

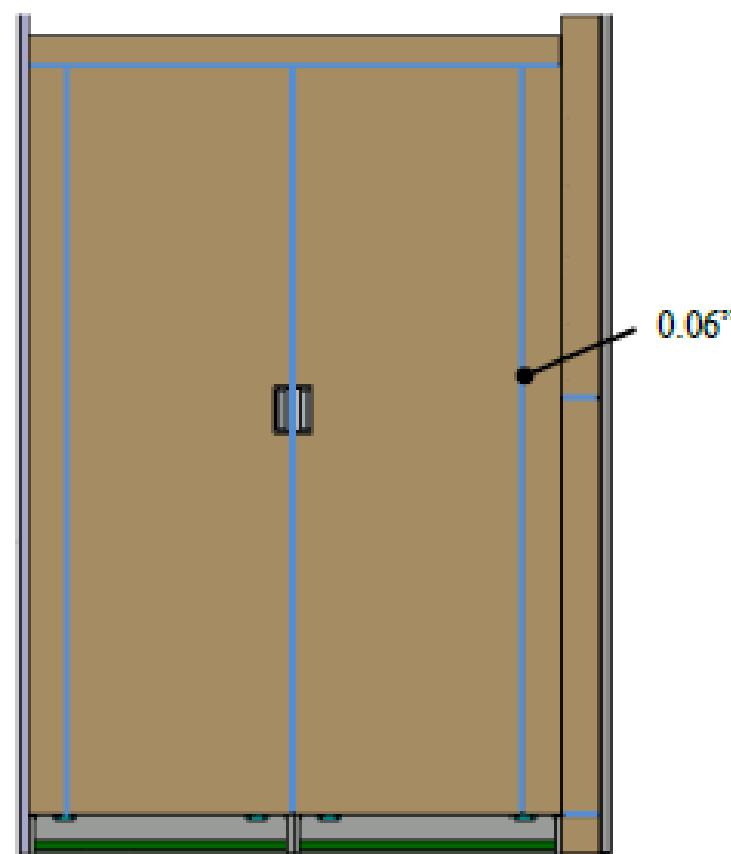


FIGURE 49 – CABINETS FAÇADE GAP

Finishing Material

The purpose of this document is to specify decorative finishes required for interiors of the cabin monuments. This document describes the visual intent for elements relevant to the customer's experience. Due to the large number of possible combinations, the monument interiors featured in this Styling sheet are generic.

Examples of Finishing Material



Felt



Tapisuede



Leather

Finishing Material

Finish Material and Application

Finish materials are a critical part of a cabinet design as they are externally visible. The edge fill cut out must be shown in the 3D definition for location purposes only.

For 3D modeling purpose, the finish materials should be represented with thickness given in Table 14.

Material		Thickness (inch)	Comments
Cabin Carpet		0.460	Manuf Tail Ping
		0.500	Manuf Scott Group
Decorative Fabric		See Table 15	
Finish Substrate (for lacquer)	Class 50	0.065	Surface, varnish included
	Class 60	0.075	Edging, varnish included
Laminate		0.015	
Leather	Class 1 (Thin)	0.035	Lightweight
	Class 2 (Thick)	0.045	Regular
Micro lumber	Type II, Class 23	0.075	Varnish included
	Type II, Class 26 [1]	0.135	
Mirror	Glass-Composite	0.047	PCD
	Polycarbonate [1]	0.080	
Sliding Glass		0.125	
Tapisuede Flannel (Felt)		0.040	
Tapisuede Ultraleather		0.040	

Sliding Glass	0.125	
Tapisuede Flannel (Felt)	0.040	
Tapisuede Ultraleather	0.040	
Varnish	Close Grain Transparent	0.015
	Close Grain Pigmented (Lacquer)	
Wood Veneer	Open Grain Transparent	0.005
	Type I, Class 1 [1]	0.030
	Type I, Class 2 [1]	0.060
	Type I, Class 3	0.065

TABLE 14 - FINISH MATERIAL THICKNESS IN 3D

NOTES

[1] Special thicknesses may only be used where standard thicknesses do not fit with the engineering dimensional envelope.

