# **WOOD-SKIN**

EASE COMPLEXITY WITH EVER EVOLVING INNOVATIVE BUILDING TECHNOLOGIES

TECHNICAL MANUAL

# OD-SKIN®

# TABLE OF CONTENTS

Introduction	p. 04
PART I - Design, Assembly and Material guidelines	p. 06
1 Design guidelines	p. 08
1.1 Designing with WOOD-SKIN	p.09
Mesh Sheets	p. 10
• Fold Panels	coming soon
Tailor made	p. 18
1.2 WOOD-SKIN key features	p. 22
1.3 Requirements for design	p.23
2 WOOD-SKIN® composite and materials	p. 24
2.2 Hinges and seams	p.25
2.3 Material composite	p.26
3 Storage and handling	p. 32
3.1 Packaging and shipping	p.33
3.2 Handling	p.35
4 Joining WOOD-SKIN sheets	p. 36
4.1 Tools	p.37
4.2 Flap-to-flap joint	p.38
4.3 Flap-to-jig joint	p. 40
4.4 Custom flap-to-jig	p. 42

PART II - Installation and technological details	p. 45
5 Pre-installation requirements	p. 46
5.1 Pre-exhisting conditions	p. 47
5.2 Scaffolding	p. 47
6 Technical details for design and installation	p. 24
6.1 Mesh Sheet	p.50
M1 suspended ceiling	p.52
M2 suspended wall	p.58
M3 direct attachment to wall	p.64
• M4 counter	p.76
6.2 Tailor Made	p.82
T1 suspended ceiling	p.84
T2 direct attachment to ceiling	p.90
T3 direct attachment to wall	p.96
• T4 canopy	p.102
• T5 counter	p.108
7 Additional customisations	p. 114
7.1 Doors and openings	p.116
7.2 Integration of other materials	p.118
7.3 Fixtures and lighting	p.122
7.4 Sprinklers	p.124
7.5 Inspection openings	p.128
8 Certifications	p. 132

# INTRODUCTION

#### General information on the WOOD-SKIN Technical Manual

- The information in this manual is intended for architects, designers and specifiers to assist in the design
  and selection of the most appropriate WOOD-SKIN system for ceiling and wall coverings, counters
  and any other custom product intended for interior use, e.g. restoration and leisure spaces, foyers and
  lobbies, conference rooms, auditoriums, retail, homes etc.
- This manual, specifically in its second part, is aimed to assist general contractors, installers, and any other personnel involved in the installation of WOOD-SKIN interior systems.
- WOOD-SKIN® is a technological system that can be tailored entirely in terms of geometry, material composition, installation method and performance.
- The classification, assembly and installation methods and details described in this manual are based on realised projects and demonstrate best practices in design and application of the WOOD-SKIN® technological system.
- Installation methods and technical details could be combined and adjusted across the various products to realise in the most efficient way possible the requirements of any design brief.
- This manual refers to the three main typologies of WOOD-SKIN surfaces Mesh Sheets, Tailor made services.
- Partial or complete customisations are possible upon request and after evaluation of a preliminary design
  project by the WOOD-SKIN design and technical teams. All changes from the assembly, installation and
  technical details described in this manual are discussed priorly with the leading architect, designer and/
  or general contractor.

