

Empirical Study for the VIDE

Leon van Gelder college

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1.0 Description (current situation of the space)

The gap (vide) is located in the school hall, on the west side of the building. As we have seen before, the access to the building is on the first floor, where is located the hall, the reception, a waiting area and rest, and a space for coffee. In the middle of this hall there is an opening space to the second floor, where there is another area with tables and chairs for students. These two spaces are connected by a hole in the floor of 25.5 m² with the dimensions of 6.9 x 3.7 m. As we can see in the attached drawings and plans, there are 2 metal square pillars with 300mm side, situated on the part of the smaller hole. In the same sides, the 2 pillars are connected with metal beams HEB300 HEB320 one on each side, at the edge of the space of 3.7 meters.

Concerning to the parts that measure 6.9 m are not bordered by any beam, which indicates that the gap is not fully lined.

This is a one-way spanning slab with prefabricated cement floor system, located perpendicular to the HEB300-330 and parallel to the sides of the gap of 6.9 m. Therefore we can say that in this part is very possible that there are concrete reinforcements for the slab before the gap.

2.0 Options for the Space

The school wants to close this gap (vide) for have more space at the above floor (second floor) and have a better use of the area.

For close this space we have to think in an auxiliary structure for put the floor and also the kind of floor. There are a lot of options for it, but logically not all of them are good, practical and easy for it.

The staff at the school suggests us that they would like to have there a glass floor, so we can consider this option inter alia.

Therefore for close the space we should find the best option. Keeping in mind for the design that this space is a passable area of a school. In addition the school is planning once this space will be closed, use it for rest area for the students placing food machines and with the possibly for a cafe area. So this area would be a traffic of people passing through.

On one side, there are options to make the auxiliary metal or wood structure, and moreover the flooring can be glass or wood or a combination between both.

On the other side, we must have in mind the weight representing this extra structure to the ground, and build a proper one that the general structure of the existing building can stand it. So we must know and calculate the moments of the structure designed to install and compared with overload values may be applied to the building. In this case the building is in use category C, "public access areas" and within the subcategory C3 "areas without obstacles to the free movement of people, such as public halls, administrative buildings, hotels,

exhibition halls, museums, etc. "so that he would apply a uniform load of 5 kN/m² and a concentrated load of 4 kN.

We can see at the following table the specifications at the Dutch regulations about use overload at the buildings.

Tabel NB.1 – 6.2 — Opgelegde belastingen op vloeren, balkons en trappen in gebouwen

Klasse van belaste oppervlakte	q_k kN/m ²	Q_k kN
Klasse A (wonen en huishoudelijk gebruik)		
A-vloeren	1,75	3 ^a
A-trappen	2,0	3
A-balkons	2,5	3
Klasse B (kantoorruimten)		
B-kantoorruimten	2,5	3
Klasse C (bijeenkomstruimten)		
C1-tafels	4,0 ^b	7
C2-vaste zitplaatsen	4,0 ^b	7
C3-zonder obstakels voor rondlopende mensen	5,0	7
C4-fysieke activiteiten	5,0	7
C5-grote mensenmassa's	5,0	7
Klasse D (winkelruimten)		
D1-kleinhandel	4,0	7
D2-warenhuizen	4,0	7
^a De puntlasten moeten zijn aangebracht op een oppervlakte van 100 mm × 100 mm; de gegeven waarden moeten ook zijn gebruikt voor constructies van ondergeschikte betekenis.		
^b Voor schoolgebouwen volstaat een vloerbelasting van 2,5 kN/m ² .		

In the analyze of the different options regarding the weight, we can know that the glass floor would be heavier that the wood floor, and also the wood structure would be lighter that the steel structure, but regarding the design is nicer the floor with glass and also because with glass the sun can go through and have more lighting the room and the area. In other hand, is better the steel structure for hold the glass floor tile, but not for the moorings of the wood tile.

Moreover, the auxiliary structure must be anchor and connected with the existent structure, so we should find a solution for it, because as we aforementioned, there is not a bean in the long part of the gap, therefore we should research about the best option for connect both structures and make sure that work in a set. In order to know that and find the best option, we will do a study with the different kinds of beams and with several option of execution, having in mind the moments of those add of the pieces for the flooring, in which will be really important the weight.



3.0 Factors to keep in mind for the VIDE

In general, the first factors to keep in mind in this space are also related with the comfort at the building, with the occupants and functions of the building and with the structural and construction aspects.

These factors are:

- Weight of the structure and floor
- Acoustics and reverberations
- Safety and security
- Use of the space
- Design

As we have said above, the weight of the auxiliary structure is really important, so In addition, the space modifications must abide by current regulations, also when dealing with schools must implement extra security for the items to be installed. There are specific regulations for the safety of the glass and also we can choose glasses with advanced safety and security technology for make it surer.

Besides, there are factors for the floor that we need have in mind too, because currently this gap (vide) provides brightness from the second floor to the first one, but it will not be a transparent glass to avoid fears and see everything through the glass. It will be a translucent glass that fulfill all the proprieties required. Also it would be a passable area, and also the school would like to adapt all the room for eat, so this floor will be scratched resistant as well as anti-slip.

In order to keep the comfort in both rooms, we should think about the materials. The glass and the steel are not porous surface, so it tends to have reverberations at the local or not be a comfort acoustic place. Then we should find a solution for do that this will not happen. Additionally, the glass will be better for the comfort of the rooms if it is Low-E with UV and thermal protection, because it can overheat the local when the sun go through it, inter alia.

Structural Glass floor

- Anti-slip
- Fracture safety (Safety and security)
- Brightness
- Low-E glasses
- Sun
- Reverberations and acoustic performance

4.0 Structural glass floor

The glass floors is a trend that increasingly extends, it provides many opportunities to offer different environments in one space.

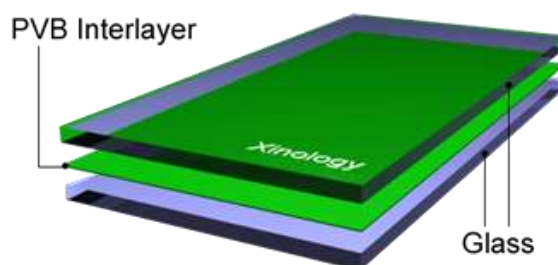
The glass floors in hallways, lobbies and stairwells, inter alia, will provide a unique identity that lies more than ever in the category of decorative structural elements. It is perfect for have more light through one room and other room.




The flooring glasses should be safeties with a proper resistance and fracture safety and security. This material is the laminated glass, which has inside a thin layer of *poli vinil butira (Pvb)* , a polymer with high level of adhesion and durability, linking different glass sheets forming plaques resistant and compact material. these sheets are joined together by heat or pressure

The glass and intermediate layers (interlayer) offer a variety of colors and thicknesses aimed at achieving the standards and requirements of the construction. So the laminated glass can be broken, but the fragments tend to adhere to the plastic layer (PVB) and largely remain intact, reducing the risk of injuries.

These laminated glass, prevents the dispersion of the glass when is damaged and break, being whole the piece despite the damage.





Laminated glass is considered a "safety glass" because it meets the requirements of the different regulations and European standards for construction. Heat strengthened glass and tempered glass can be incorporated into laminated glass units to further enhance the impact resistance. Protection against bombs shock waves, sound attenuation and bulletproof security and safety protection are the main uses of laminated glass.

This floor is used on steel or aluminum structures, studying the characteristics of each glass, choosing the type that best suits each case.

There are more innovations through the use of materials such as steel, glass sculptures and shape beautiful environments. Currently the elegance of glass can be combined with maximum safety using non-slip floors

5.0 Options for the VIDE

In the following points we can see pictures for the different options of this vide.

There are several options for the Vide, but I have just take in mind with glass floor and steel or wood structure.

5.1 Glass floor and steel glass structure



5.2 Glass floor and wood structure





6.0 Laminate Glass installation

For installing this type of glass holding the following systems should be considered:

- supported is installed in at least two of its parallel sides horizontal, straight using fasteners to prevent deflections. The laminated glass is made up of two or more tempered glass in its manufacture, installation guidelines for the tempered glass is considered. In no case should drill a hole of a laminated glass.
- With profiles and channels into two parallel edges.
- with mechanical clamping or structural silicone to two and four sides, is important to use props at the lower ends of the glass to prevent displacement of the glass by their own weight.

7.0 Vide Solution and Structure Calculations

For the calculation of the structure of the Vide we have chosen the option of metal structure and glass floor. Being the most unfavorable, as it will be the more weight has. It is also the option and solution since the beginning the school suggested us.


The complete calculations can be seen in the attached documents.

For the steel structure is selected two types of metal section, on the one hand the IPE and on the other hand the rectangular profile, as they are the most common in this type of structure and floors.

As we can see the details and drawings attached, the beams are placed across the gap - vide (beam length 3.65 m) with a spacing between beam and beam of 0.575 m. therefore in all the hole will be in total 11 beams to support the glass plates-tills. Each glass plate will have the dimensions of 0,575 m width and 0.73 m long, so will be a small steel plate placed between beam and beam to close the joint between the glass tills (will be in total of four joint). Moreover, there is also the possibility of placing the glass plates - tills with 0.575 x 0.9125 m dimensions, and adding glass plates placed between the beams, perpendicular to the glass tile in the same way to support and close the glass joint (will be 3 in total). In this way we will avoid placing metal frame in both directions and the total glass load can be equally supported.

For the calculation of the size and dimensions of profiles has been calculated with the two types described above.

For IPE, the IPE 120 does not fulfilled, and the IPE140 fulfilled at the section level, but at the element - component level did not meet the buckling of the profile. To check the lateral buckling, XLT was 0.128 then the equation that has to have a value less than 1 gave a solution of 3.49, therefore had to go to IPE160 profile, which is shown in the attached calculations.



For the rectangular profile, we took the profile (90x50x5) and it fulfilled, so we kept this one.

Regarding to the EAE, the profile IPE will be class 1 and the rectangular profile class 2. And it will be really important for the calculations and verifications of each one because will use different equation.

As we can see in the calculations, we took for the kind of steel S275. It has a weight of 7850kg/m^3 . And regarding to the glass, in general it has a weight of $2,5\text{Kg/m}^2 \times \text{mm}$ of glass thickness. We choose a glass with 3 layers (10+8+8) so in total it has 26mm of thickness and all the vide has a dimension of $25,185\text{m}^2$. In conclusion, the weight of the glass will be 65kg/m^2 . And as we say above, we took the overweight parameter of 5KN/m^2 .

Through the ultimate limit state (Situations that if would be achieved, will pose the total or partial collapse of the structure) we can figure out the “q” for all the calculations.

In the calculations we checked and verified to see if the section fulfills the resistance of the in the most unfavorable section. Besides, it's important to verify firstly the section resistance that the element, because if the first will not fulfill, the second nether.

In conclusion of the structure calculations, we have to choose the lightweight one of this both profiles.

- In one hand, the own weight of the IPE160 is $0,158\text{KN/m}$ and each beam is 3,65m long, so each beam will be $0,5767\text{KN}$. - 57,56kg

$$57,56\text{kg} \times 11 \text{ beams} = 634,37 \text{ kg in total}$$

- In the other hand, the rectangular profile own weight is $0,1\text{KN/m}$ and also each beam is 3,65m long, so will be $0,365\text{KN}$ - 36,5kg each beam.

$$36,5\text{kg} \times 11 \text{ beams} = 401,5 \text{ kg in total.}$$

And regarding the glass: $65\text{kg/m}^2 \times 25,185\text{m}^2 = 1637,025 \text{ kg}$

If we took the rectangular profile, this structure will has in total 2038,525 kg .



8.0 *Attachments*

Calculations

Drawings and plans

Other documents



Structural Glass floor

<http://www.saflex.com/es/ArchiStructural.aspx>

<http://www.saflex.com/es/saflex-dg41-structural-interlayer.aspx>

http://www.saflex.com/es/DownloadLibrary.aspx?f1=ARCHI&f2=ARCHI_STRUCTURAL

otra compañía

<http://www.sunguardglass.es/SpecificationsResources/index.htm>

http://www.corbalan.com/Productos/Laminares/vidrio_laminado_pisable.html

Emparrillados de mayas para sujetar el vidrio quizás, y para hacerlo más seguro.

<http://www.spr.es/>

<http://todoentramex.com/materiales-y-acabados/materiales-rejillas/>

<http://www.rayter.es/es/rejillas-pavimentacion>

Quality glass – Cristal transitable más delgado, ligero y seguro

<http://www.c24h.es/suelo-de-cristal-transitable-cristales-para-suelos-de-cristal.html>

otra casa de vidrio laminado para suelo con catalogo

de donde he sacado las referencias técnicas documento pdf.

http://www.yourglass.com/agc-glass-europe/gb/en/laminated_safety_glass/stratobel/brand_description.html

catalogo: http://www.yourglass.com/agc-glass-europe/gb/en/toolbox/stratobel/brand_availabilities.html

<http://www.yourglass.com/agc-glass-europe/gb/en/products.html>

http://www.yourglass.com/agc-glass-europe/gb/en/laminated_safety_glass/stratobel/brand_summary.html

Esta página tiene detalles en pdf y en dwg. Parece que esté bastante bien.

<http://www.ibpglassblock.com/glasswalk.htm>

detalle solo en plan imagen <http://www.qbgreece.com/default.aspx?section=detail&id=25027>

para estructura metálica de la Vide

<http://www.arcad.com/details/steeler/prod2069.html?coid=46754>

otra pagina de vidrio para suelos

http://www.rogerwilde.com/firefloor_made_measure.htm#measure

suelos de cristal con protección al fuego: <http://www.fireglass.com/media/coverage/fire-rated-glass-flooring.aspx>

Fotos de las vigas <http://www.lcristobal.com/loft-cronos>

Madera http://www.elarcodepiedra.es/index_archivos/Detalles_constructivos_UPN_LPN.htm

Detalles constructivos

http://www.elarcodepiedra.es/index_archivos/Detalles_constructivos_UPN_LPN.htm

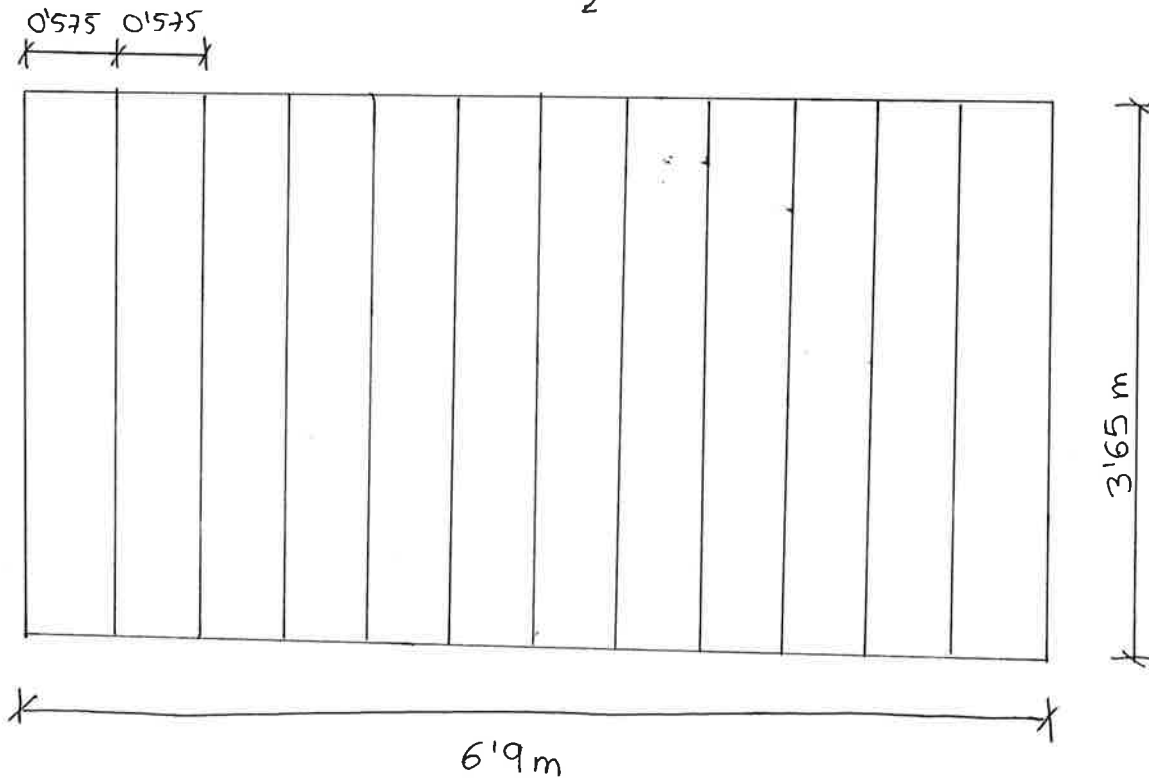
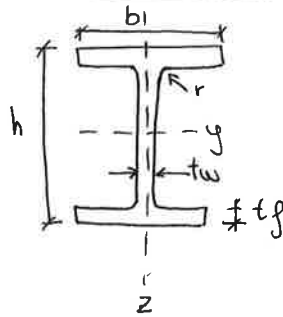
Suelo de cristal <http://www.sevasa.com/productos/crisamar%C2%AEstep-decor-grabados>

<http://www.glassblockdesigns.com/st.php>

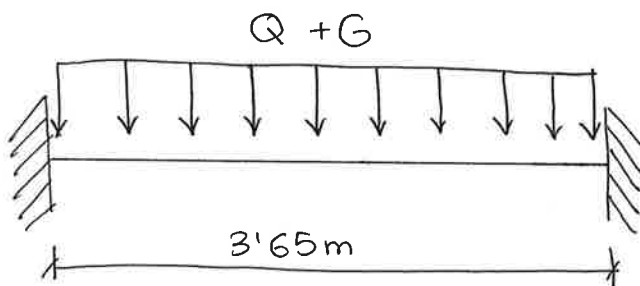
<http://www.glasspods.com/index-8.html>

STRUCTURE CALCULATIONS

IPE Profile



11 IPE Profiles



$Q = \text{Variable}$

$G = \text{Permanent}$

Own weight glass = 0.65 KN/m^2

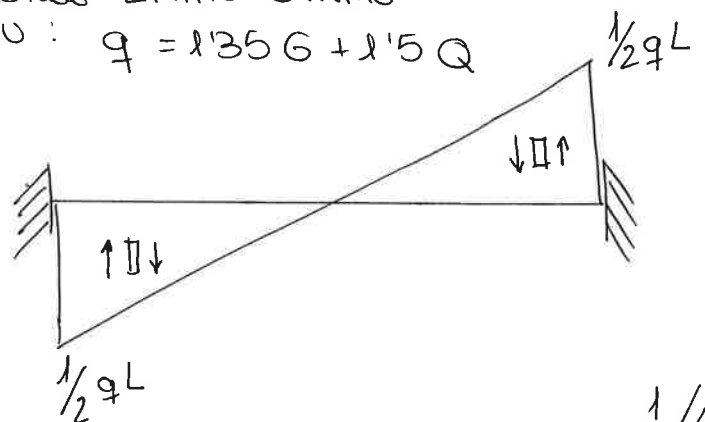
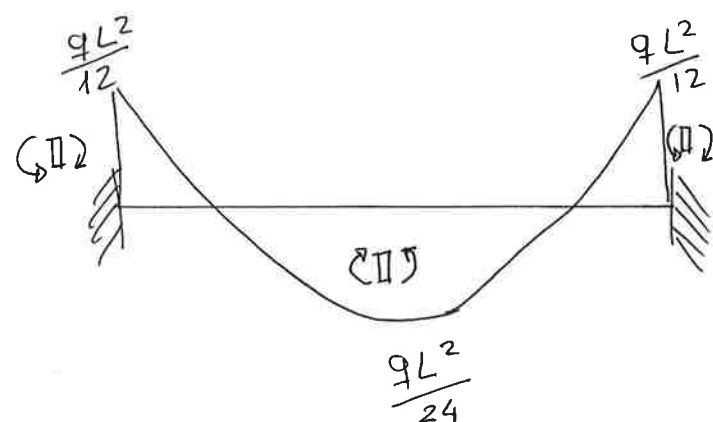
sbc (overweight use) = 5 KN/m^2