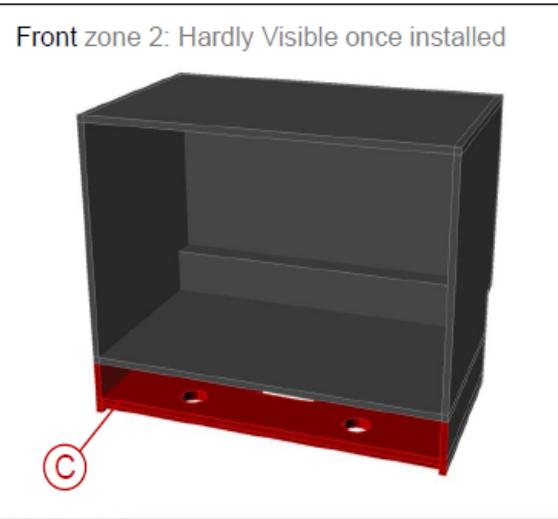
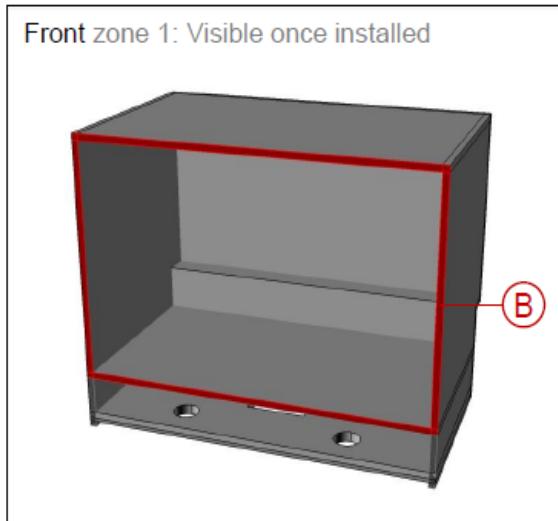
Finishing Material

Two families of finishes are featured: 'Dry' or 'Wet', depending on the items typically stored in the monument.

- Typical Dry Box, without drawers
- Typical Wet Box, without drawers
- Typical Dry or Wet Box, with drawers
- Typical Dry drawer
- Typical Wet drawer
- Typical Dry shelf
- Typical Wet shelf

Finishing Material Application

Typical Dry Box, without drawers



Type of Finishing

A-TAPISUEDE

B-LACQUER

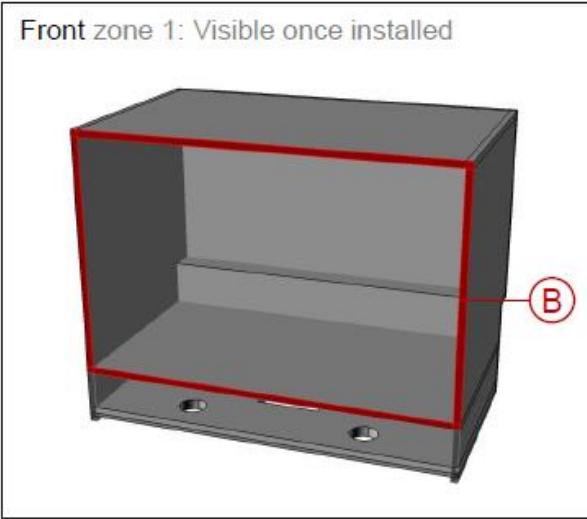
Lacquer color to match A.

C-PAINT

Paint color to match A.

Finishing Material Application

Typical Wet Box, without drawers



Type of Finishing

A-TAPISUEDE

B-LACQUER

Lacquer color to match A.

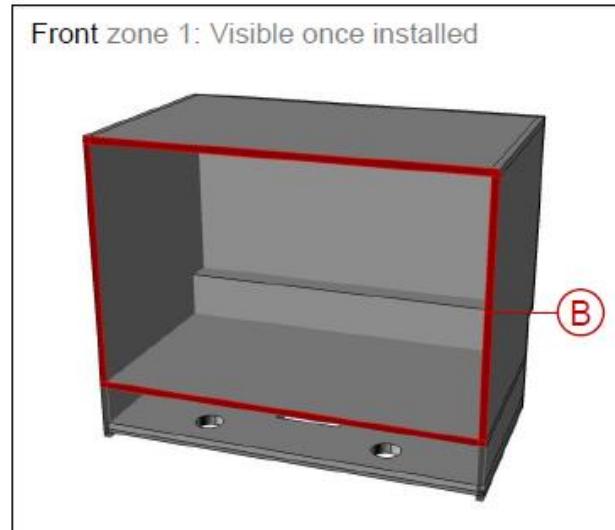
C-PAINT

Paint color to match A.