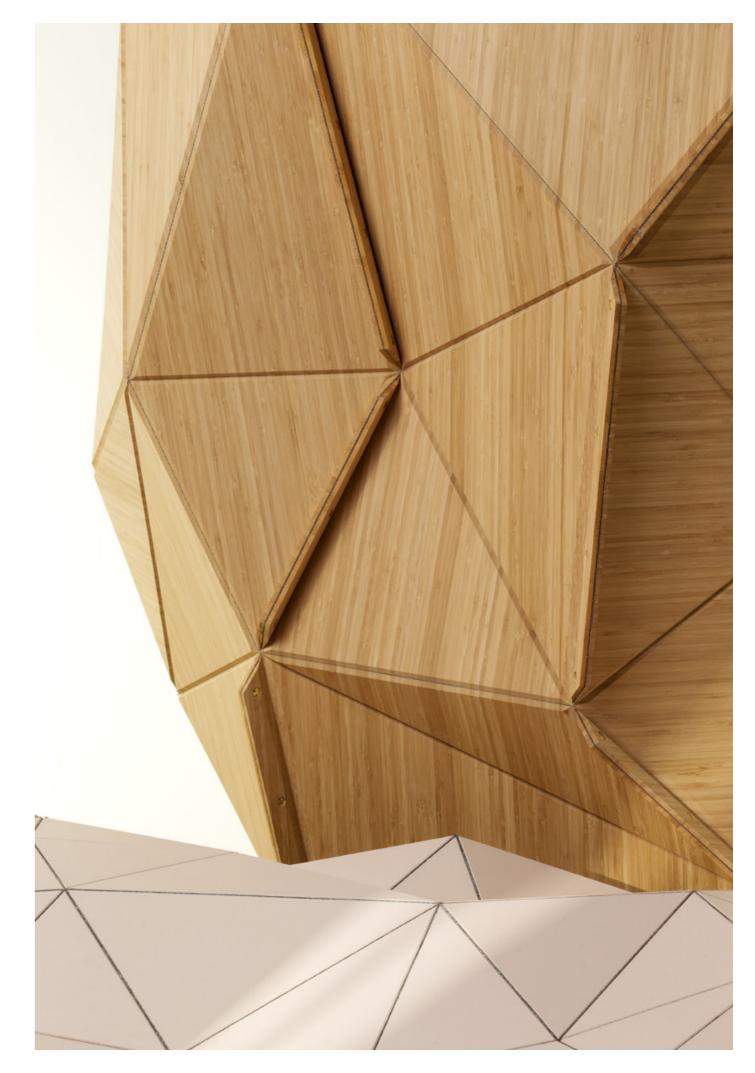
#### Validity and field of application

- This installation manual is valid as an application guideline and does not represent a complete reference
  to existing standards or codes. Descriptions and details refer only to WOOD-SKIN products. It defines
  dimensions, limits and design requirements for ceilings, walls and counters intended for interior
  application
- Given the vast versatility of the WOOD-SKIN® technological system, this manual does not cover all
  the possible typologies of systems integration and surface design but rather focuses on a selection of
  typically applied solutions of WOOD-SKIN surfaces
- This installation manual however has no validity for the following applications:
  - 1. Accessible ceilings and their supporting structure;
  - 2. Ceilings with dynamic and/or static load effects.

For more information regarding specific design, structural or installation requirements and regulations, please contact us at: info@wood-skin.com

# PARTI

DESIGN, MATERIALS & ASSEMBLY GUIDELINES



# 1 DESIGN GUIDELINES

#### 1.1 DESIGNING WITH WOOD-SKIN

#### **WOOD-SKIN®** technology

WOOD-SKIN surfaces are made from a highly resistant textile core sandwiched between sheets of hard material. Once material is removed with precision from both sides a textile hinge is formed which allows the surfaces to assume a range of programmed threedimensional forms. The three main groups of products described in detail in this manual - Mesh Sheets, Fold Panels and Tailor Made Services - are born from this unique technological system.

#### Most common applications

Currently intended mainly for application in interiors, exterior solutions can be developed upon request and in careful consideration to the material selection based on the local environmental conditions. WOOD-SKIN is a system that allows the easy creation and installation of 3D surfaces otherwise expensive and difficult to build. Due to the high degree of flexibility and customisation, the system can respond to any spatial complexity and creative decisions. Standardised panels/components in large quantities can also be developed thanks to the mass customisation logic of production.