STEEL \rightarrow S275

$\gamma_{\text{STEEL}} = 78.5 \text{ KN/m}^3$

Estado Limite Último

ELU: $q = 1.35G + 1.5Q$



IPE 160

$$A = 2009.26 \text{ mm}^2$$

$$PP_{IPE} = 78.5 \cdot 2009.26 \cdot 10^{-6} = 0.158 \text{ KN/m}$$

$$g = 1.35 (0.158 + 0.374) + 1.5 \cdot 2.875 = 5.03 \text{ KN/m}$$

Tabla de Clasificación de Secciones \rightarrow ACERO S275 \rightarrow IPE 160
Clase 1

VERIFICATION OF THE SECTION

$$\eta = 1.2$$

$V_{ed} \leq 0.5 V_{pl,Rd} \rightarrow$ Cumple la Resistencia a nivel Sección y no será necesario reducir la sección
EAE 34.7.1

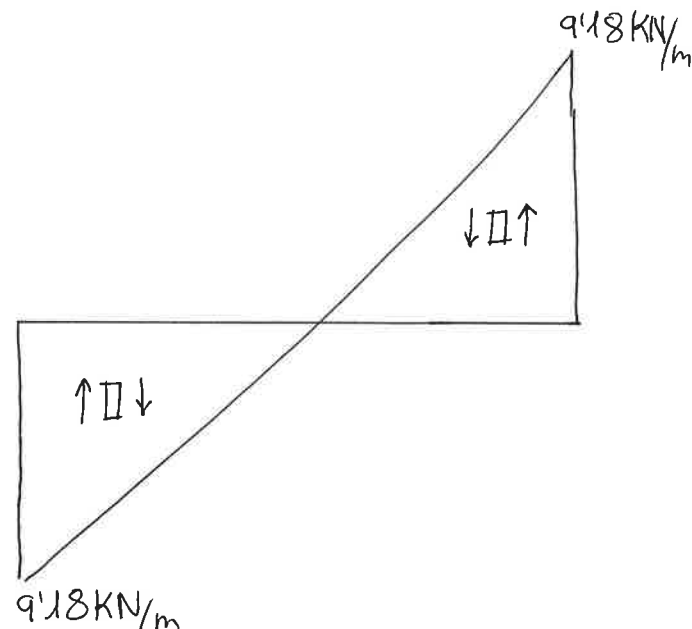
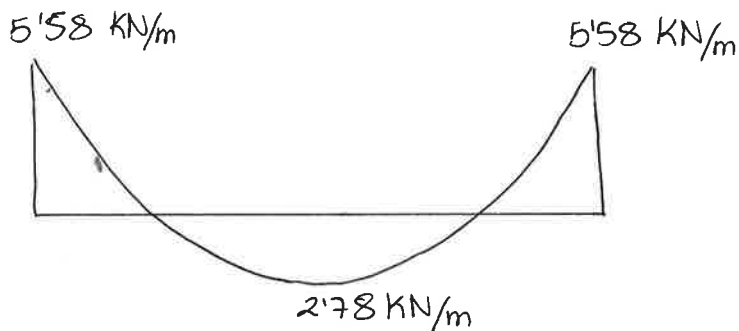
$$V_{pl,Rd} = A_v \cdot \frac{f_{yd}}{\sqrt{3}}$$

$$A_v = \eta \cdot h_w \cdot t_w = 1.2 \cdot 145.2 \cdot 5 = 871.2 \text{ mm}^2$$

$$f_{yd} = \frac{f_y}{\gamma} = \frac{275}{1.05}$$

$$V_{pl,Rd} = 871.2 \cdot \frac{275/1.05}{\sqrt{3}} = 131.73 \text{ KN}$$

$9.18 \text{ KN} < 0.5 \cdot 131.73 = 65.8 \text{ KN} \rightarrow$ Cumple Resistencia a Sección



→ Comprobación a nivel Sección del perfil. IPE 160
EAE 34.7.1

$$M_{pl,Rd} = W_{pl} \cdot f_{yd} = 123'86 \cdot 10^{-6} \cdot \frac{275 \cdot 10^3}{1'05} = 32'4 \text{ KN}\cdot\text{m}$$

$M_{pl,Rd} \geq M_{ed}$

$32'4 > 5'58 \rightarrow \text{Cumple}$

VERIFICATION OF THE ELEMENT

Elemento sometido a flexión + Cortante (EAE ap. 35.7.1)

$$S_n \frac{V_{Ed}}{V_{bw,Rd}} < 0.5 \rightarrow \text{Comprobación elemento a axil + flexión}$$

$$V_{bw,Rd} = \frac{\chi_w (\gamma_w / \sqrt{3}) h_w \cdot t_w}{\gamma_{M1}}$$

→ Esbeltez del alma λ_w (Rigidizadores en los apoyos)

$$\lambda_w = \frac{h_w}{86'4 t_w \sqrt{\frac{235}{f_y}}} = \frac{131'73}{86'4 \cdot 5 \sqrt{\frac{235}{275}}} = 0'3298$$

$$\lambda_w < 0'83/\eta \rightarrow \chi_w = \eta = 1'2$$

$$V_{bw,Rd} = \frac{1'2 (275 / \sqrt{3}) 131'75 \cdot 5}{1'05} = 119'5 \text{ KN}$$

~~$$\frac{V_{Ed}}{V_{bw,Rd}} = \frac{15'68}{119'5} = 0'131 < 0'5 \rightarrow \text{Comprobación a flexión + axil.}$$~~

$$\frac{V_{Ed}}{V_{bw,Rd}} = \frac{9'18}{119'5} = 0'077 < 0'5 \rightarrow \text{Comprobación a flexión + Axil.}$$

→ Caso de sección de Perfil Abierto
Caso 2 (EAE ap. 35.3)

$$(1) \frac{C_{my} \cdot M_{yEd}}{\chi_{LT} \cdot M_{y,Rk}} \leq 1$$

• Elemento sometido a cargas transversales → $c_{my} = 1$

• $M_{yEd} = 5'58$

• $M_{y,Rk} = f_y \cdot W_y$ (Sección de clase 1)

$$M_{y,Rk} = f_y \cdot W_{pl} = 275 \cdot 10^3 \cdot 123'86 \cdot 10^{-6} = 34'06 \text{ KN} \cdot \text{m}$$

↳ (EAE ap. 34.4)

• χ_{LT} (EAE ap. 35.2.3)

$$\chi_{LT} = 1 / \lambda_{\phi} = \frac{K_c \cdot L_c}{\lambda_{\phi} \cdot \lambda_E} \leq \lambda_{co} \cdot \frac{M_c \cdot R_d}{M_y \cdot E_d}$$

$$K_c = 0'9$$

$$L_c = 3'65 \text{ m}$$

$$\lambda_{\phi} = 16'54 \text{ mm} = 0'01654 \text{ m}$$

$$\lambda_E = 93'9 \sqrt{\frac{235}{f_y}} = 86'8$$

$$\lambda_{co} = 0'5$$

$$M_c \cdot R_d = \frac{W_{pl} \cdot f_y}{1'05} = \frac{275 \cdot 10^3 \cdot 123'86 \cdot 10^{-6}}{1'05} = \frac{32'34}{\text{KN} \cdot \text{m}}$$

$$\lambda_{\phi} = \frac{0'9 \cdot 3'65}{0'01654 \cdot 86'8} \leq 0'5 \cdot \frac{32'34}{5'54}$$

$2'888 < 2'92 \rightarrow$ Check the sag of the lateral of the profile.

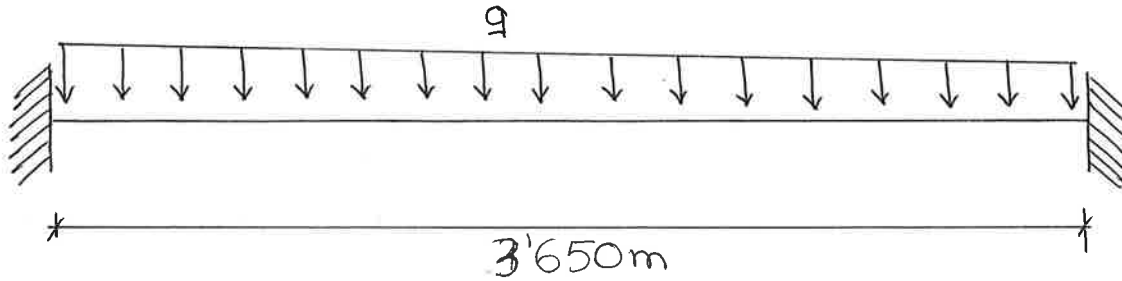
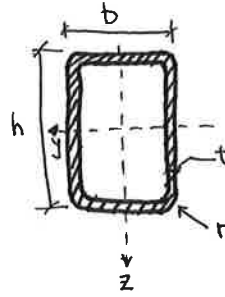
and $\chi_{LT} = 1$

$$(1) \frac{1 \cdot \frac{5'58}{1'05}}{1 \cdot \frac{34'06}{1'05}} = \frac{0'172}{0'34} \rightarrow \text{Cumple IPE 160}$$

STRUCTURE CALCULATIONS

Rectangular Profile

CLOSED SECTION



GLASS

$$\text{own weight}_{\text{glass}} = 0.65 \text{ KN/m}^2 = 0.65 \cdot 0.575 = 0.374 \text{ KN/m}$$

$$\text{sbc (ower use weight)} = 5 \text{ KN/m}^2 = 5 \cdot 0.575 = 2.875 \text{ KN/m}$$

Profile $\rightarrow 90 \times 50 \times 5$ (h x b x t) mm

$$A = 1273 \text{ mm}^2$$

$$\gamma_{\text{STEEL}} = 78.5 \text{ KN/m}^3$$

STEEL

$$\text{Own weight (beam profile)} = 0.1 \text{ KN/m}$$

$$\rightarrow 1273 \cdot 10^{-6} \cdot 78.5$$

ELU

$$q = 1.35 (0.374 + 0.1) + 2.875 \cdot 1.5 = 4.9524 \text{ KN/m}$$

VERIFICATION OF THE SECTION

(EAE ap. 34.5) \rightarrow Sometido a cortante + flexión

$$V_{ed} \leq 0.5 V_{pl,Rd}$$

$$V_{pl,Rd} = A_v \cdot \frac{f_{yd}}{\sqrt{3}}$$

$$\text{Rectangular Profile : } A_v = \frac{A \cdot h}{b+h} = \frac{1273 \cdot 90}{90+50} = 818'36 \text{ mm}^2$$

$$V_{pl,Rd} = 818'36 \frac{275/1.05}{\sqrt{3}} = 123'74$$

$$9'03 < 0.5 \cdot 123'74 \rightarrow \text{FULFILL THE PROFILE } 90 \times 50 \times 5$$

⊛ Next Page:

VERIFICATION OF THE ELEMENT

"Esta sometido a flexión + Cortante, pero al ser una sección cerrada y ser $\frac{V_{ed}}{V_{bw,Rd}} < 0.5$ Comprobaremos el caso 1 de la EAE

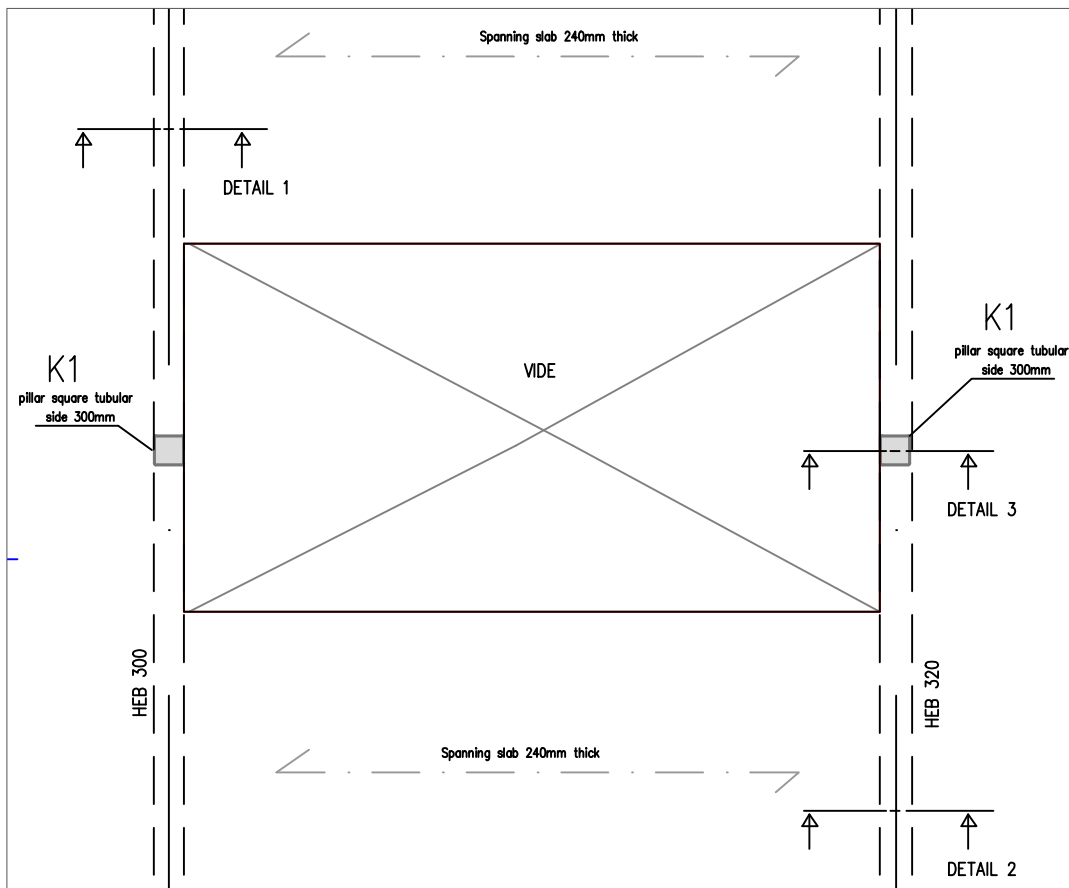
(ap. 35.3) Método Simplificado.

$$\frac{C_m \cdot M_{ed}}{\frac{M_{RK}}{\gamma_{M1}}} \leq 1$$

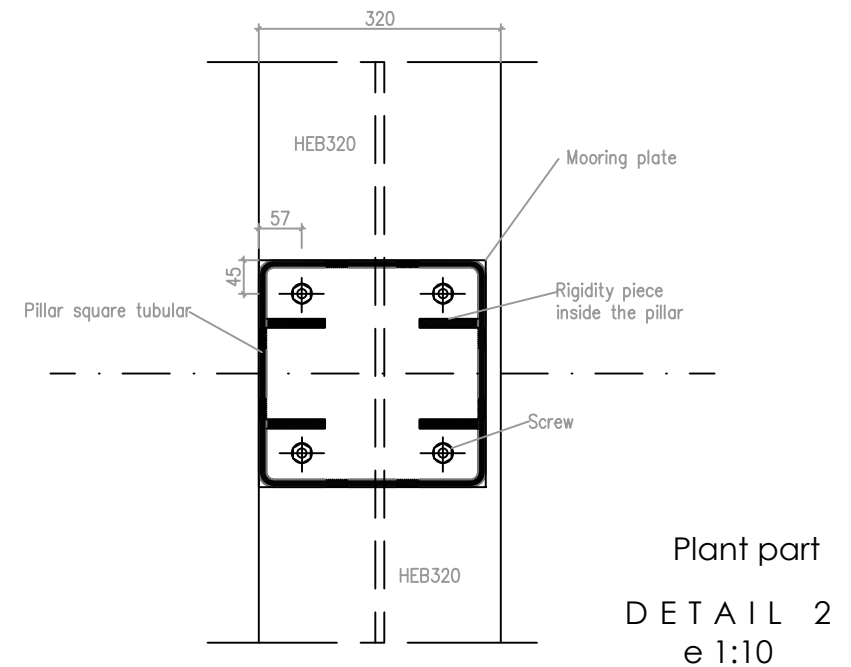
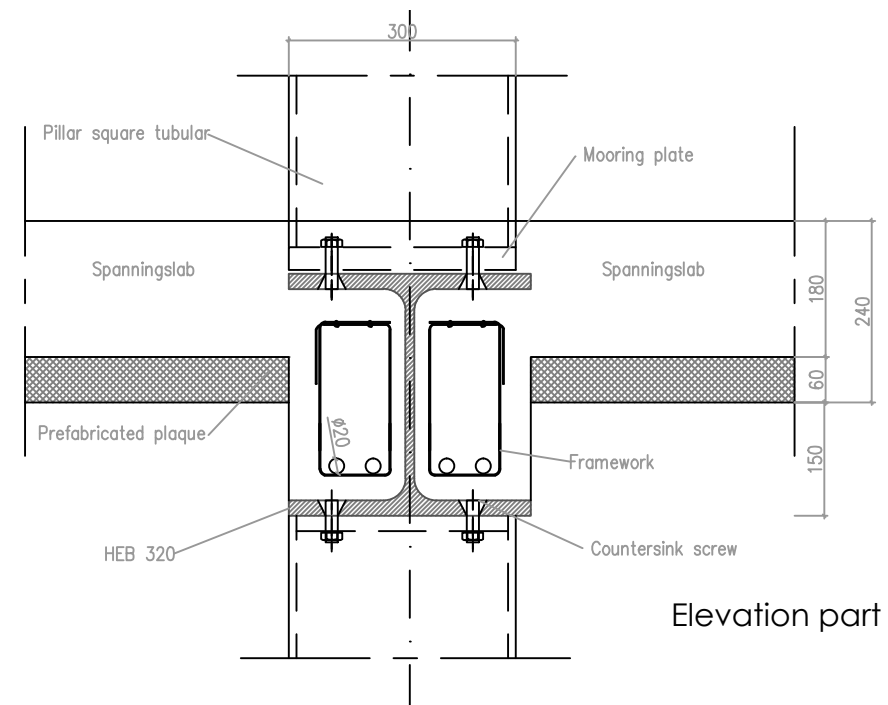
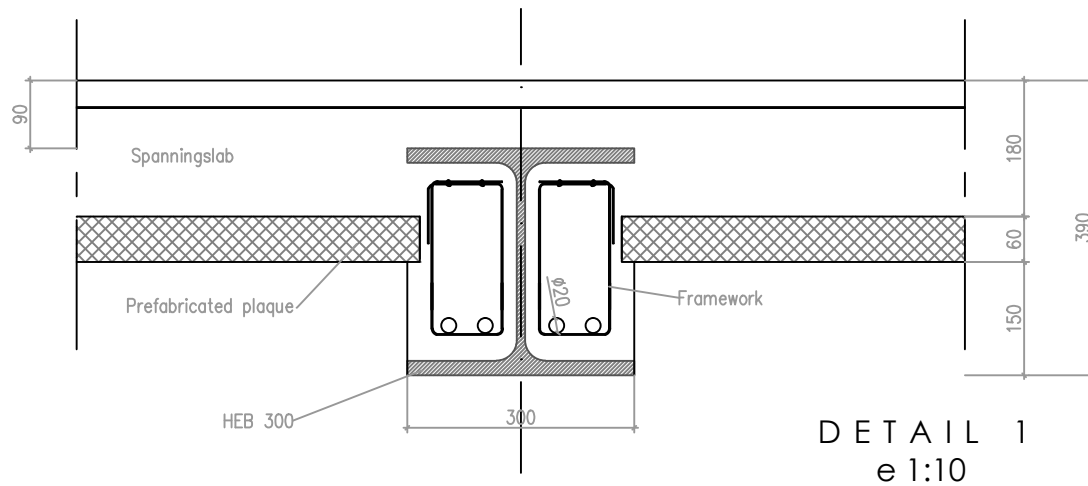
$C_m = 1$ (elemento sometido a cargas transversales)