Finishing Material Application

Typical Dry or Wet Box, with drawers



Type of Finishing

A-TAPISUEDE

B-LACQUER

Lacquer color to match A.

C-PAINT

Paint color to match A.



Finishing Material Application

Typical Dry drawer

Type of Finishing

A-TAPISUEDE

C-PAINT

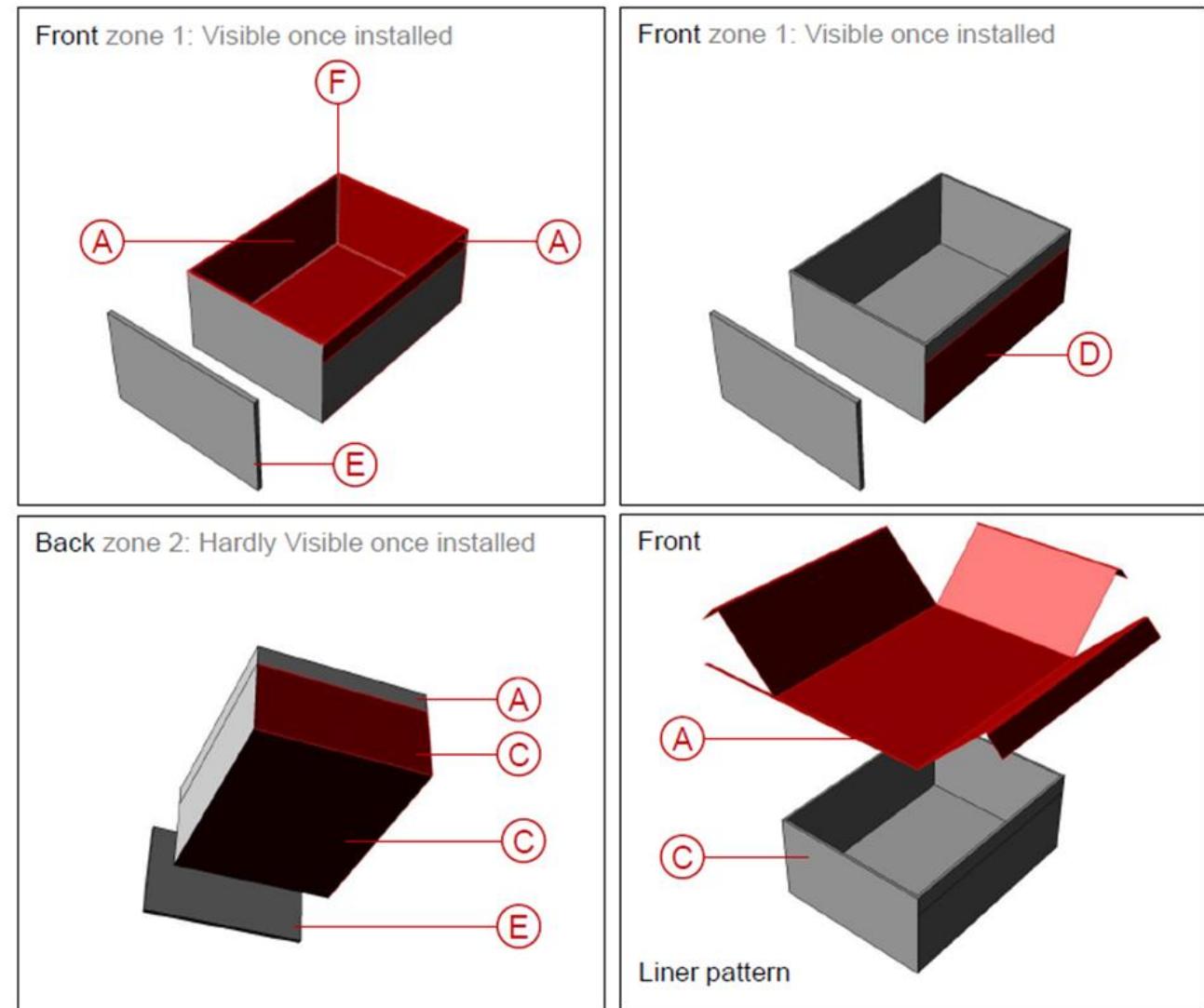
Paint color to match A.