#### **WOOD-SKIN** geometries

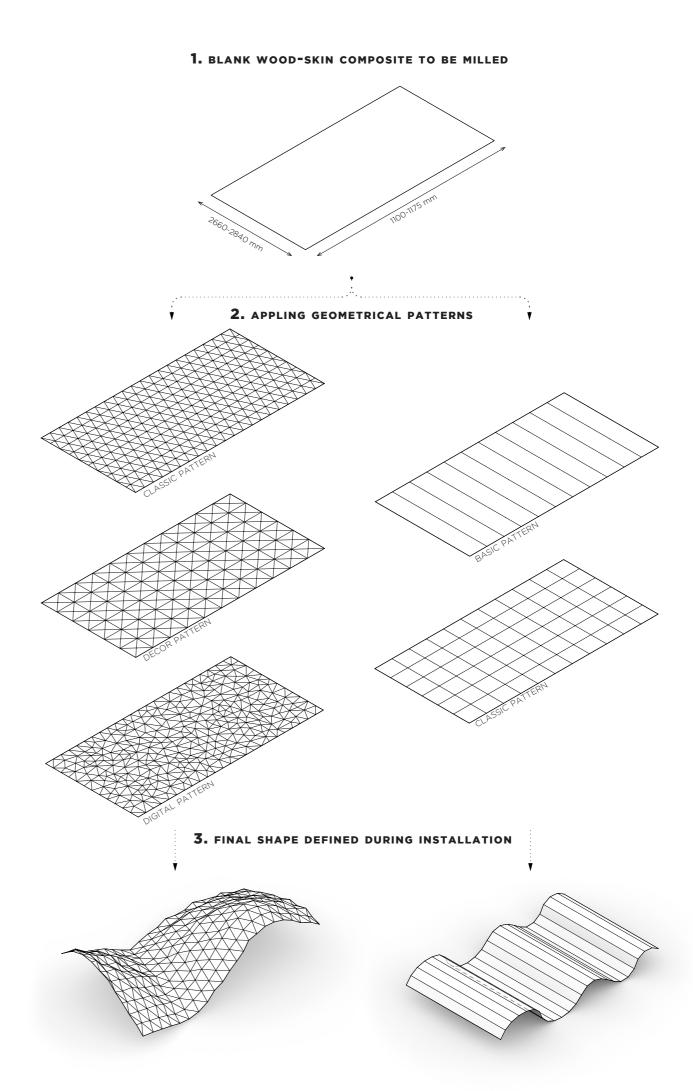
Geometry plays a crucial role in the design with WOOD-SKIN® technology. Mesh Sheets, Fold Panels and Tailor Made surfaces are part of the same technological system but each offers a unique geometrical expression. Thanks to the large number of hinges, Mesh Sheets create fluid surfaces with non-defined three-dimensionality. With Tailor Made services it is possible to materialise almost any three-dimensional geometry defined by the designer and/or client.

#### FREE FORM 3D SURFACES

me & D SHEETS

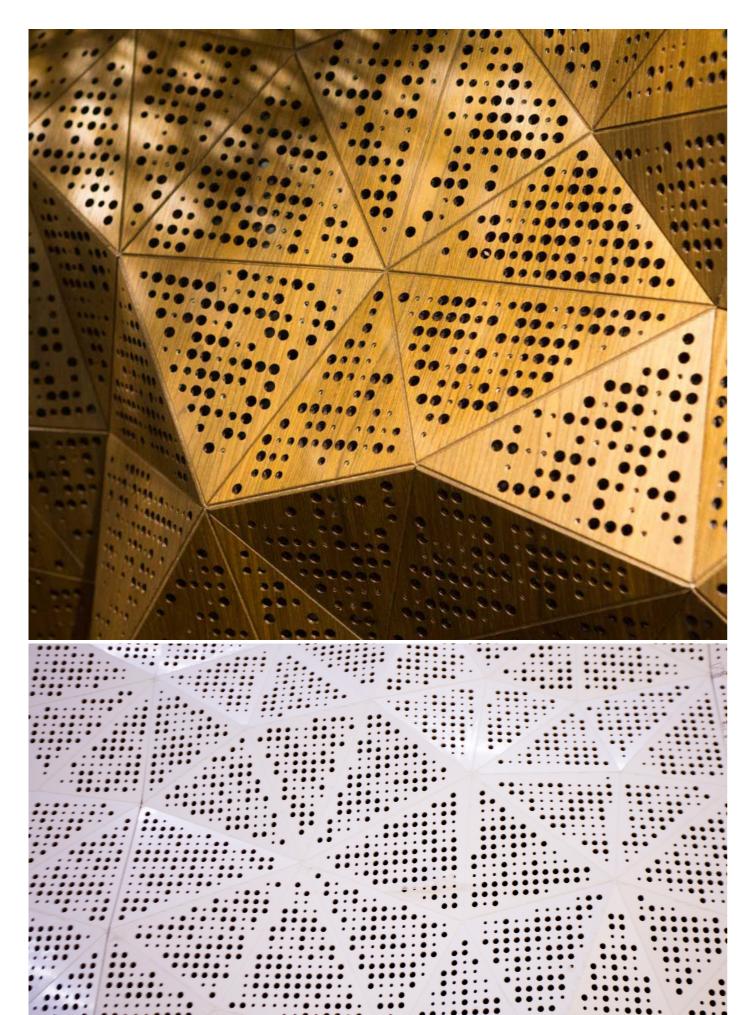
Mesh Sheets offer a new way to design freeform surfaces. The 3D geometry created by the Mesh Sheets results from the milling patterns applied on a flat composite sheet. This Bottom Up design logic implies that the surfaces can assume wide range of form - three-dimensional or flat. The geometry of the Mesh Sheets is defined during the installation phase, where the flexible sheets are constrained in specific points thanks to aiplain cables and wooden templates.