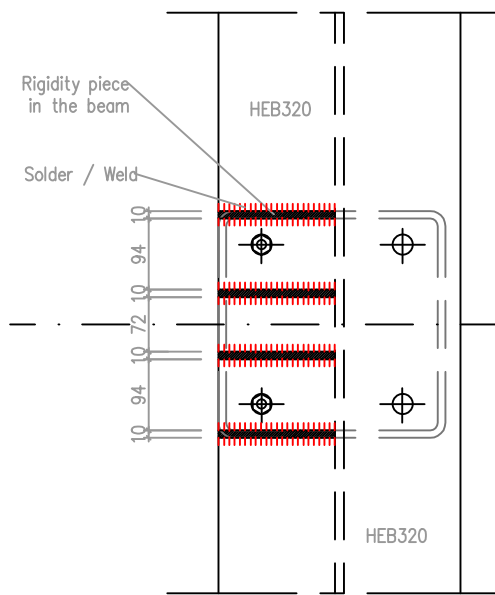
$$M_{RK} = f_y \cdot W_{pl} = 275 \cdot 10^3 \cdot 35'99 \cdot 10^{-6} = 9'89$$

$$\frac{1 \cdot 5'5}{\frac{9'89}{1'05}} = 0'584 < 1 \rightarrow \text{FULFILL THE SECTION}$$



V I D E
e 1:75

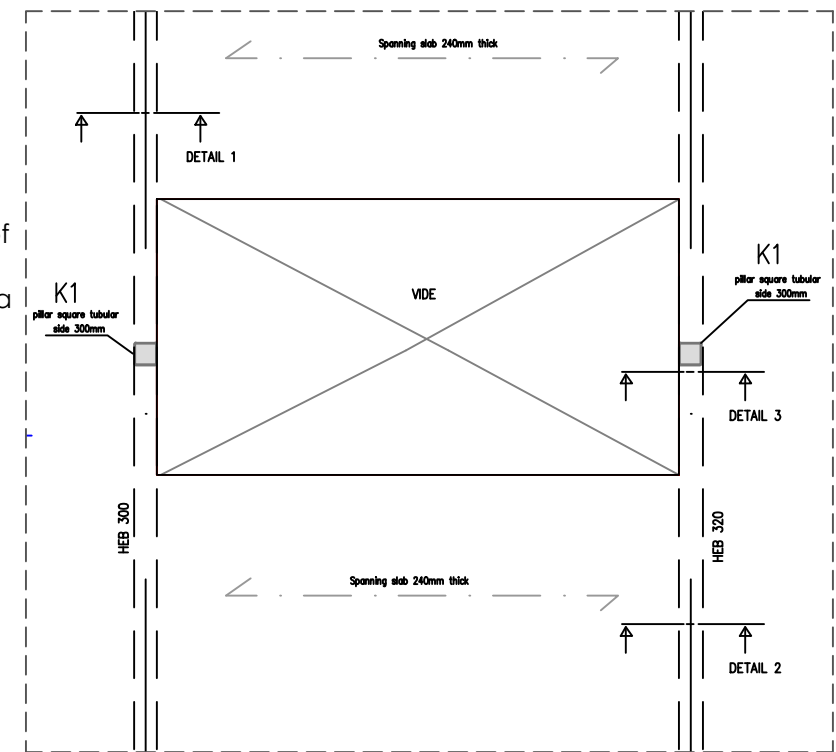




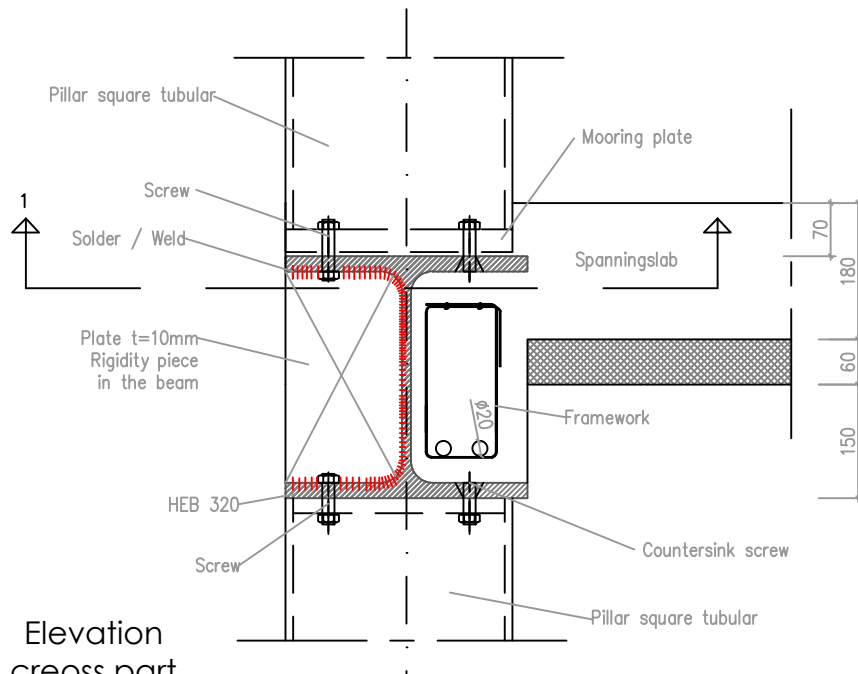
Plant part
cross 1

Current situation of the beams and pillars at the vide.

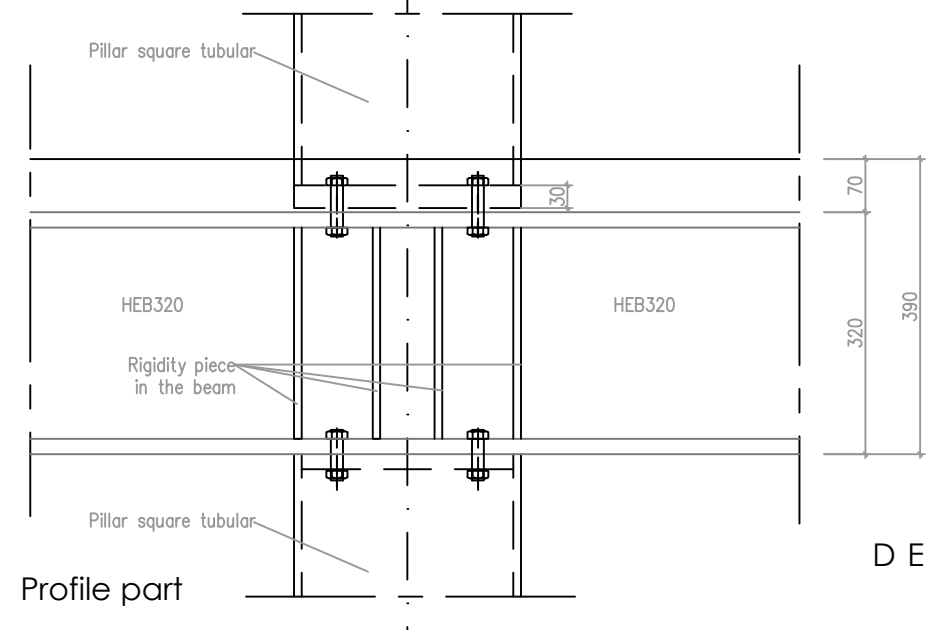
The detail 3 show how is connected the beam HEB320 with the pillar and with the spanningslab. The beam is connected to the pillar with screws and where it is located, there are at the middle of the beam, rigidity plates for bear the weight. As we can see in the following pictures, they put a plate around all the beam with the aim to cover the core of the beam and embellish it.



V I D E
e 1:100



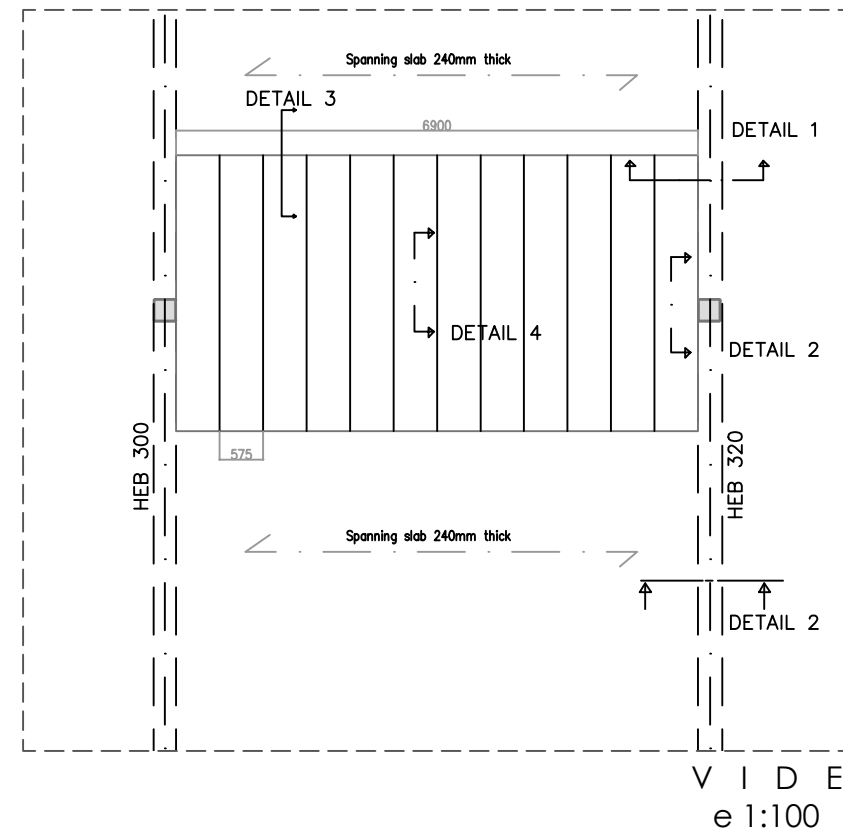
Elevation
cross part



Profile part

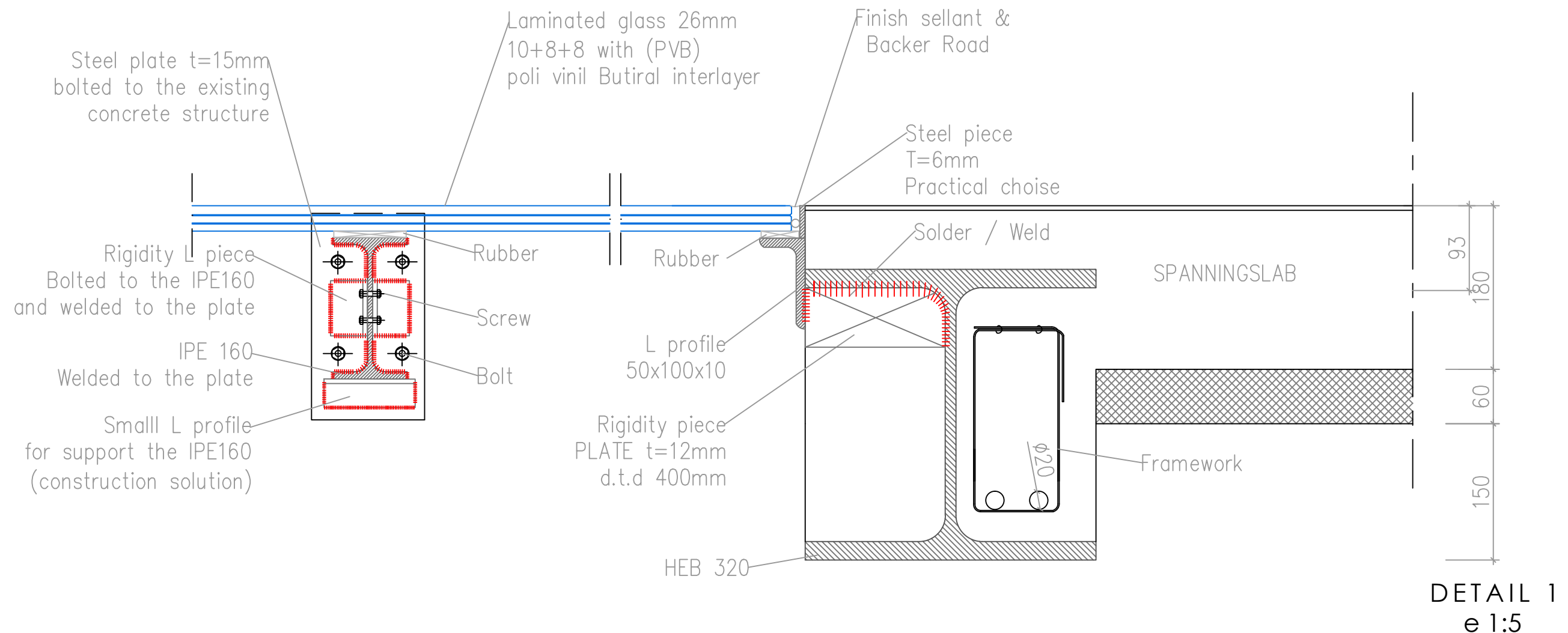
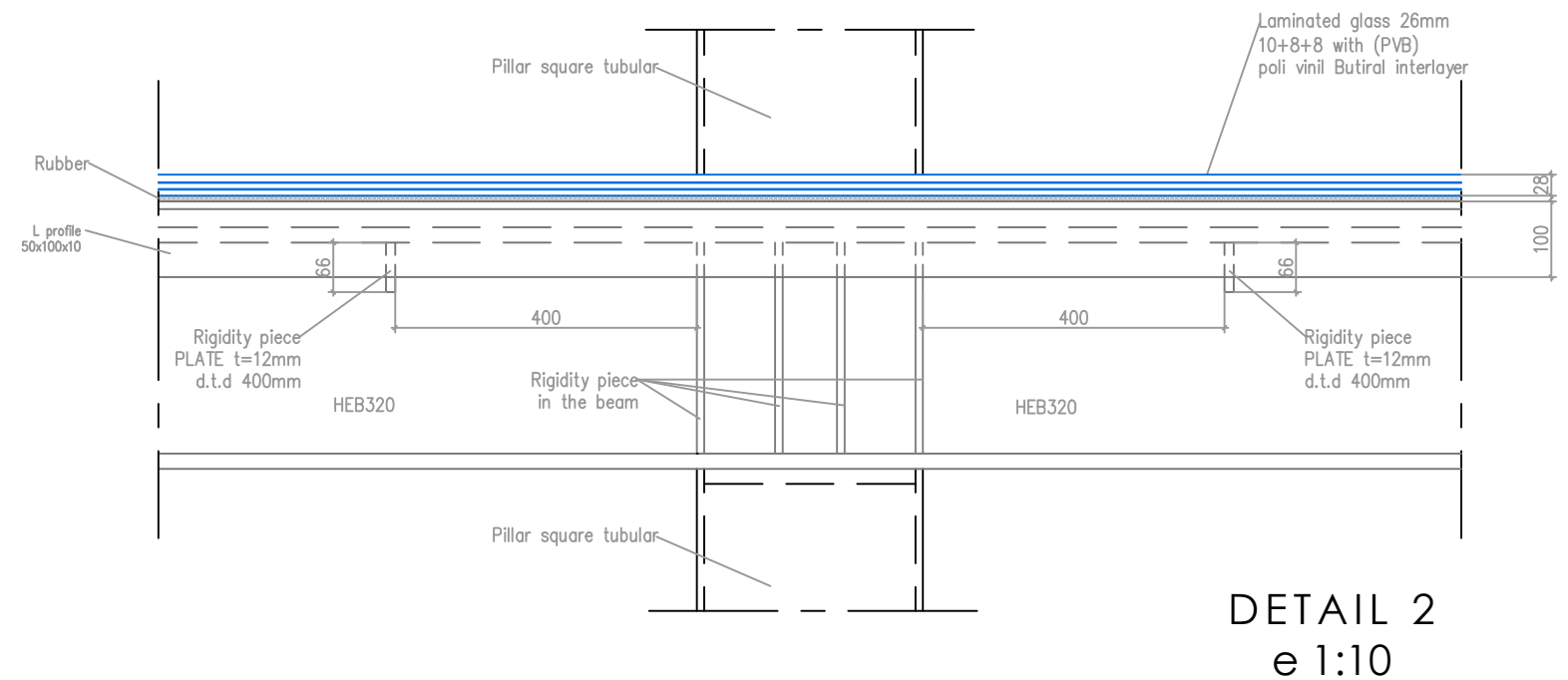
DETAIL 3
e 1:10

V I D E S O L U T I O N S

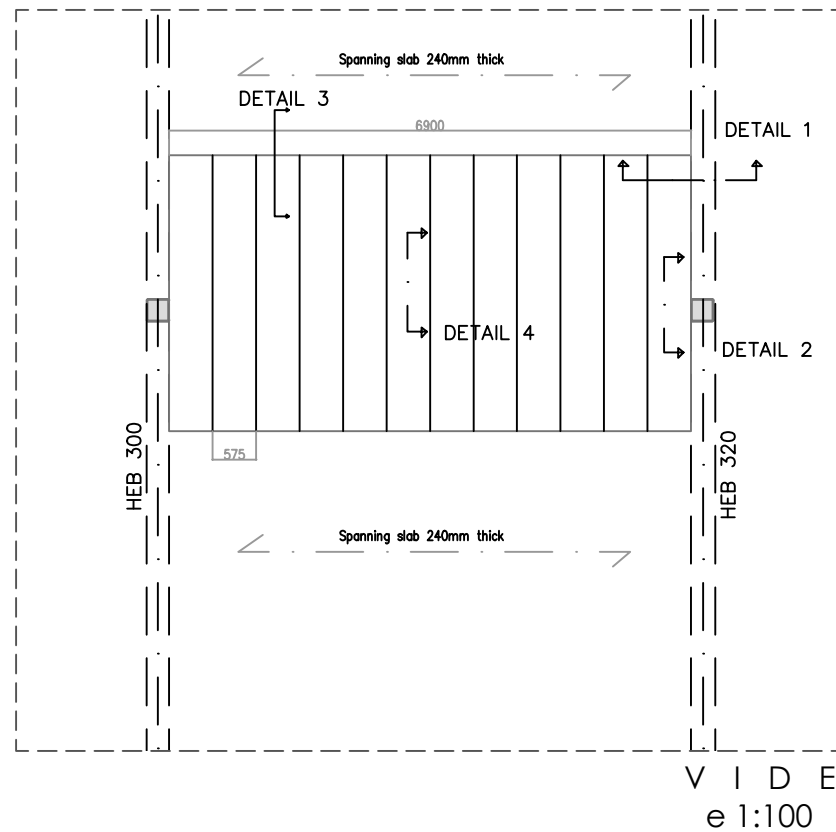


In the details 1 & 2 we can see how we can hold the steel structure to the existent struture and how to connect the new structure to the beams HEB at the borders of the Vide.