D-LAMINATE

Laminate color to match A.

E-FINISHED EXTERIOR SURFACE

F-FRENCH STITCHES



Finishing Material Application

Typical Wet drawer

Type of Finishing

A-TAPISUEDE

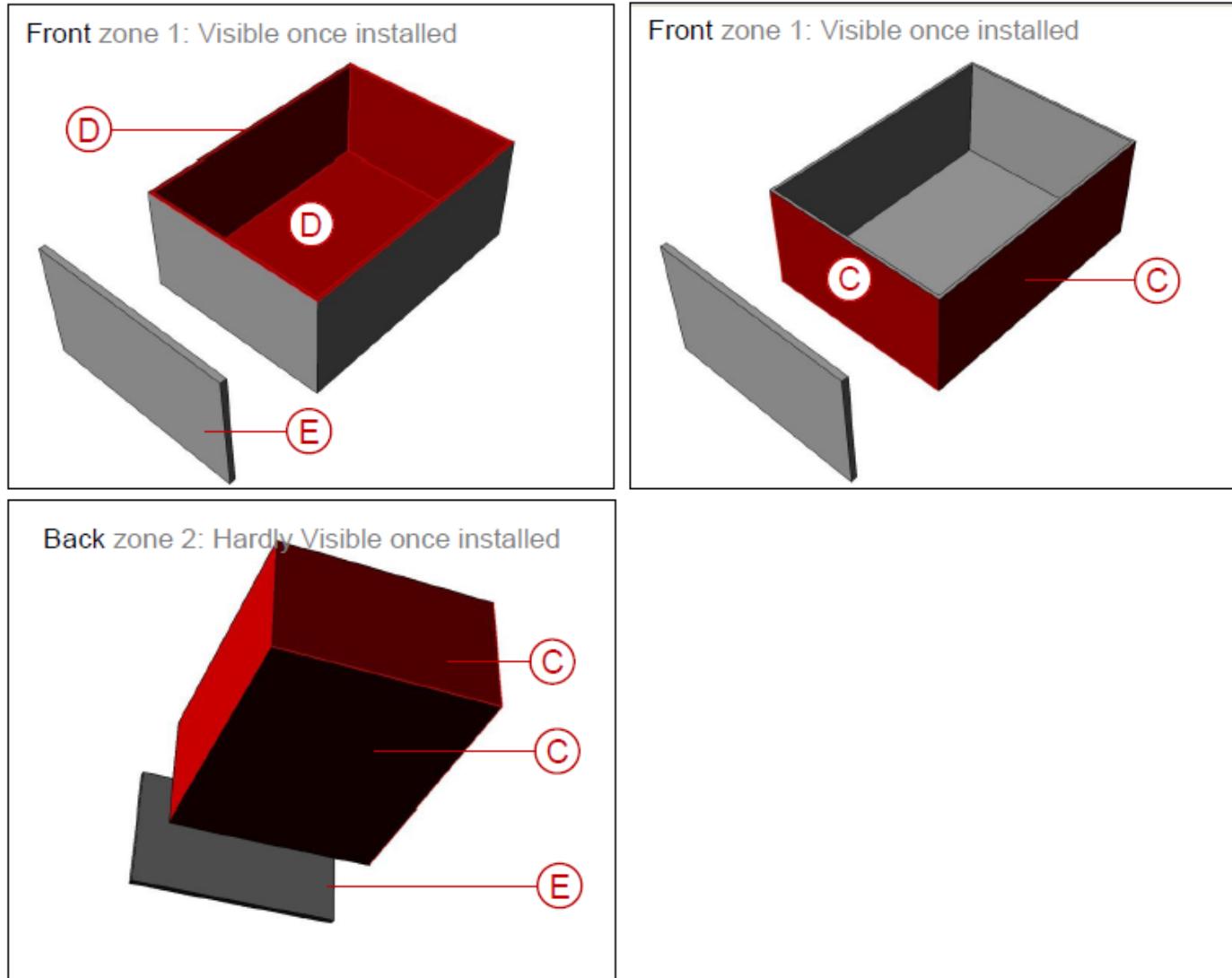
C-PAINT

Paint color to match A.