Our WOOD-SKIN designers are highly experienced in handling complex geometries and working with free-form surfaces. We use parametric design tools that allow us to simulate the behavior of the Mesh Sheets. This makes it possible to provide the client with a clear idea about the final look of the product based on the chosen pattern, material and dimension.



# **AVAILABLE PATTERNS AND DIMENSIONS**

# CLASSIC DIGITAL BASIC DECOR

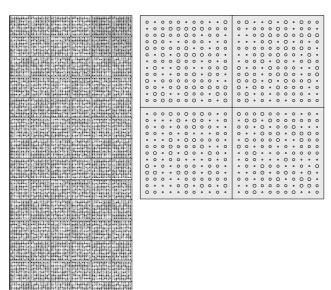


## **ACOUSTIC PERFORATIONS**

The Mesh Sheets can be additionally customised to serve as acoustic panels. The perforation pattern options are endless. The required open area can be achieved with circular holes or lines.

CLASSIC B | Size: L

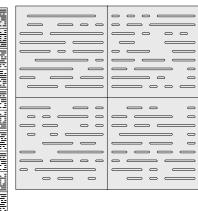
Perforation: various diameter holes



CLASSIC B | Size: L

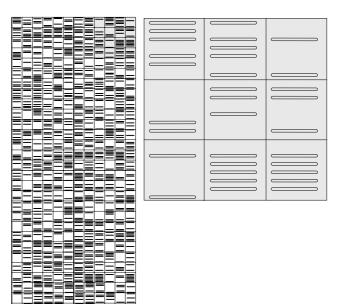
Perforation: various lenghts lines





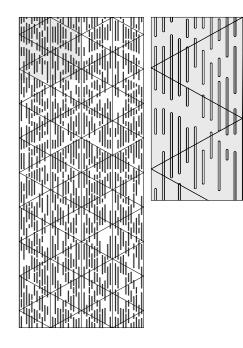
#### CLASSIC B | Size: S

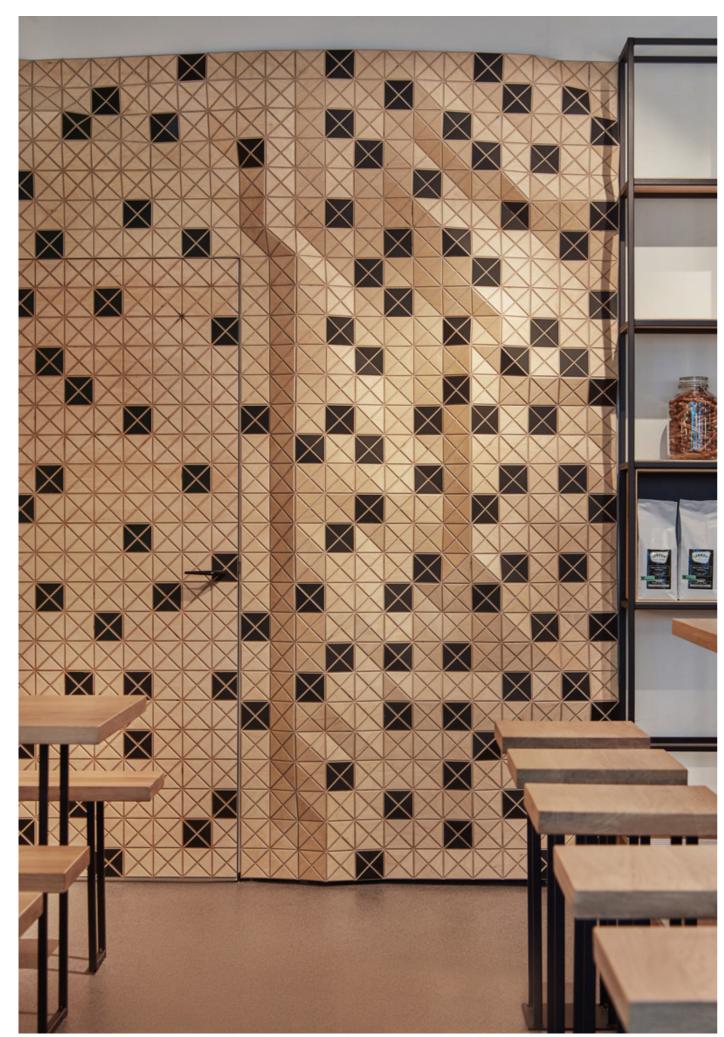
Perforation: lines



#### CLASSIC A | Size: L

Perforation: various lenghts vertical lines



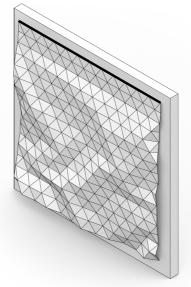


16

Lebkov&Sons, Amsterdam

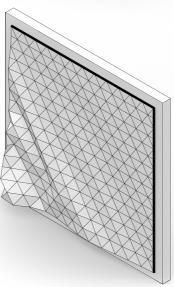
#### **CONSTRAINTS**

Mesh Sheets behave like a macro textile depending on the constraints. The strongest 3D effect is achieved with only a few fixed edges or points. The surface remains flat closer to the fixed edges and texturised further away from them.



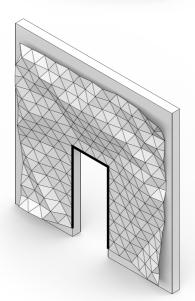
#### 1 ONE SIDE CONSTRAINED

The WOOD-SKIN sheet creates three-dimensional surface with free-form geometry



#### **2** TWO SIDES CONSTRAINED

The three-dimensionality of the resulting WOOD-SKIN surface is reduced, especially towards the constrained edges



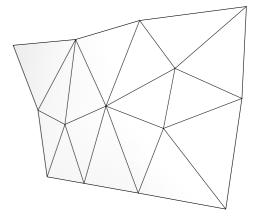
#### **3 THREE SIDES CONSTRAINED**

The WOOD-SKIN surface remains flat closer to the constrained edges but remains highly freeform towards the free edges