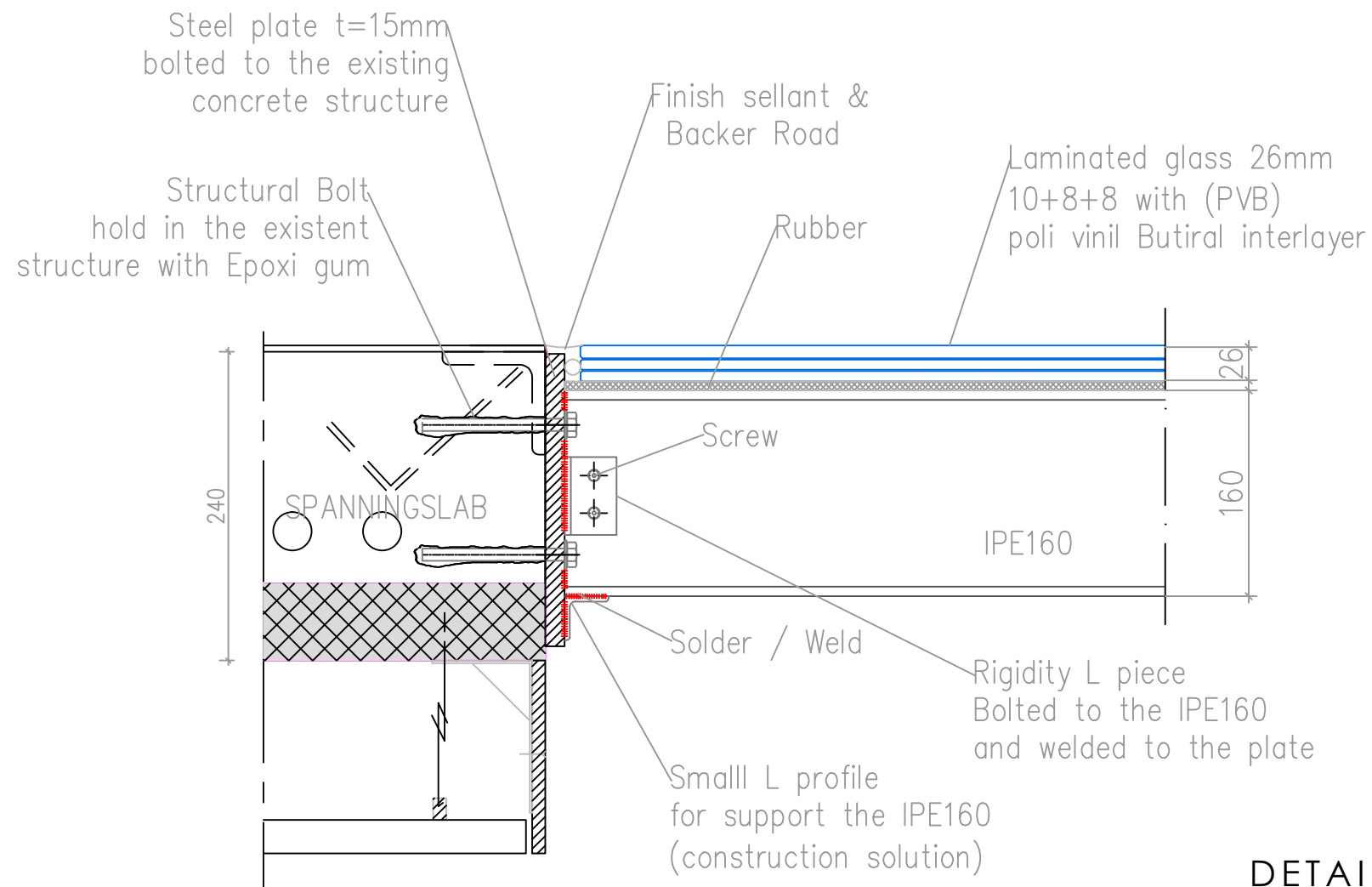
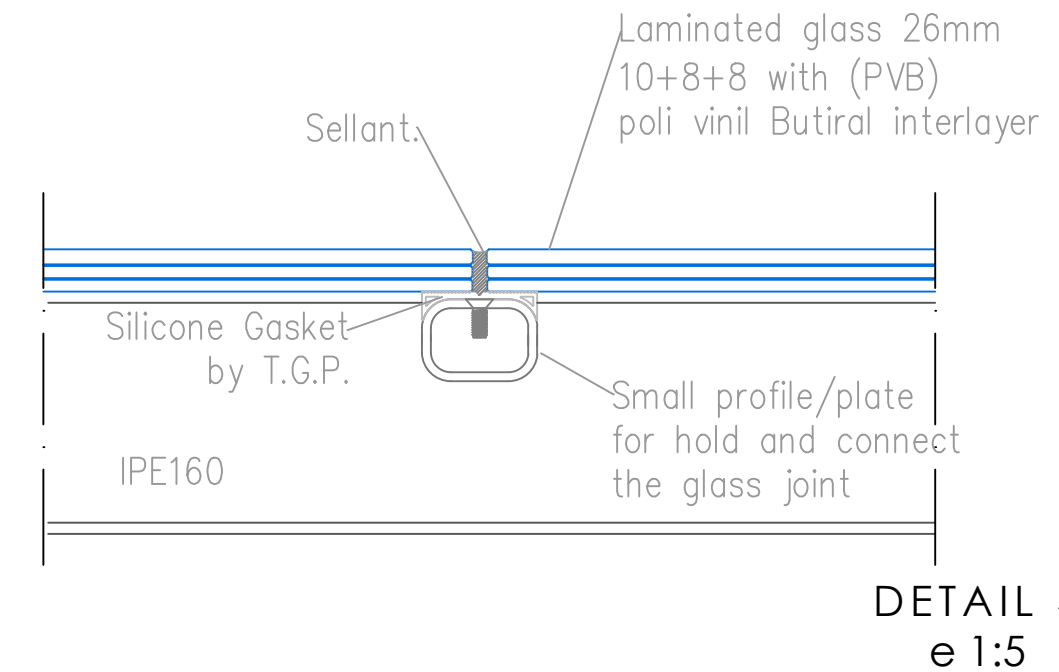
Vide solution with steel structure IPE160 and glass floor.



V I D E S O L U T I O N S



In the detail 4 we can see how will be connected the different glass tills. There will be a small profile or a plate welded between the beams to hold the gasket and seal it.



Vide solution with steel structure IPE160 and glass floor.

In the detail 3 we can see the connection between the beam IPE160 and the existent spanningslab.

The beam IPE160 will be welded to a steel plate $t=15\text{mm}$.and It will be connected by structural bolts held in it.

For do that, firstly, we must hold the steel plate $t=15\text{mm}$ in the structure by the bolts and epoxy gum,and weld to the plate the digidity L pieces and the small L profilefor support the beam. Later we will put the beam and it will be bolted to the rigidity L pieces and welded to the steel plate.

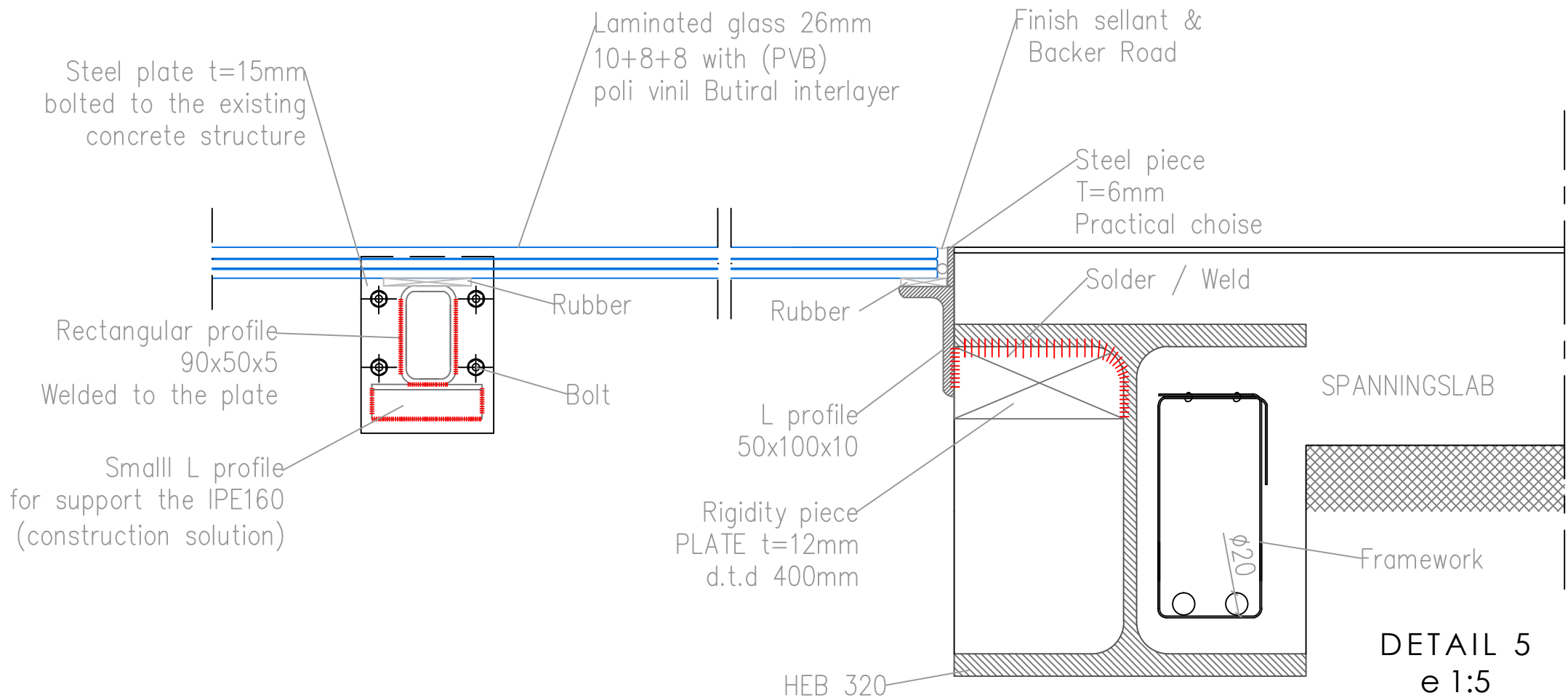
After that we will put the small profiles or plates for the glass gaskets, as we show in the detail 4.

For hold the steel plate to the structure we must keep in mind the framework and the existent installations that it would has, for don't drill it.

V I D E S O L U T I O N S

Vide solution with steel structure
Rectangular Profile (90x50x5)
and glass floor.

This detail (5) is the same cross section
that the previous detail 1, but in this
section, the solution is made with the
rectangular profile (90x50x5)





fireframes[®]
CLEARFLOOR SYSTEM

**Technical Glass Products
Product Documentation
& Installation Manual**



FIREFRAMES CLEARFLOOR® SYSTEM PRODUCT DOCUMENTATION AND INSTALLATION MANUAL

Fireframes ClearFloor® System allows for large horizontal expanses of fire-rated glass walking surfaces in both interior and exterior applications. Envision expansive transparent walking surfaces bringing natural daylight into spaces below, and a unique sensation of awe from above with more glass and less frame. Along with exterior applications, lobbies and atriums are well suited to the use of fire-rated glass floors to bring a new type of dynamic. The ClearFloor System is just one of the many expressions of creativity that are changing traditional thinking about fire-rated glass and framing. The future of fire safety has never looked so good.

For specifications, photographs and additional information contact:

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CSI-SPECIFICATION

Full copies of our detail drawings and CSI format specifications can be downloaded from our Web site or obtained from our office. This Product Documentation and Installation Manual provides general information and assembly/installation instructions for Fireframes ClearFloor System frames. Please consult TGP project drawings and Technical Glass Products for specific project details.

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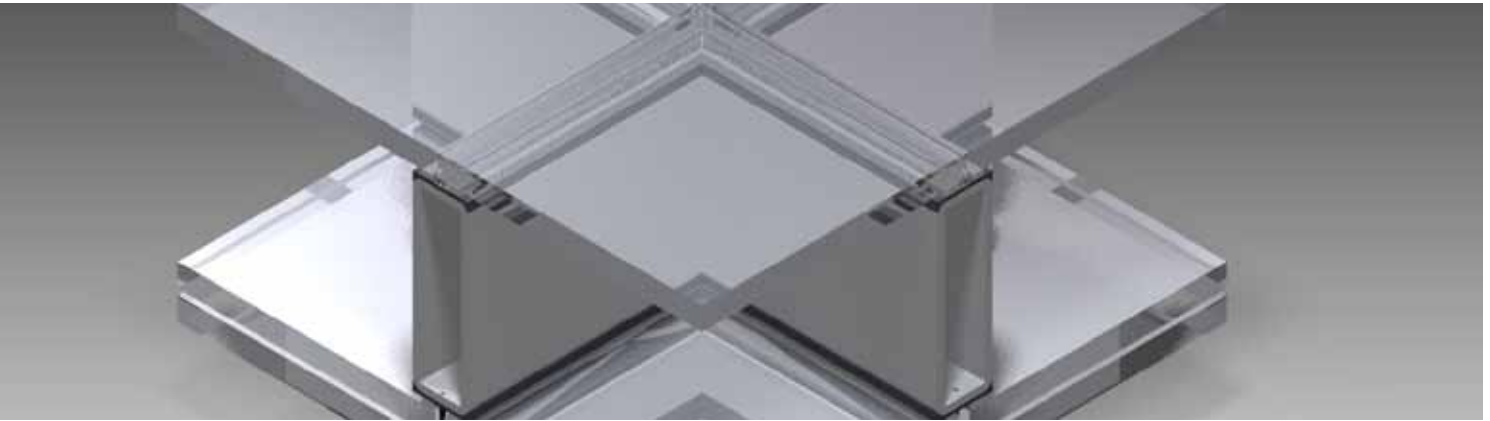
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GENERAL INFORMATION
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TOUCH UP PROCEDURE

GENERAL INFORMATION**FIRE-RATED GLASS FLOORING SYSTEMS**

The Fireframes ClearFloor® System is revolutionizing fire-rated framing. Fabricated in the United States, Fireframes ClearFloor System frames are listed and labeled with UL and ULC.

This advanced glass floor system is impact-resistant and fire-rated for two hours – the only glazed floor in North America with that level of protection.

Fireframes ClearFloor can be used as a durable, non-slip walking surface, and is approved for loads up to 150 psf. Listed by Underwriters Laboratories (UL), the system is available for both interior and exterior applications.

FEATURES

- Fire-rated for up to two hours
- Allows glazing in spaces that previously would have required alternative opaque fire-stopping materials like concrete and corrugated steel
- Consists of two-hour fire-rated Pilkington Pyrostop® glass; a tempered, laminated walking surface glass; and a steel framing grid
- Brings daylight deep into building interiors, creating dramatic visual effects between different building levels
- Maximum size of individual glass panels are approximately 48" x 50"
- Protection against radiant and conductive heat transfer
- Barrier to fire and smoke
- Durable, non-slip walking surface
- Modular system enables design creativity
- Replacement of individual walking surface panels in case of impact breakage
- Allows for decorative color frits and sandblasted glass without affecting fire rating
- For use in interior and/or exterior applications
- Fabricated in the U.S.A.
- Frames supplied "K-D" (knock-down) ready for installation
- Easy installation
- Finish painted at the factory to match desired color scheme

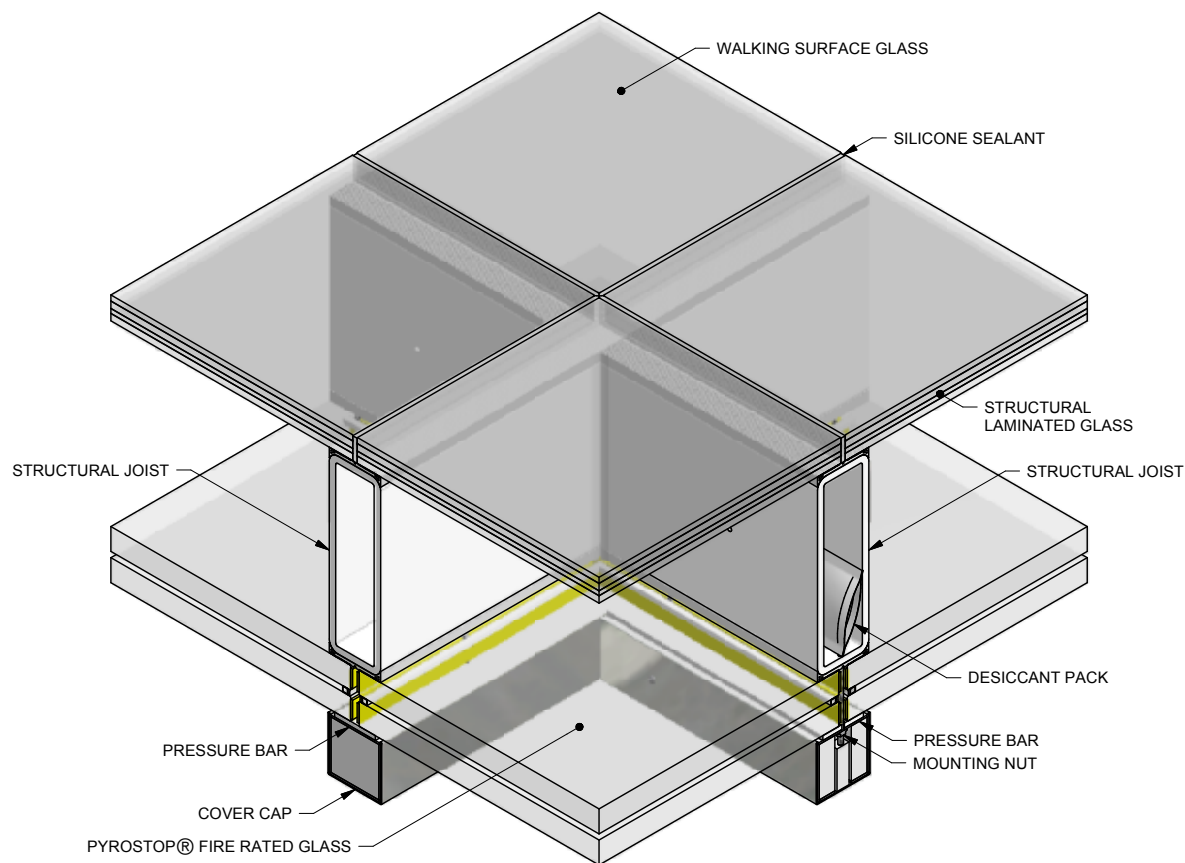


Figure 1: ISO Section

LISTINGS

- Listed with Underwriters Laboratories, Inc.® File number BXUV.C901
- Listed with Underwriters Laboratories of Canada, Inc. File number BXUVC.B901
- Tests performed in accordance with ASTM E-119, UL 263 and NFPA 251
- Approved for use in Los Angeles: LARR 25798

SIZING GUIDELINES

Frame Rating	Maximum Exposed Glass Dimensions	Maximum Joist Centerline Dimensions
120 minutes	48-1/4" x 45-1/8"	51-1/4" x 48-1/8"

RECOMMENDED GUIDELINES**1. REVIEW CONTRACT DOCUMENTS**

Review architectural drawings, specifications, approved TGP project drawings, installation instructions, and shipping lists to become thoroughly familiar with the project. The project drawings take precedence and include specific details for the project. Respond to any request for field verification of dimension or conditions prior to authorizing the production of frame components. The installation instructions are of a general nature and cover most conditions.