D-LAMINATE

Laminate color to match A.

E-FINISHED EXTERIOR SURFACE



Finishing Material Application

Typical Dry shelf

Type of Finishing

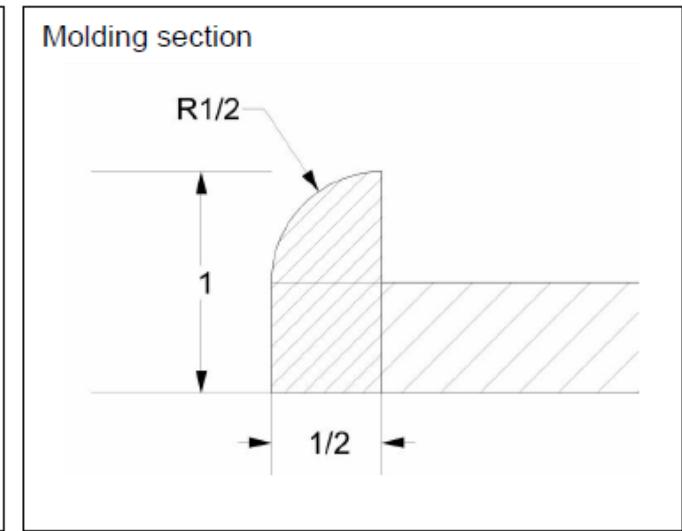
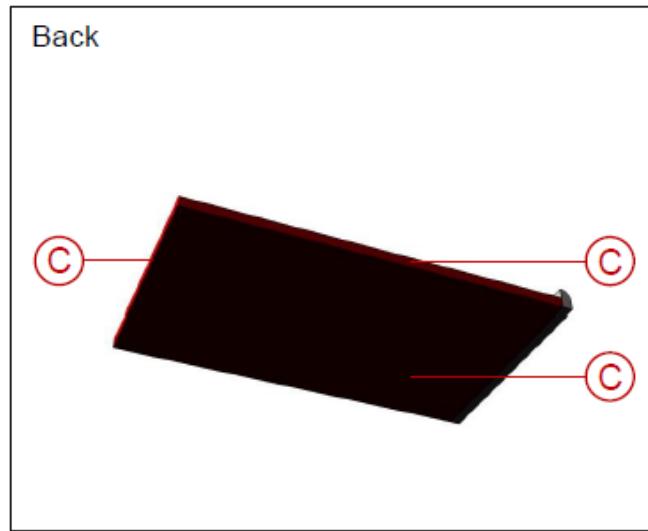
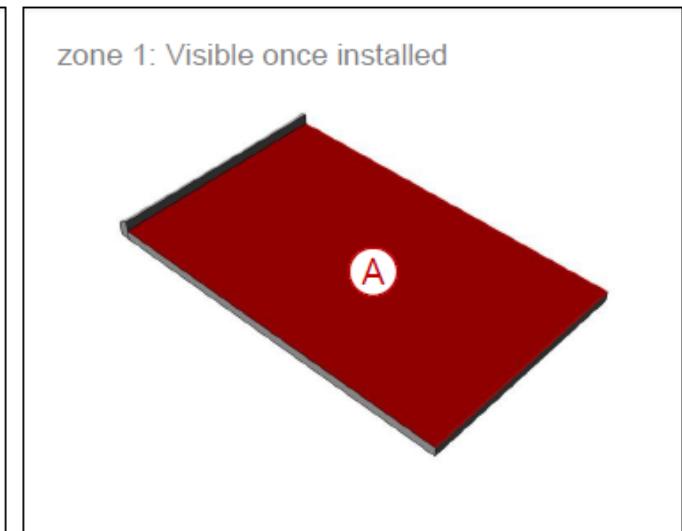
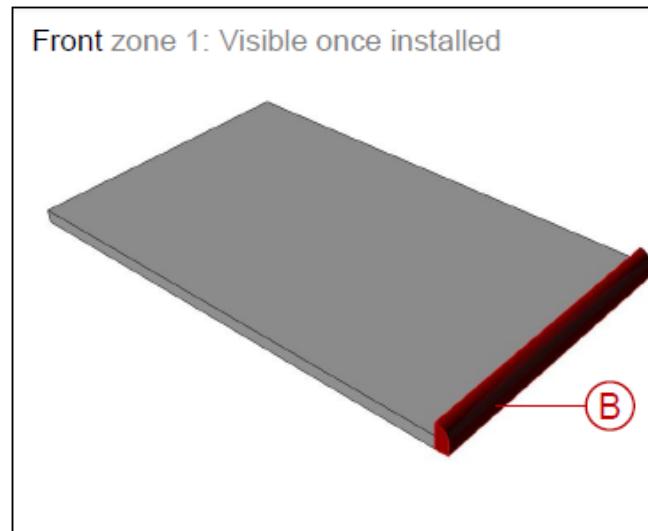
A-TAPISUEDE