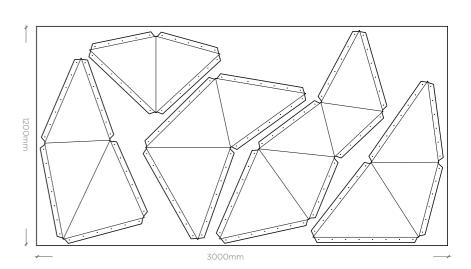
# **TAILOR** MADE

WOOD-SKIN Tailor Made surfaces are bespoke products created for specific projects. The guiding design principle here is the geometry. Our architectural and design team has years of experience working with award-winning design and architecture practices on international projects, by engineering intricate shapes, designing custom details, and devising solutions to 'impossible' problems. The WOOD-SKIN design team is able to discretise any complex geometric input - with single or double curvature, and transform it into a series of flat elements easily produced and installed. Thanks to WOOD-SKIN®'s proprietary design software and digital manufacturing process, the most expensive and time-consuming aspects of customization are significantly reduced.

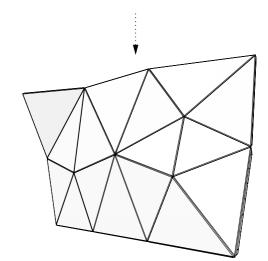
2. TESSELLATION AND ENGINEERING



3. PRODUCTION



4. INSTALLATION

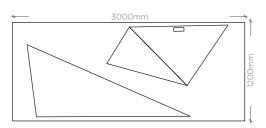


## **AVAILABLE PATTERNS AND DIMENSIONS**

The machinable slabs have a maximum size of 3000x1200mm, inside these slabs, the WOOD-SKIN® software optimizes the space to make the best use of the material. This process is called nesting and depends on the size of the shapes to be obtained.

FACTOR: this number refers to the additional amount of WOOD-SKIN we need to take into account to cover a certain area. We need more WOOD-SKIN than the net surface area to cover to achieve a 3D effect, this considers scraps due to the differences in sizes between our production sheets and the surface to cover and the amount of WOOD-SKIN surface used to achieve the desired 3D effect. A good example is what happens with textiles when you tailor a jacket, you start from a roll of fabric that then is cut in pieces with a specific form. To create a three-dimensional object like a jacket you use meters of fabric even if the result fits a much smaller area.