2. BUILDING CODES

Due to the diversity in local, state / provincial, or federal laws and the codes that govern design and application of architectural products, it is the responsibility of the individual architect / owner and installer to assure that products selected for use on projects comply with all the applicable building codes and laws. Technical Glass Products exercises no control over the use or application of its products, glazing materials, and operating hardware and assumes no responsibility thereof. Compliance of TGP project drawings with applicable codes for a given project shall be the responsibility of the TGP customer.

3. INSTALLATION

All materials are to be installed plumb, level and true.

4. BENCHMARKS

All work should start from benchmarks and / or column lines as established by the architectural drawings and the general contractor with guaranteed accuracy. Working from these datum points and lines determine:

- a. The plane of the wall in reference to offset lines provided on each floor;
- b. The finish floor lines in reference to benchmarks on the outer building columns; and
- c. Mullion spacing from both ends of masonry openings to prevent dimensional build-up of daylight opening.

5. FRAME CONSTRUCTION

- a. As a standard, most frames are shipped “K-D” (knock-down) and are to be assembled on site. Depending on the size and / or the installer’s preference, some ClearFloor components may be pre-assembled or welded in the factory.
- b. Some pre-assembly of the frames prior to installation on site is possible. Contact TGP if this method of installation is desired, as changes in TGP’s fabrication procedures will be required. TGP does not pre-assemble frames prior to shipment, as the method for doing so is not intended for long shipping distances, just local shop to jobsite conditions.

6. FIELD STEEL ANCHORS

Steel anchors that weld to steel structure or are bolted to embeds must be line set before joists are placed. Anchors must be perpendicular to surface of floor. Joist spacing should be held to $\pm 1/32"$ (0.8 mm). Anchor clips vary per job conditions. Follow approved project drawings for size and location of clips.

7. FIELD WELDING

- a. TGP recommends AWS-certified welders be used to install all field weld conditions called out in the TGP project drawings. The responsibility of using experienced, certified welders is the installing contractor's, not TGP's.
- b. All field welding must be adequately shielded to avoid any splatter on glass or frame components. Results of inadequately shielded field welding will be unsightly and /or structurally unsound. Advise general contractor and other trades accordingly.
- c. TGP typically finishes all steel material to protect from corrosion during shipping and storage onsite prior to installation. For powder coated finishes, it is required to grind off the finish at the expected weld location prior to welding operations. The field weld must be re-finished with a zinc rich primer (in unexposed areas) or with touch-up paint (in exposed areas) after the welding is completed. Welds should never be left unpainted or unfinished. TGP can furnish small quantities of touch-up paint as required to match the original finish.

8. COORDINATION WITH OTHER TRADES

Coordinate with the general contractor any sequence with other trades which impact installation (i.e. fire proofing, back-up walls, partitions, ceilings, mechanical ducts, converters, etc.) or in which installation may impact the work of adjacent trades.

9. SURROUNDING CONDITIONS

- a. Coordination of adjacent material and construction tolerances to TGP's systems will be facilitated by TGP as part of preparing project drawings, and these drawings will indicate acceptable tolerances for critical dimensions.
- b. The installer should verify that surrounding construction is in accordance with the approved project drawings. This includes rough opening dimensions. Do not accept rough opening dimensions less than shown on project drawings. For example, a frame may fit within a given opening but sealant may not perform as detailed if a smaller sealant joint is installed. Expansion / contraction issues may also be compromised.
- c. The installer MUST notify and receive approval from TGP and the General Contractor when conditions are not in accordance with approved project drawings AND / OR change any aspect of the structural performance of the Fireframes ClearFloor System before making any modifications to the TGP-furnished material or making changes which are different from those shown on the TGP project drawings. These conditions include, but are not limited to anchor placement / location, changes in adjacent materials the anchor is being connected to, or changes to dimensional relationships between framing, anchors and connection to adjacent materials.

d. TGP must review and approve any changes required prior to the subcontractor installing any “corrective” work. These reviews may incur additional charges, which must be approved by the TGP customer prior to TGP’s review. Consult with the TGP project manager for coordination of these issues.

10. SEALANTS

a. Sealants must be compatible with all materials they are in contact with, including other sealant surfaces. Consult with sealant manufacturer for recommendations relative to joint size, shelf life, compatibility, cleaning / priming, tooling, adhesion, etc.

b. The chemical compatibility and / or adhesion of all glazing materials and framing sealants with each other and with like materials used in glass and frame fabrication must be established by the installer. This is required on every project.

c. It is the responsibility of the Glazing Contractor to submit any documentation or samples required by the specifications to the sealant manufacturer indicating that glass and glazing material have been tested for compatibility and adhesion with glazing sealants. This applies to all TGP materials in contact with any sealant. TGP will furnish samples of these materials as requested by the Glazing Subcontractor.

d. Interpreting and implementing these test results is the responsibility of:

- TGP when any sealant work is required as part of the manufacturing process.
- The Glazing Subcontractor to correctly apply the testing recommendations to the project on all field sealant related issues.

e. The implementation of the test results is the responsibility of the installing contractor, and includes material performance and recommendations for primers and substrate preparation required to obtain adhesion.

CLEANING INSTRUCTIONS

Both the frame and glazing material should be cleaned regularly. Dirt can be removed from the surface by using a soft, clean, grit-free cloth and a small amount of mild soap, detergent or non-stringent window cleaning solution. Rinse immediately with clean, cold or lukewarm water.

TIPS:

- It is important to clean the glass during and after construction.
- Make sure you use a different sponge, cleaning cloth, and water bucket for cleaning outside and the inside of the windows.
- Do not use the same cloth or sponge used for wiping sills or frames when washing the glass.
- After each cleaning, rinse with clear, cold water.

GLAZING MATERIAL

Excess water can be removed from the glass surface with a squeegee.

Note: Bullet resistance glazing materials have a surface-applied film, in which case, extra care must be taken not to scratch the film.

MUST NOT BE USED:

- Steam jets
- Abrasives
- Strong acidic or alkaline detergents or surface-reactive agents
- Detergents of unknown compounds
- Detergents must not be used at temperatures above 77°F
- Organic solvents containing ester, ketones, alcohols, aromatic compounds, glycol ether or halogenated hydrocarbons, etc.
- Metal or hard parts of the cleaning equipment must not contact the glass surface
- Excessive pressure

CLEANING THE FRAME

A thorough cleaning of the frame is required in order to preserve decorative appearance and prevent corrosion or stains. The frame surface coating should be cleaned at least once a year. Environments with high pollution levels require more frequent cleaning. Proper maintenance allows for early detection of deterioration of frames.

WITH MORE SEVERE SOILING, NEUTRAL OR SLIGHTLY ALKALINE DETERGENTS MAY BE USED.

- Greasy, oily or sooty substances can be removed with the help of naphtha hydrocarbons free from aromatic compounds.
- Remove residues from glue, silicone caulking or adhesive tapes in the same manner and as quickly as possible.
- Test any cleaning solution to be sure that they will not react for at least one hour. Testing on a small, hidden area is recommended.

FOR OPTIMUM CLEANING AND MAINTENANCE OF COATED SURFACES, THE FOLLOWING RECOMMENDATIONS SHOULD BE OBSERVED:

- The surface temperature of the façade elements to be cleaned must not exceed 77°F during the cleaning process.
- Clean water must be used, to which small amounts of neutral or slightly alkaline detergents may be added.
- For thorough cleaning: soft, non-abrasive cloths may be used.

POWDER COAT FINISH TOUCH UP PROCEDURE

This procedure is intended for minor scratches or scrapes no larger than a dime. TGP provides a 2-ounce touch up bottle with attached brush inside of the lid.

TESTING THE COLOR MATCH

ALWAYS test the paint before applying it to your frame. **You are responsible for making sure the paint matches by testing the color BEFORE you apply it to your frame.** If the paint applied to your frame doesn't match, it will need to be cleaned off with automotive lacquer thinner, or worse, if allowed to thoroughly dry, it will need to be sanded off.

PRACTICE

It is recommended to practice using the touch up paint before you apply it to the frame. This will give you a good feel for the paint application process and you can check the color match. Use a surface such as a metal can, a glossy sheet of paper, etc. to practice on. Use several light coats rather than one heavy coat when brushing the paint. Always let the paint dry thoroughly to see the exact color and sheen.

GUIDELINES

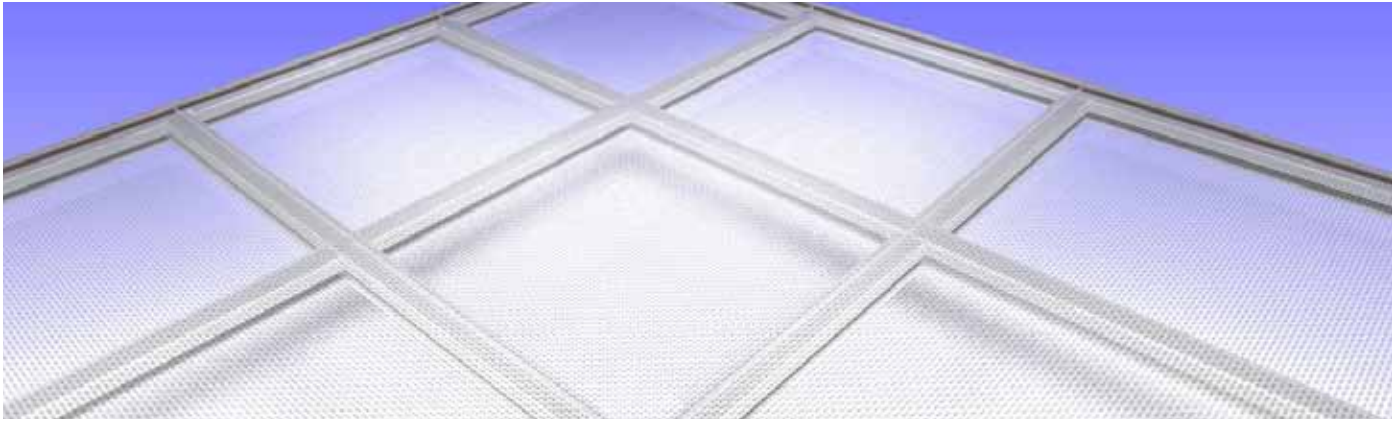
Do not try to brush areas larger than a dime as the repair will look very uneven. When a metallic paint is applied with a brush, the metallic flake may not lie down properly, which may cause even a perfectly matched paint to appear darker. If the damaged area is larger than a dime, contact TGP to see if a spray can of touch up paint can be obtained for your color or contact a professional painter. Using a spray applied paint will produce better results for large areas.

APPLICATION STEPS

- Thoroughly clean area to be repaired with dish soap (Joy, Dawn etc.), water and a clean lint free towel to assure a clean surface free of wax, grease and other oil-based surface contaminants. Let dry completely.
- For best results do not apply in direct sunlight.
- Thoroughly shake the touch up paint bottle before applying.
- Using the brush applicator tip, lightly apply touch up paint to affected area. Dabbing the paint on instead of rubbing or brushing may provide better results.
- Feather edges into the surrounding area.
- Generally, 24 hours of drying time is sufficient before returning to service. Please note, however, drying times may vary depending on the temperature. If the temperature is below 70°F, drying times may be longer.
- Protect touch up painted area from weather elements and contact until it is thoroughly dry.

STORAGE

- Store touch up paint in a cool, dry place.
- Do not leave in direct sunlight.
- Do not freeze.



GENERAL ASSEMBLY AND INSTALLATION INSTRUCTIONS

STEP 1: RECEIVING AND CONTAINER INSPECTION

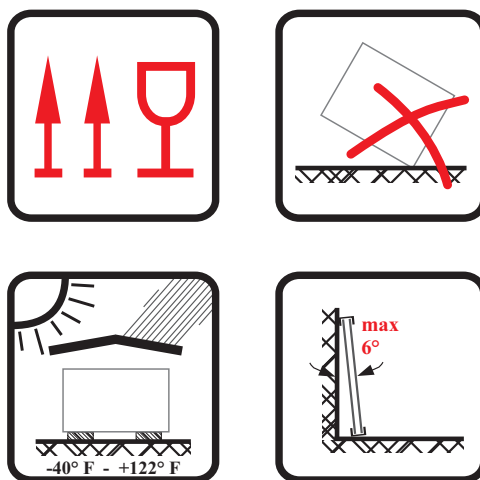
1. Glazing materials and framing components are shipped in separate containers. Upon receipt, be sure to thoroughly inspect the containers for any damage.
2. Inspect “Tip-N-Tell” indicator on the outside of the crate for activation.
Note: small packages shipped via UPS, DHL, or FedEx do not have “Tip-N-Tell” labels.
3. Note any visible damage or tip indicator activation on the Delivery Receipt. If possible, pictures should be taken and all damage noted in detail.
4. If damage is discovered after signing delivery receipt, it is the receiving party’s responsibility to contact TGP within 24 hours of shipment delivery.
5. If damage is discovered, all crating materials must be held at your location until an inspection has been completed by the carrier and / or the claim is settled.
6. TGP will file all freight claims on prepaid shipments. If you suspect damage or are unsure, call our Customer Service Hotline as soon as possible. (800) 426-0279, 7:30 am – 4:30 pm PST, Monday through Friday.

STEP 2: UNPACKING AND CONTENT INSPECTION

1. Caution: Glazing materials and frame units can be heavy, use extreme caution when opening crates and removing contents.
2. Whenever possible, open the crate and inspect the contents while delivery personnel are present. If not, as soon as possible after receipt of crates, open and inspect the contents of all containers, crates, etc.
3. Be sure to carefully inspect glass for observable edge damage or surface imperfections. Report any damage immediately to TGP.

STEP 3: TEMPORARY STORAGE OF UNPACKED GLAZING MATERIALS AND FRAME UNITS

1. Caution: Do not expose unassembled glass and framing materials to direct sunlight or weather.
2. For Glazing Material:
 - a. TGP supplied glazing material must be stored upright, at a maximum of 6 degrees from vertical. Fully support glass evenly along the entire length. Glass must be carefully separated by non-abrasive pads, such as foam or cork.
 - b. For glass not supplied by TGP, consult glass manufacturer for storage recommendations.

Attention**Dry storage**

3. For Framing Material:
 - a. Store framing components in their protective packing.
 - b. Store pre-assembled frames upright and separated by non-abrasive pads, such as foam or bubble wrap. Take care not to gouge or scratch the frame surface.
 - c. Should small scratches occur, a small bottle of touch up paint is typically supplied with the project. Contact your TGP Project Manager (800-426-0279) to arrange for more touch up paint. See Powder Coat Finish Touch Up Procedure (Page 13).

STEP 4: PREPARATION AND INSTALLATION OF FRAME

Protect frames during installation to avoid scratching the powder coating. For cleaning instructions see Page 11. Please note the details shown in this manual are to be used as a guide only. Refer to the approved TGP project drawings, provided with shipment for actual project conditions.

1. Working with the General Contractor, determine the layout control lines the floor will be set from. Layout of floor with relation to joist placement is assumed to have already taken place in relation to:
 - a. Building control lines
 - b. Building grid or column lines
 - c. Within rough openings and
 - d. Other conditions, as required by the specific project.
2. Verify Placement of ClearFloor Framing:
 - a. Arrange framing parts and verify placement of each primary joist with the intersecting secondary joists with the TGP project drawings.
 - b. CRITICAL: Allow for joint sizes at all perimeter conditions per the approved TGP project drawings.
3. Prepare Perimeter Conditions:
 - a. Remove loose debris.
 - b. Check adjacent trades are ready to receive ClearFloor framing and eventually receive perimeter sealant or other waterproofing as detailed on the project drawings.

STEP 5: INSTALLING ANCHOR BLOCKS

Several different methods of securing the anchor blocks to the surrounding structure may be used. Consult the TGP supplied project drawings for specific methods used (See Figure 2 for examples).

Anchors must be installed within 1/32" [0.8 mm] of nominal location.

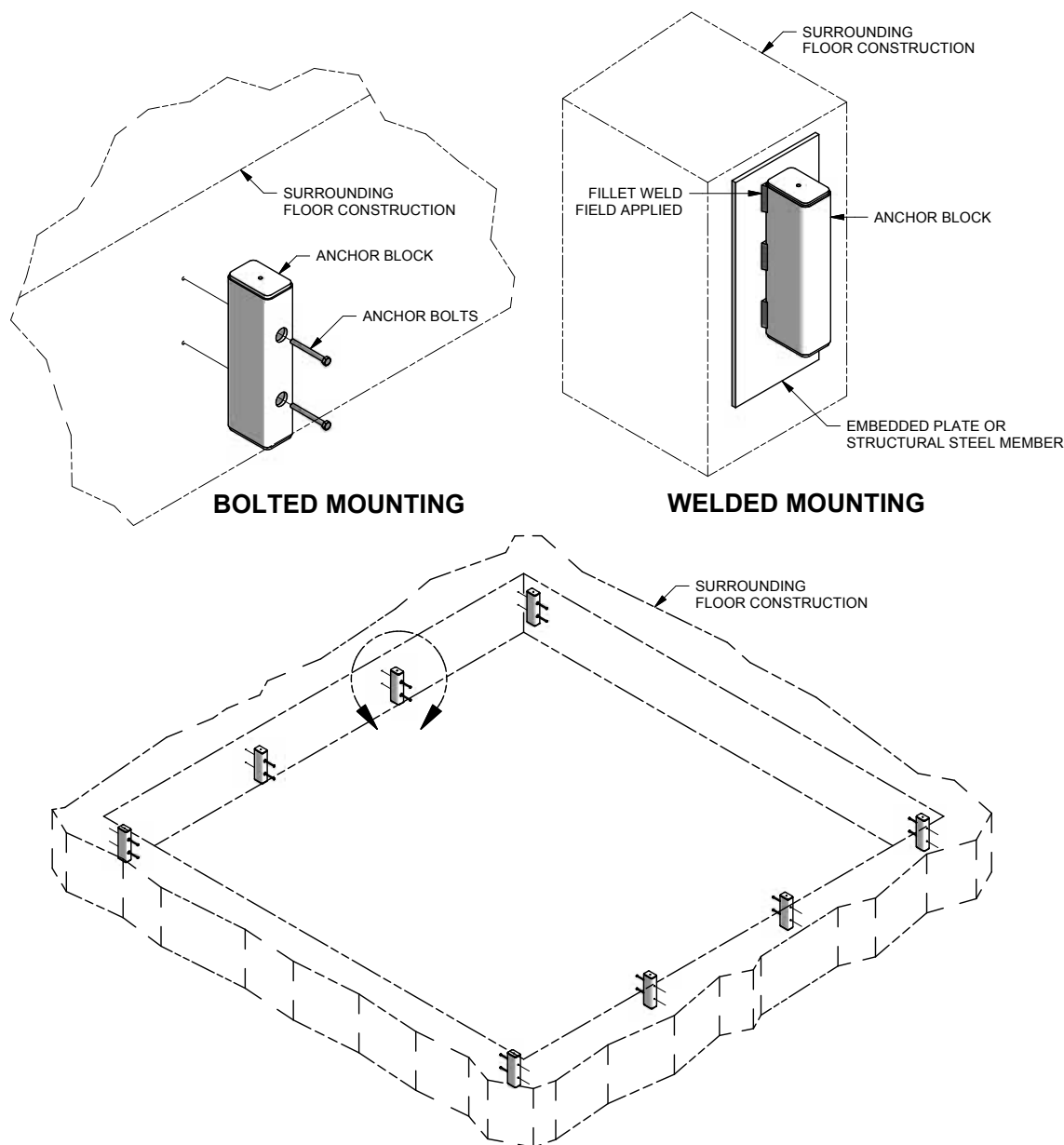


Figure 2: Anchor Block Installation

STEP 6: PRIMARY JOIST INSTALLATION

1. Study the TGP supplied project drawings for proper installation order, joists that are to be installed first are typically labeled as primary joists. These will connect to the anchor blocks that were installed in Step 5. If the typical anchor blocking is used, the bottom of the primary joists will have a machined notch on the bottom to allow for the joists to be slid down into place over the anchor blocks. The silicone gasket on the bottom will have to be peeled back to uncover notch for clearance (See Figures 3 and 4).