B-LACQUER

Lacquer color to match A.

C-PAINT

Paint color to match A.



Finishing Material Application

Typical Wet shelf

Type of Finishing

B-LACQUER

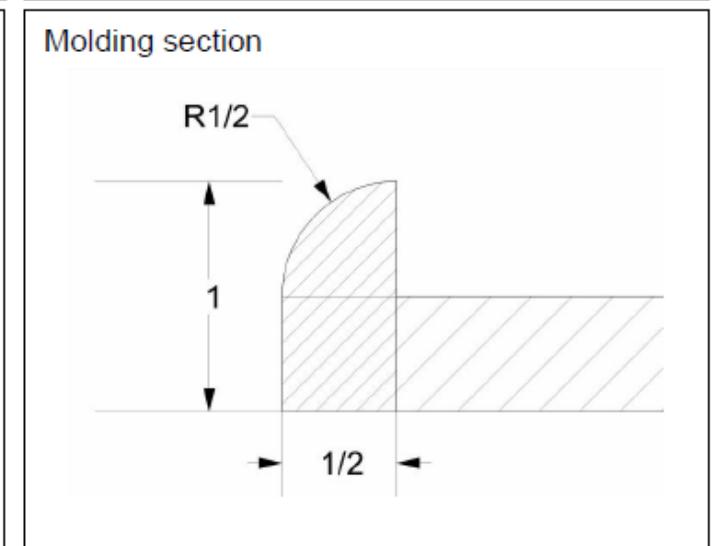
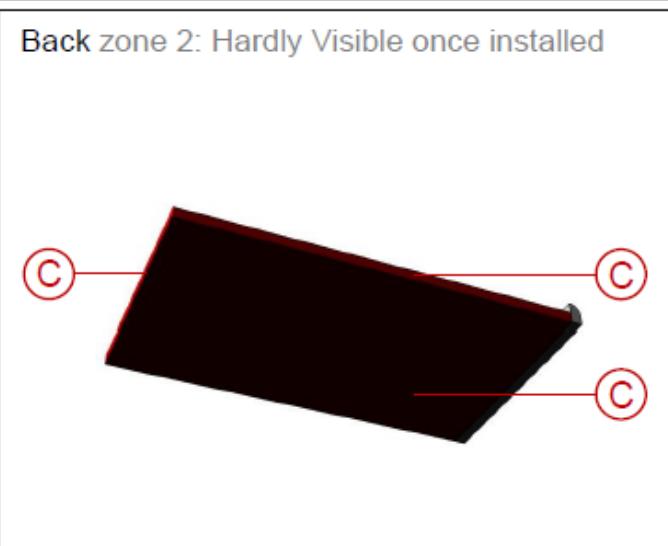
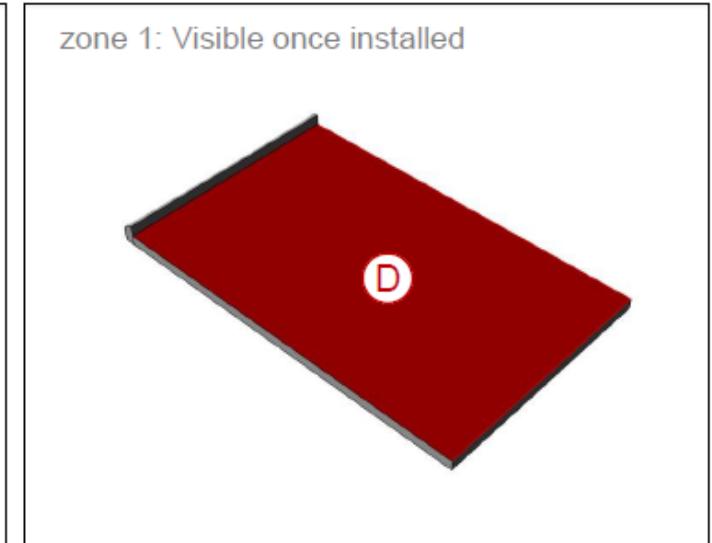
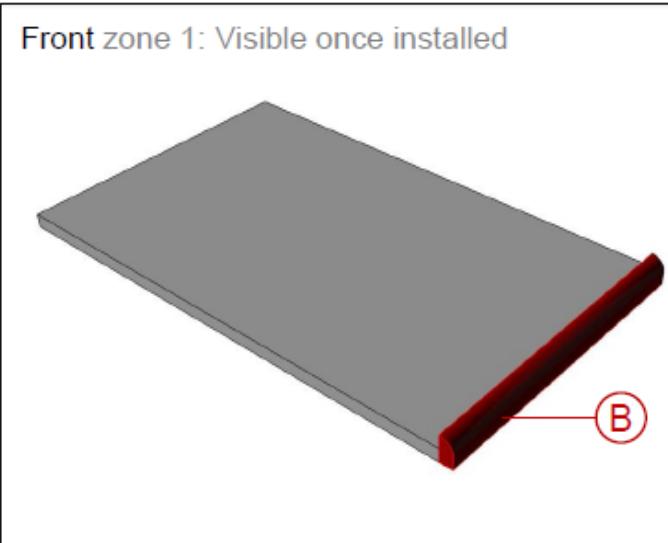
Lacquer color to match A.