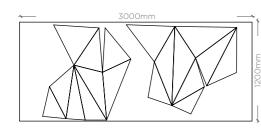
#### LARGE FACTOR: 2





Project example: LinkedIn, Madrid

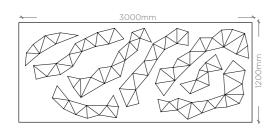
#### MEDIUM FACTOR: 1.8





Project example: luter Store, Ibiza

# SMALL FACTOR: 1.6



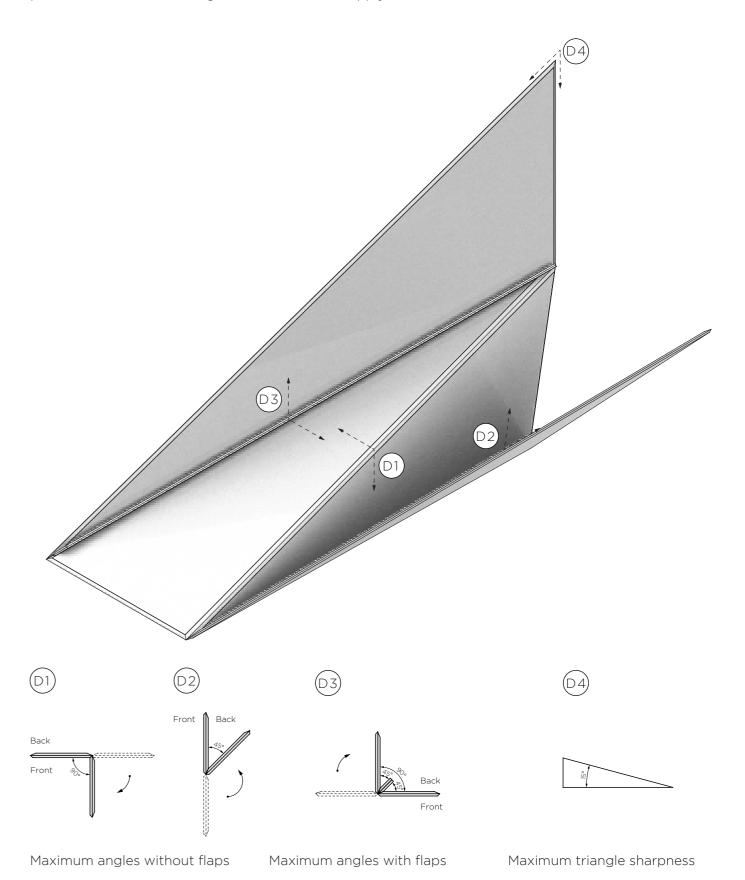
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**CONSTRAINTS** 

The fabrication process has an important role in the definition of the final 3D geometry of our products. The advanced milling machines and tools we use allow us to create strong hinges. In order to ensure the product resistance certain geometric limitations apply.



#### **JOINING SYSTEMS**



#### STANDARD FLAPS

> MESH SHEETS

All WOOD-SKIN sheets are joined together by the flaps already embedded in the product. They are designed and fabricated to ensure a seamless and strong joint between the sheets while maintaining flexibility.



#### **CUSTOM FLAPS**

> FOLD PANELS AND TAILOR MADE

The flaps can also be customised and produced in different shapes in order to accommodate specific requirements. The custom flaps necessitate more material than the standard ones. a single WOOD-SKIN sheet can be produced with both standard and custom flaps.



#### **SYMBOLS**

22

> MESH SHEETS, FOLD PANELS AND TAILOR MADE

The symbol on the back of each WOOD-SKIN piece aids their assembly. The numbers indicate the assembly sequence and are present in all WOOD-SKIN products. The -/o symbols instead are crucial for achieving the designed three-dimensional result. They can be found on the Fold Panels and Tailor Made surface pieces. The "-" defines a valley, meaning that the edge where this symbol is placed should be folded inwards, while "O" defines a mountain, the edge must be folded outwards.

#### SUSPENSION SYSTEM



#### **HOLES**

The holes in the flaps allow Mesh Sheets to be suspended, from walls and ceilings, and are essential in determining the final three-dimensional form.