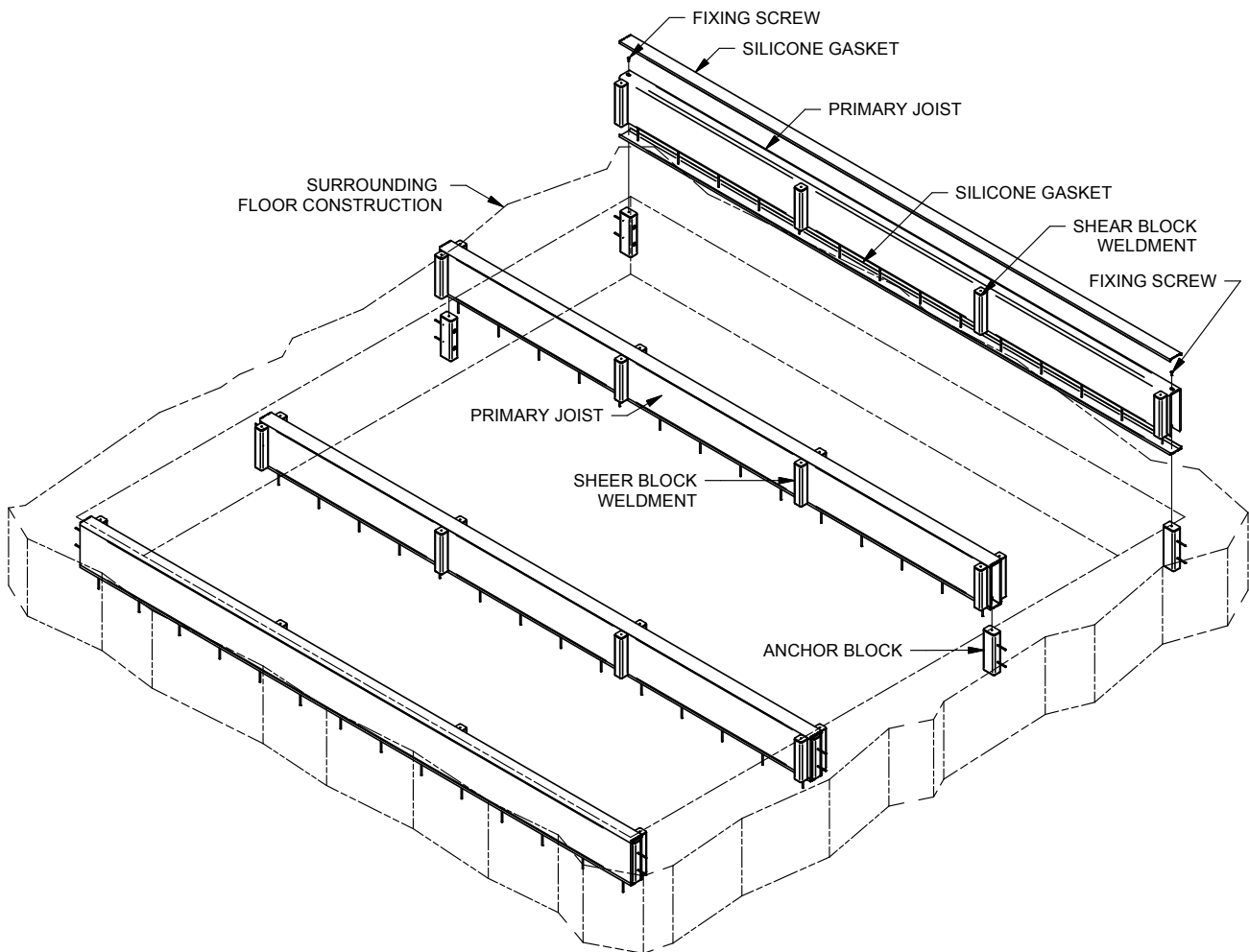


Figure 3: Primary Joist Installation

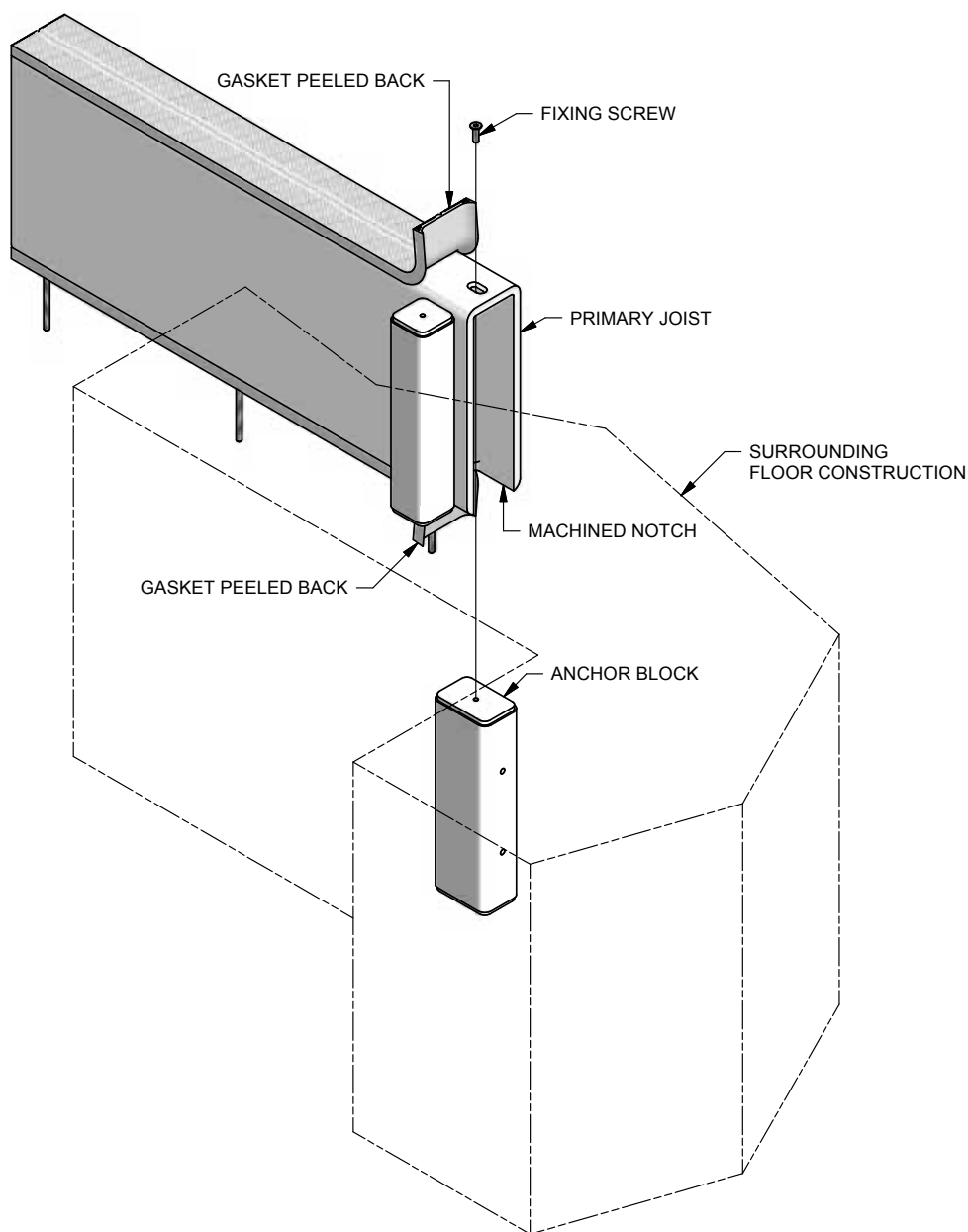


Figure 4: Primary Joist Closeup

STEP 7: DESICCANT INSTALLATION

1. Desiccant is supplied by TGP to be placed inside the system to prevent moisture and condensation from inside the completed assembly. It will be supplied in individual 8 oz. packages that will be shipped inside a sealed plastic bag. This plastic bag is not to be opened until the time of installation for maximum efficiency.
2. TGP supplied project drawings will detail correct locations for the desiccant packages. Typically they will be installed in the interior secondary joists (See Step 8). They should be evenly divided between the beams they are to be installed in (See Figures 5 and 6).

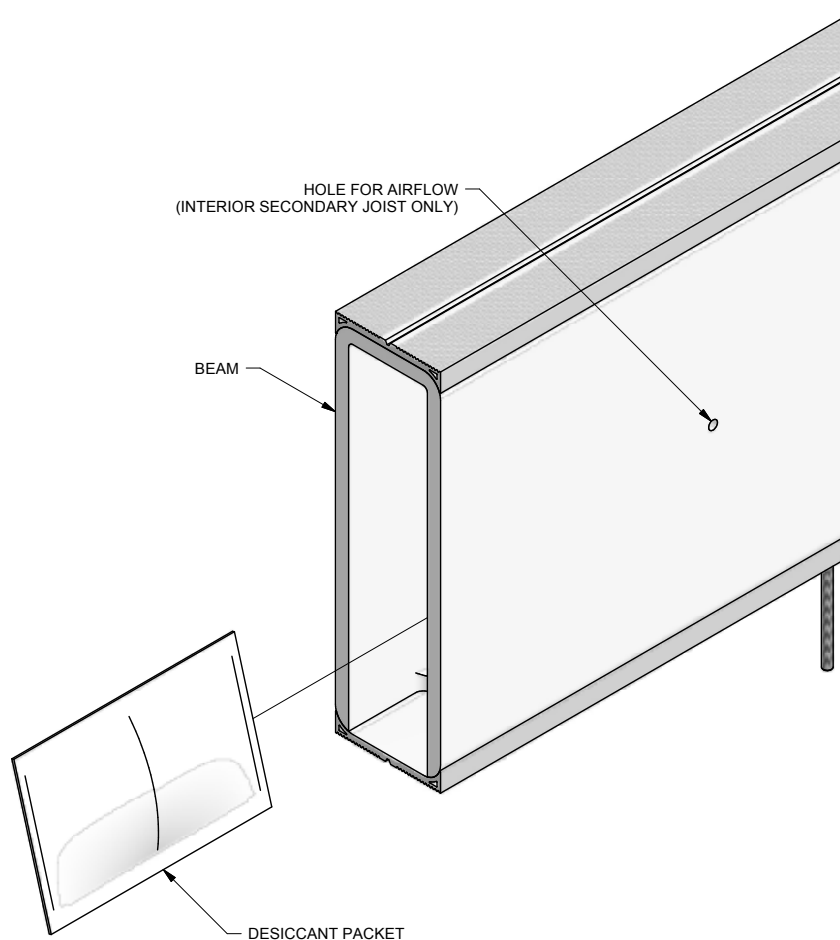


Figure 5: Desiccant Installation

STEP 8: SECONDARY JOIST INSTALLATION

1. Secondary joists connect in between the primary joists. Primary joists have shear blocks welded to them at all secondary joist locations. Secondary joists have a machined notch in the bottom to allow for clearance for the shear block weldments. Secondary joists with holes are interior, secondary joists without holes are placed at the perimeter. The silicone gasket on the bottom will have to be peeled back to uncover notch for clearance (See Figure 6).
2. After all joists are installed in place, before installing fixing screws, ensure all openings and framing are square and straight. Then install the supplied 3/8" flathead fixing screws with a #4 drive phillips head bit or screwdriver. These screws should be hand tightened until snug, and not over-tightened.

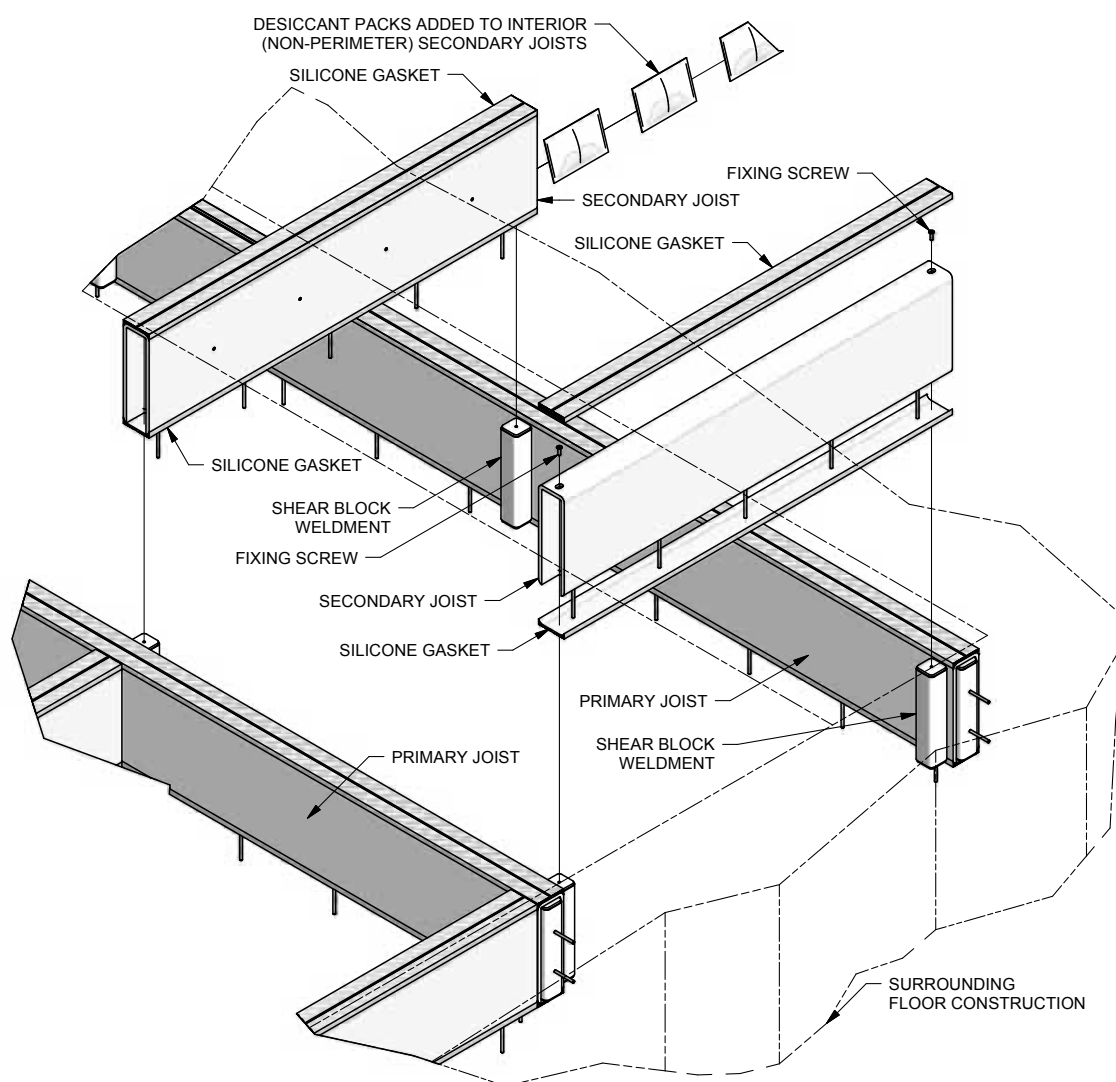


Figure 6: Secondary Joist Installation

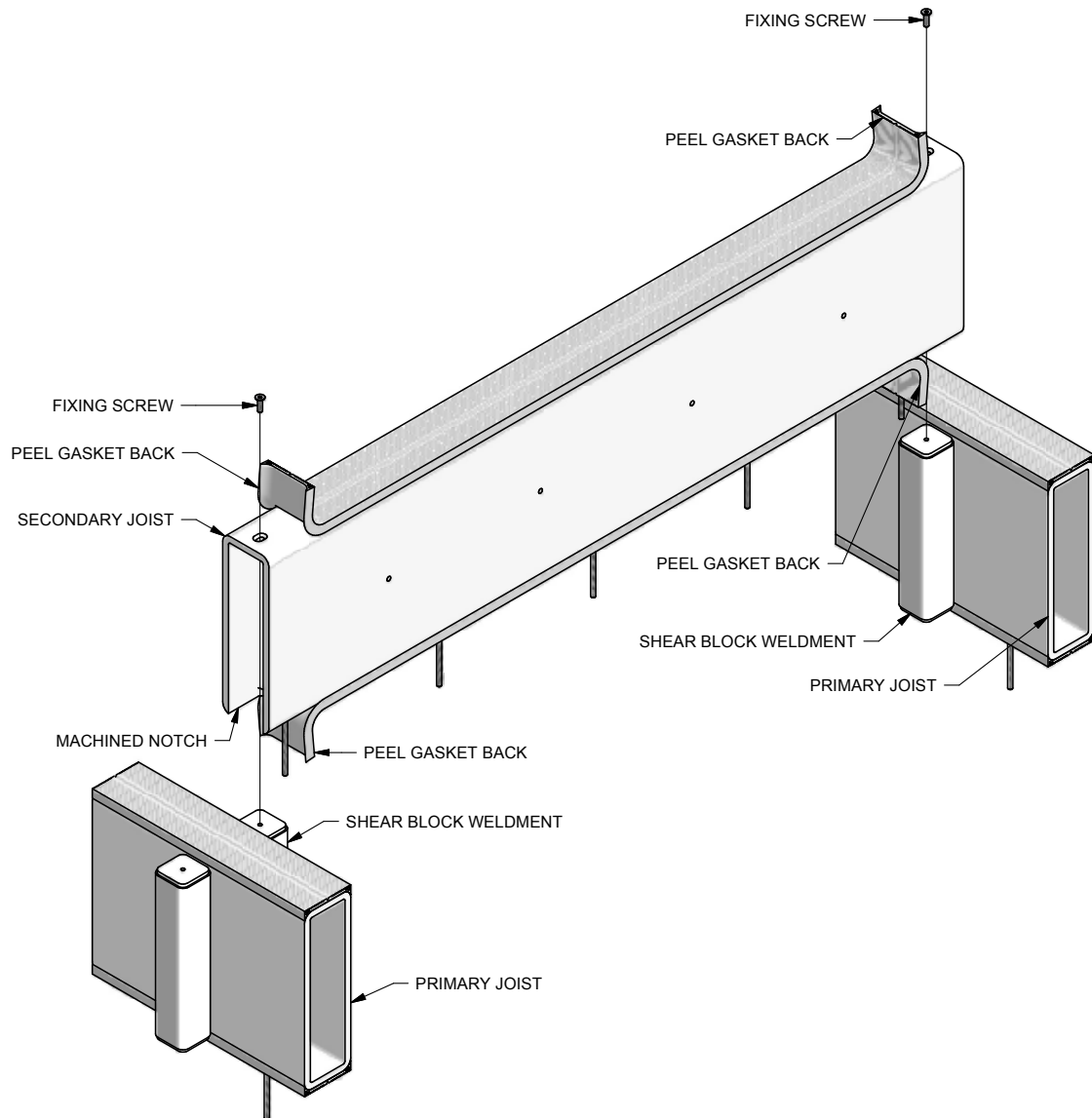


Figure 7: Secondary Joist Closeup

STEP 9: GASKETING AND SEALING

1. There is a silicone gasket installed to the top and bottom of the joist. Plastic stretch wrap is used to hold the gaskets to the beams during shipping and installation. It is recommended that this plastic wrap be left on during the installation to hold the gasket in place, and remove after installing the fire-rated glass.
2. The joints where the silicone gasket meet must be sealed together to create air-tight chambers. This is to prevent moisture from getting inside the assembly, possibly creating condensation. A silicone compatible sealant is required for this step (See Page 9, Figure 8).
3. Apply a 1/2" bead of silicone sealant to the mating of the joists. Smooth bead for aesthetic looks (See Figure 8).