C-PAINT

Paint color to match A.

D-LAMINATE

Laminate color to match A.



Panels Finshing Method

HONEYCOMB SANDWICH PANEL FINISHING METHODS

Hexcel Composites panels can, if required, be finished or protected by a wide variety of methods.

PAINT FINISHING	For aluminium face skin panels: Degrease. Self etch prime followed by standard paint specification treatment.	For woven and UD fibrous faced panels: Degrease, lightly abrade surface and fill to obtain a smooth finish as required, followed by standard paint specification treatment.
DECORATIVE FINISHES: e.g. - MELAMINE - WOOD VENEER - TEDLAR® - FABRICS - LEATHER - STONE	Degrease all surfaces to be bonded with an approved degreasing solvent which will not damage the material surfaces. Filling of fibrous faced panels may be necessary if thin decorative finish materials are to be used. Light abrading is recommended. Care must be taken not to abrade severely as this could damage the surface fibres. Ensure that all surfaces are dust free. A second degreasing process is advisable. Bond decorative finish to panel face using epoxy, polyurethane or resorcinol adhesive systems as appropriate. Bond under warm press pressure if possible. Porous or absorbent decor materials can be bonded using rubber based or polyurethane adhesive systems.	

The production of a test piece is advisable before completing any finishing operation, follow the adhesive manufacturer's recommendations.

WARNING: If decorative surfaces are to be applied to sandwich panels with contact adhesive, use ONLY petroleum or emulsion based adhesives. DO NOT use adhesives based on ketones or esters (acetates).

Hexcel Composites Technical Support can offer advice on suitable adhesives for sandwich panel fabrication (contact details are included on the back cover of this brochure).

Reference Material



Adobe Acrobat
Document

DESIGN GUIDE FOR G7000



Adobe Acrobat
Document

FACTSHEETS GLOBAL 7000_2015



Adobe Acrobat
Document

STYLING SHEET MONUMENTS INTERIOR
FINISHES



Adobe Acrobat
Document

SANDWICH STRUCTURE INSERTS

Reference Video

Machining Operation ,Potted Insert installation and Edge Filling Videos



Thank You



\$6.8 BILLION | 105,562 EMPLOYEES | 31 COUNTRIES