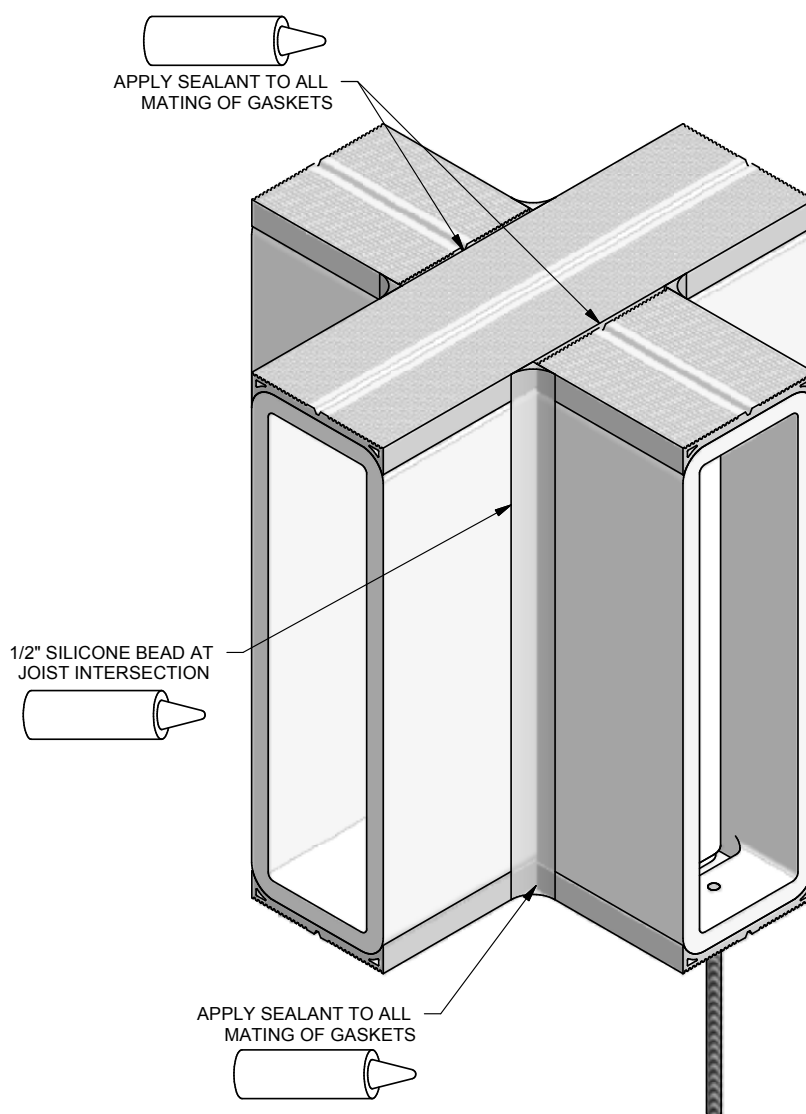


Figure 8: Joist and Gasket Sealing Detail

STEP 10: GLAZING PILKINGTON PYROSTOP® FIRE-RATED GLASS

CAUTION: Pilkington Pyrostop is a high-value, multi-layered laminated product. Edge pressure must be low and uniform. Excessive edge clamping pressure will cause deformation and breakage.

1. Before Pilkington Pyrostop is installed, all panes must have two strips of Intumescent (Fire Proofing) tape installed around all four sides of the glass (See Figures 9 and 13).
2. Lift the glass into the opening, being careful not to hit the exposed mounting studs.

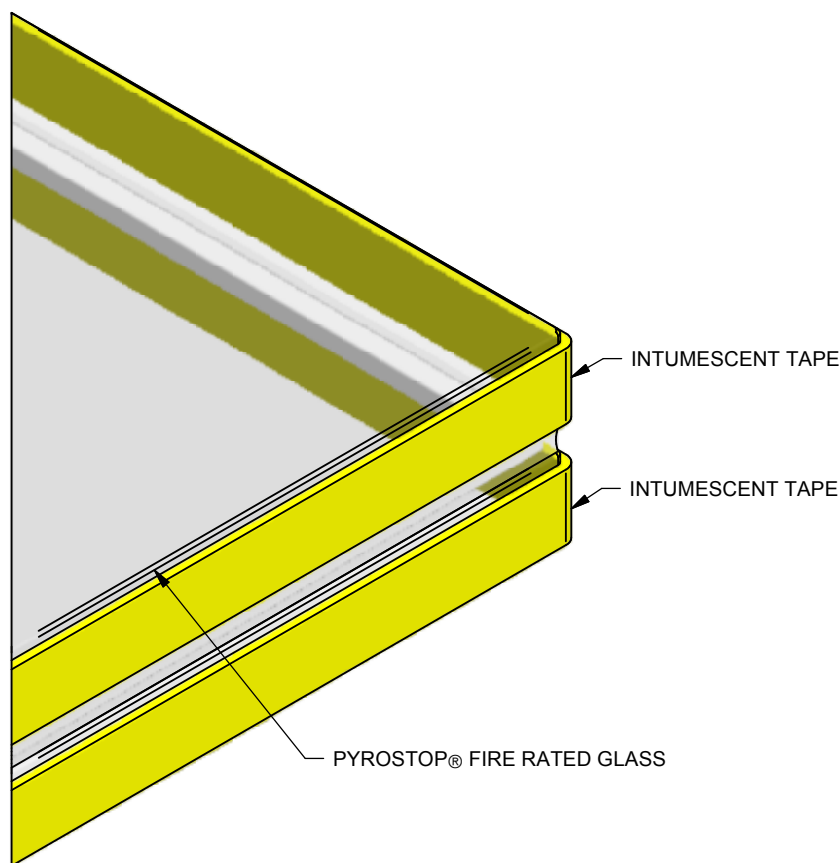


Figure 9: Intumescent Tape Installation

STEP 11: PERIMETER SPACERS

1. Perimeter spacers are to be installed around the outside of the system. This ensures even glazing pressure on the glass. Perimeter spacer location will be marked on the TGP supplied project drawing (See Figure 10).

STEP 12: TEMPORARY BARS

1. If needed, temporary bars may be supplied to assist with the glazing. Due to the weight of the Pilkington Pyrostop, glass breakage is likely unless at least two full edges of the Pilkington Pyrostop is supported at all times. Never leave the Pilkington Pyrostop overnight unless all four edges are supported.

STEP 13: PRESSURE BARS

1. Pressure bars are to be installed with supplied mounting nut (5/16" nylon locking hex flange nut). Tighten nuts evenly along length of pressure bar just snug enough to create a seal between the glass and the silicone gasket on the joist beams. DO NOT OVERTIGHTEN OR GLASS BREAKAGE WILL OCCUR (See Figure 10).

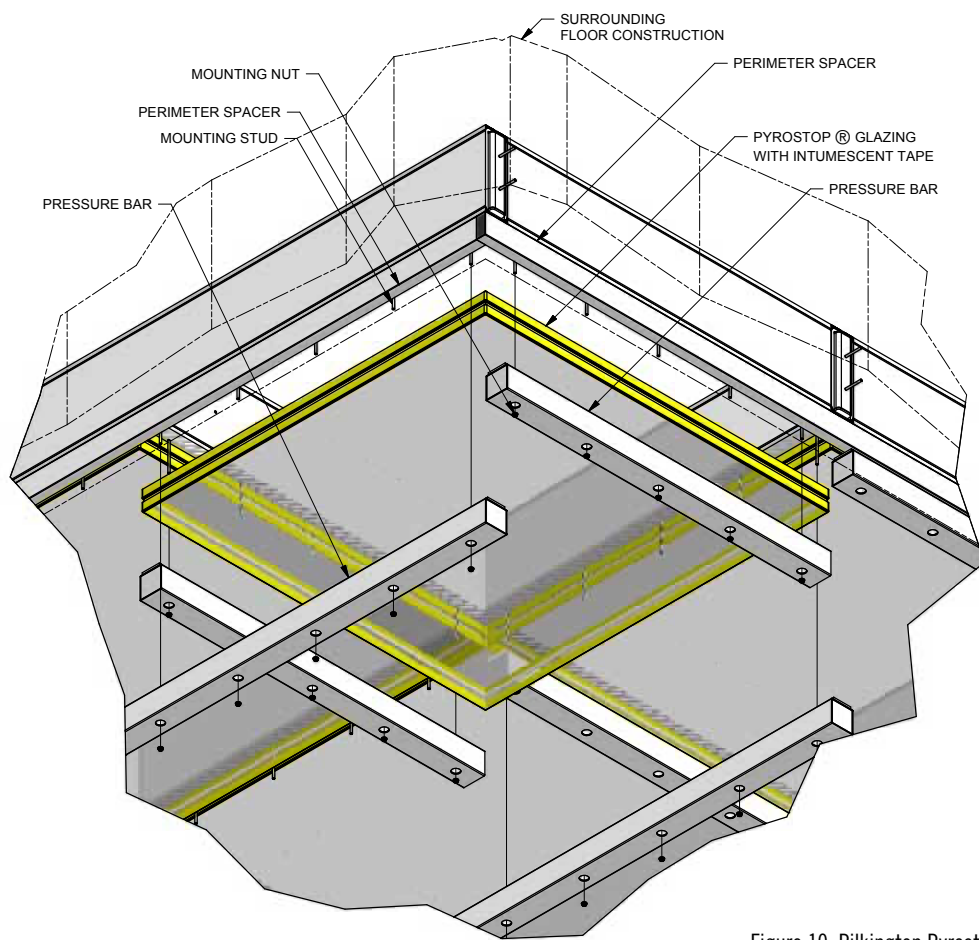


Figure 10: Pilkington Pyrostop® Installation

STEP 14: INSULATION PLUGS

1. After all pressure plates are installed, use 3M Type 25WB Fire Barrier Caulk and supplied insulation plugs to fill holes in pressure bars. Insulation plugs might be supplied long, if this is the case, these should be snapped off so they remain flush with the pressure bar (See Figure 11).

STEP 15: COVER CAPS

1. Snap cover caps over pressure bars. Refer to TGP supplied project drawings for locations (See Figure 11).
2. Use supplied #10 self-drilling flat head screws to secure cover caps to the pressure bars. Location of screws is not critical. For aesthetic purposes, it is recommended to install on the side of the profile. Installation of minimum two screws per cap is required to secure cap.

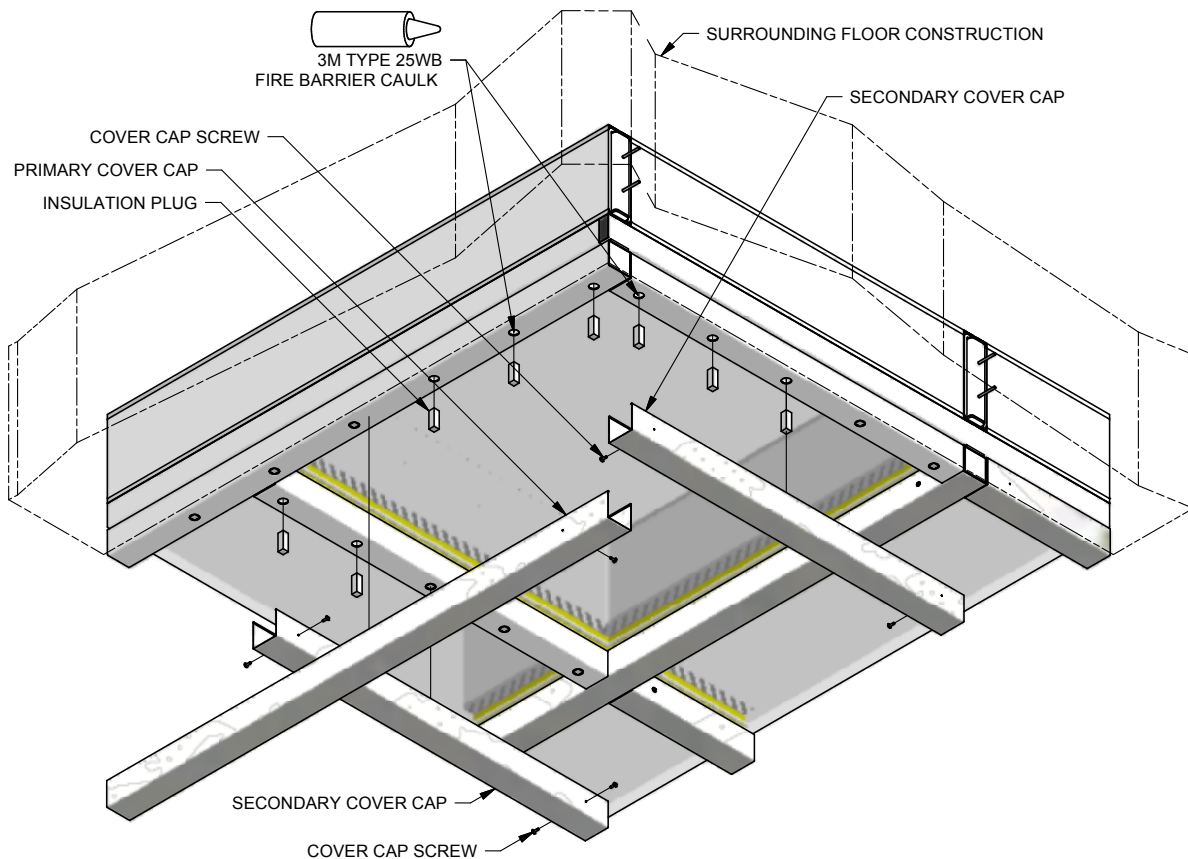


Figure 11: Cover Cap Installation

STEP 16: TOP SURFACE GLAZING

1. The top surface glazing is made up of two components, the structural layer, and the walking surface layer. The structural layer is to be glazed first.
2. Ensure the silicone gasket is clean and clear of errant material, place the structural glass onto gasket, keeping an even joint between all pieces of glass (See Figure 12).
3. Place the walking surface onto the structural layer, if there is a frit or other non-slip surface, make sure it is facing up (See Figure 12).
4. Using silicone, seal the gaps between the glass, tooling silicone into gap (See Figure 13).

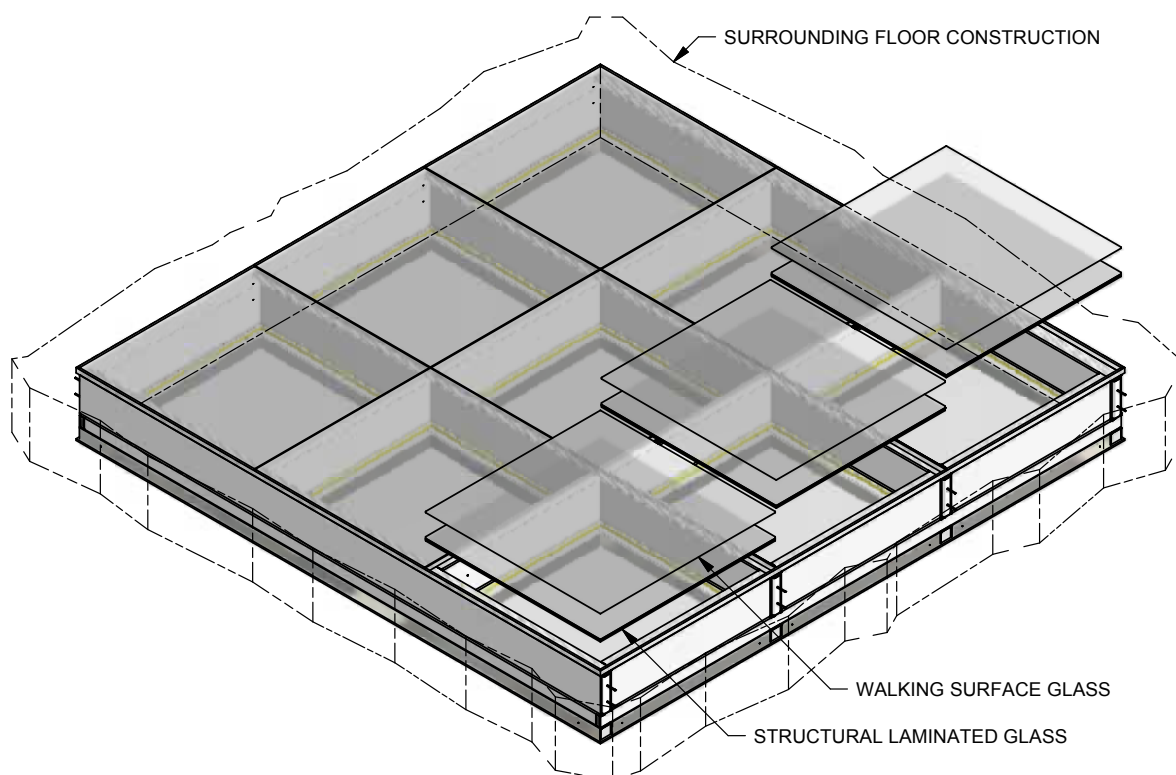


Figure 12: Top Glass Installation

STEP 17: FIRESAFING AND PERIMETER SEALANT

1. Fire-rated insulation (such as mineral wool) must be installed around the entire perimeter of the framing to ensure the proper fire integrity of the system is maintained. From the top or bottom of the frame, fill cavity between the frame and surrounding structure (See Figure 13).
2. See project drawing details for specifics about any finish seals or trim required.

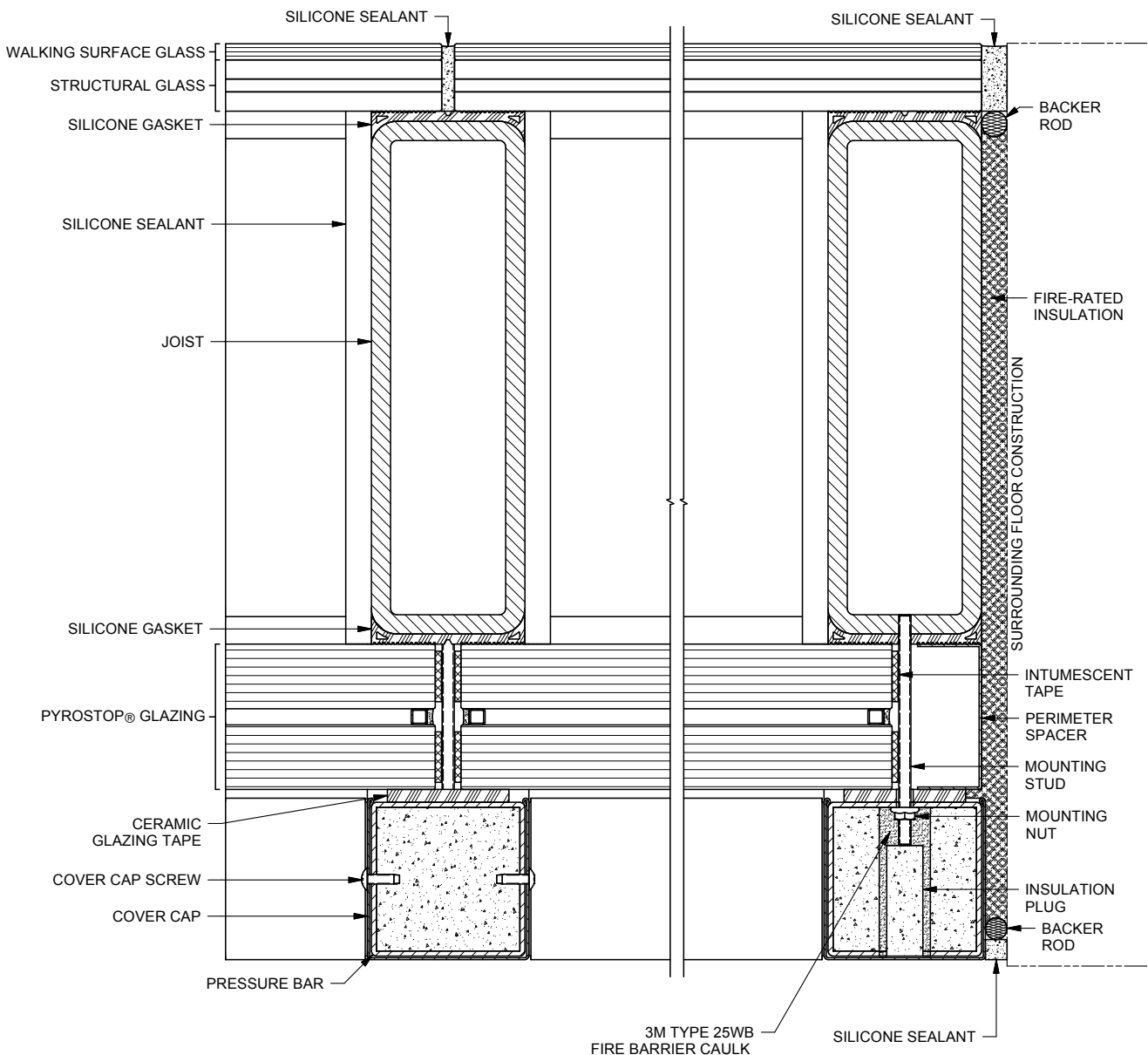


Figure 13: Section View

CriSamar® STEP

Vidrio pisable Antideslizante

Non-slip floor glass

La elegancia del vidrio con **la máxima seguridad del antideslizamiento**
The elegance of glass with the **highest non-slipping safety**



SEVASA
ARQUITECTURA Y DECORACIÓN

CriSamar® STEP

El nuevo vidrio antideslizante **CriSamar® STEP** para suelos y pavimentos consigue combinar elegancia y seguridad, permitiendo su uso en todo tipo de ubicaciones, tanto de interior como de exterior.

Una amplia gama de 8 diseños en 3 acabados distintos:

- **Serie T** (transparente)
- **Serie S** (satinada)
- **Serie X** (máximo antideslizamiento)

Aplicaciones:

Suelos: Escaleras, rampas, pasarelas, piscinas, techos pisables, zonas de paso...

Otros: Puertas, divisorias, mamparas, fachadas, muebles...

The new non-slip glass **CriSamar® STEP** for floors and pavements achieves to combine elegance and safety, allowing its use in all types of locations, such as in and outdoor.

A wide range of 8 designs in 3 finishings:

- **T-Serie** (transparent)
- **S-Serie** (satined)
- **X-Serie** (maximum non-slip degree)

Applications:

Flooring: stairs, ramps, gateways, swimming pools, roofs and skylights to step on...

Other: doors, partitions, furnishing...

- Incluso para rampas exteriores mojadas
- Certificados

- Even for wet outdoor ramps
- Certified



Pisable Antideslizante

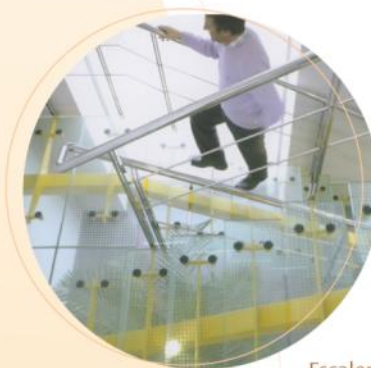
Non-slip flooring

Ventajas:

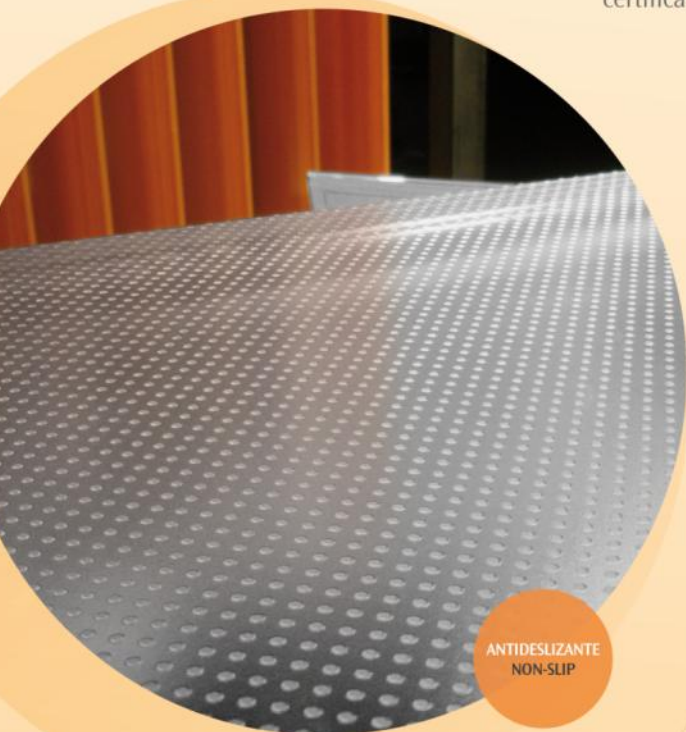
- ☛ La más amplia gama.
- ☛ Diseños específicos de agarre y drenaje.
- ☛ Su uso incluso mejora el antideslizamiento.
- ☛ Uso en interior, exterior, seco o mojado.
- ☛ Calidad homogénea, sin irregularidades.
- ☛ Alta resistencia a rayadas y manchas.
- ☛ Certificación antideslizamiento y resistencia a rayadas.
- ☛ Certificación ISO 9001 e ISO 14001.

Advantages:

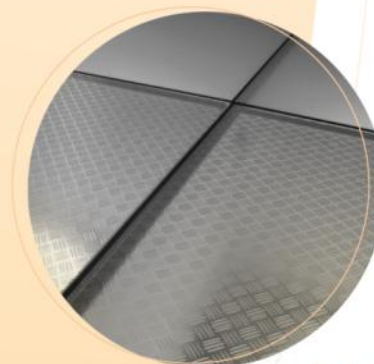
- ☛ The wider range available.
- ☛ Designs that enhance its grip and draining.
- ☛ Its use even improves its traction properties.
- ☛ Indoor, outdoor, dry and wet conditions.
- ☛ Homogeneous quality, without unevenness.
- ☛ High resistance to scratches and stains.
- ☛ Non-slip grip and scratches resistance certificates.
- ☛ ISO 9001 and ISO 14001 certification.



Escaleras
Stairs



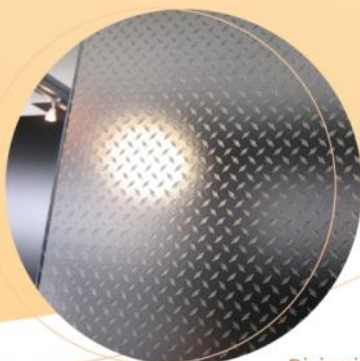
ANTIDESLIZANTE
NON-SLIP



Suelos, rampas
Floors, ramps



Pasarelas, techos pisables
Footbridges, roofs to step on



Divisorias, mamparas, puertas
Partitions, screens, doors

NOVEDAD/NEW

Serie-X

SEGURIDAD
SAFETY

EXTRA
ANTIDESLIZANTE
NON-SLIP GRIP

La elegancia del vidrio con la máxima seguridad antideslizamiento incluso para exteriores mojados, resbaladizos y con las pendientes más pronunciadas.

The elegance of the glass with maximum non-slip safety grip even for slippery wet outdoors and most inclined ramps.



Lunar X



Aluminum X



Nexus X



Incus X



Omicron X



Codex X

Serie-S

ESTILO
STYLE

Carácter contemporáneo con gran seguridad antideslizamiento. La serie S aúna diseño y prestaciones en un acabado satinado de estilo atemporal.

Contemporary character with high non-slip safeness. The satin finish S-Series combine design and added value of timeless style.



Lunar S



Aluminum S



Nexus S



Incus S

Serie-S

Serie-T

TRANSPARENCIAS
TRANSPARENCIES

Estilo y versatilidad
con una excelente
transparencia.
Originalidad en una
serie idónea para crear
espacios únicos.

Style and versatility with
excellent transparency.
Fresh designs ideal
to create unique
ambiances.



Lunaris T



Aluminum T



Nexus T



Incus T



Omicron T



Trapecius



Omicron S



Codex



Versus

✓ Certificaciones

Las 3 series de CriSamar® STEP combinan todos los niveles antideslizamiento, **consiguiendo superar los máximos requisitos de seguridad para el tránsito peatonal establecidos por las normativas y métodos nacionales e internacionales:**

- UNE-ENV 12633 (Péndulo), Clases 1, 2, 3 (Rd>45).
- DIN 51130 (Rampa), R9 - R13.
- DIN 51097 (Pie descalzo), A, B, C.
- UL 410 - Slip Resistance of Floor Surface Materials.

✓ Certifications

The 3 series of CriSamar® STEP offer all non-slip degrees, **achieving the maximum safety requirements for pedestrian traffic established by international norms and methods:**

- DIN 51130 (Ramp), from R9 to R13.
- DIN 51097 (Barefoot), A, B, C.
- UL 410 Approved – Slip Resistance of Floor surface materials.
- UNE ENV 12633, Class 1, 2, 3 (Rd>45).

Características Characteristics

- Espesores: 3 a 12 mm, y laminado. Medidas: Estándar 225 x 321 cm.
- Thickness: 3 to 12 mm (from 1/8" to 1/2"), and laminated. Size: 225 x 321 cm (88" x 126").

- Colores Colours
 - extralclaro extraclear
 - claro clear
 - bronce bronze
 - gris grey
 - azul blue
 - verde green
 - espejo mirror

N – NOVEDAD/NEW

CriSamar® STEP

ATRIBUTOS Y CALIDAD

- Disponibles todos los niveles de antideslizamiento (según modelos).
- Certificaciones antideslizamiento internacionales.
- Facilidad de limpieza.
- Base: vidrio float norma UNE EN 572-2
- Puede ser cortado, biselado, curvado, taladrado, templado y laminado.

SERVICIOS OPCIONALES

- Producción Personalizada: específica según sus necesidades en diseño, producción, servicios y logística.
- Servicio Integral: gestionamos todo el proceso en sus etapas (corte, pulido,...) para obtener el producto listo para ser colocado en su destinación final.

ATTRIBUTES AND QUALITY

- All levels of non-slip grip available (subject to designs).
- International non-slip certificates.
- Easy to clean.
- Base: float glass norm UNE-EN 572-2
- Can be cut, beveled, curved, drilled, tempered and laminated.

OPTIONAL SERVICES

- Customized production: depending on your needs in design, production, services and logistics.
- Integral service: if wished, we supervise the whole process throughout all its phases (cutting, polishing, curving, tempering, laminating...) to obtain a product that is ready to install at its final point of destination.

RECOMENDACIONES

Almacenar el vidrio en lugar seco para evitar oxidaciones.

La alta resistencia a rayadas y manchas no está garantizada en caso de fuertes abrasiones con maquinaria o productos químicos industriales.

COMPROMISO MEDIOAMBIENTAL

Líder nacional e internacional en la obtención de certificados de Calidad ISO 9001 e ISO 14001 de Calidad Medioambiental, así como los rigurosos controles diarios confieren a SEVASA el sello de empresa ecológica y sostenible.

RECOMMENDATIONS

The glass should be stored in a dry place in order to avoid oxidation.

The high resistance to scratches and stains is not guaranteed in case of abrasions with machinery or chemicals.

ENVIRONMENTAL COMMITMENT

International and Spanish leader in obtaining the ISO 9001 and Environmental ISO 14001 Quality Standard certificates. Its strict routine controls give SEVASA the seal of an eco-friendly and sustainable company.



SEVASA

Sociedad Española de Vidrios Artísticos S.A.

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www.sevasa.com

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CriSamar® is a trademark of SEVASA. Although the pictures reproduce the colors close to reality, we recommend to see a real sample of the product.



La tranquilidad de pisar
totalmente seguro.

Peacefulness of stepping
completely safe.



Base material:

float glass to UNI EN 572 1-2: 2004.

Description and characteristics:

the treated side is roughened and sparkling. Its anti-slip properties are certified with method BCRA ($\mu > 0,40$) and to standard DIN 51130 (R9). Its resistance to scratching is certified to standard UNI 9428:1989: Level 4. The low porosity of this side also ensures resistance to stains (whether grease or coloured liquids) and is easy to clean. It screens vision whilst allowing light through.

Plate size:

2250 x 3210 mm;

useful size 2220 x 3180 mm

Standard thicknesses:

8/10 mm

Weight:

2.5 kg/sqm/mm thickness

Standard colours:

clear, extraclear

Compatible processing:

all mechanical and heat processes (cutting, grinding, bevelling, etching, drilling, laminating, painting, silvering, enamelling, tempering, bending etc.)

Interior/Exterior applications:

steps, flooring, tiles, footbridges etc.



Base material:

float glass to UNI EN 572 1-2: 2004.

Description and characteristics:

the glass is permanently acid-etched on one side to form a texture with points in relief (Ø 1.8 mm) 4 mm apart, tracing a cross-shaped pattern. The tops of these high points are rendered opaque and rough, while the surrounding glass is shiny. It screens vision whilst allowing light through. Anti-slip characteristics certified with method BCRA ($\mu > 0,40$), to standards DIN 51130 (R11) and ASTM C 1028 (I.S.C.F $> 0,60$).

Plate size:

2250 x 3210 mm;
useful size 2220 x 3180 mm

Standard thicknesses:

8/10 mm

Weight:

2.5 kg/sqm/mm thickness

Standard colours:

clear, extraclear

Compatible processing:

all mechanical and heat processes (cutting, grinding, bevelling, etching, drilling, laminating, painting, silvering, enamelling, tempering, bending etc.)

Interior/Exterior applications:

steps, flooring, tiles, footbridges etc.



Product fact sheet | **Madras® Pixel Flooring**

Base material:

float glass to UNI EN 572 1-2: 2004.

Description and characteristics:

the glass is permanently etched on one side to form a texture with points in relief (Ø 1 mm), 5 mm apart, tracing a cross-shaped pattern. It almost completely keeps the original transparency and brilliance of the float glass. Anti-slip properties certified with standards DIN 51130 (R10) and DIN 51097 (A).

Plate size:

2250 x 3210 mm;
useful size 2220 x 3180 mm

Standard thicknesses:

8/10 mm

Weight:

2.5 kg/sqm/mm thickness

Standard colours:

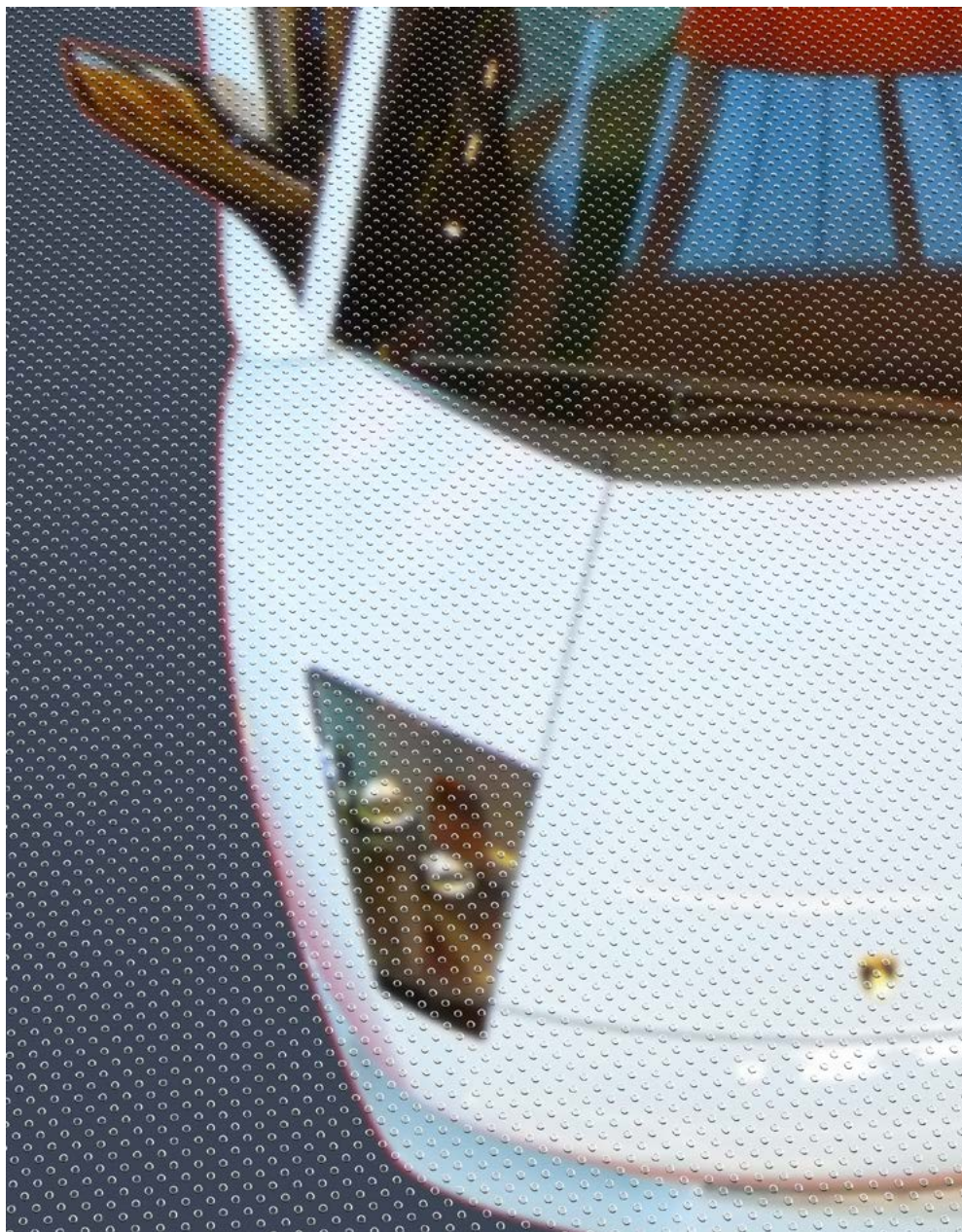
clear, extraclear

Compatible processing:

all mechanical and heat processes (cutting, grinding, bevelling, etching, drilling, laminating, painting, silvering, enamelling, tempering, bending etc.)

Interior/Exterior applications:

steps, flooring, tiles,
footbridges etc.



Product fact sheet

Madras®
Punto Flooring Transparent