#### **SUSPENSION KIT**

The suspension kit, provided by WOOD-SKIN, consists of an aircraft cable and a steel locking cable wire rope grip which allows the length of the cable to be adjusted.

WOOD-SKIN makes sure to provide you with the kit most suitable for the selected product and its intended application.

#### 1.3 REQUIREMENTS FOR DESIGN

#### **SURVEY**

Thanks to the digital fabrication process, all WOOD-SKIN elements are produced to exact measures. The custom surfaces are made to order and with few tolerances. This requires a precise survey of the space where Wood-Skin products will be installed.

#### LASER SCANNING AND DIGITAL 3D MODEL

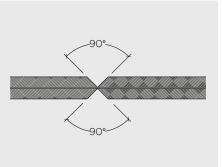
For complex or large-scale projects, our technical team recommends a laser scan and an accurate 3D model of the site. This allows for our design team to create and produce highly precise surfaces and reduce waste material.

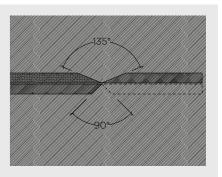
# OOD-SKIN®

# 2 WOOD-SKIN COMPOSITE AND MATERIALS

## 2.1 HINGES AND SEAMS





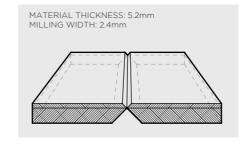


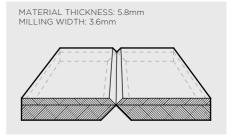
#### HINGES

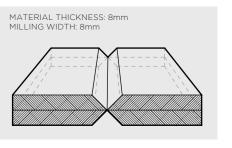
The hinges permit WOOD-SKIN surfaces to behave like a textile-like material. They are created by removing material from the front and back of the flat composite sheet using numerically controlled machinery. Two types of milling angles are used to guarantee a better control over the three-dimensionality - 90° for the front and back grooves and 135° for the back grooves where flaps are added.

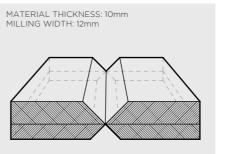
#### RELATIONSHIP BETWEEN MATERIAL THICKNESS AND SEAM WIDTH

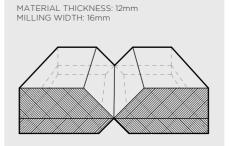
Because of the milling angles, the width of the seams depend on the thickness of the used material. This is an important aspect defining WOOD-SKIN's aesthetics.

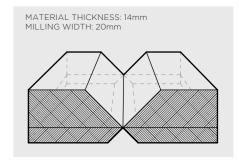












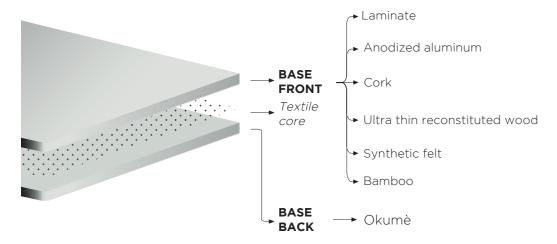
WOOD-SKIN works with material suppliers, this allows us to create composites with tailored properties, performance and aesthetics. Our team can help you design the most suitable material composite for your needs.

The standard core of WOOD-SKIN composites is made of a polyester based technical textile with the following characteristics:

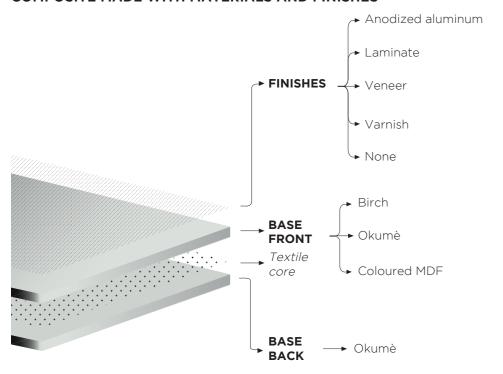
- Total weight 250 gr/m<sup>2</sup>
- Tensile strength 1800/1700 N/50 mm
- Tear strength 350/330 N
- Seam strength 50/N 5 cm

Information about adhesive available upon request

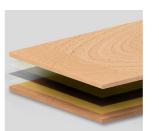
#### **COMPOSITE MADE WITH MATERIALS WITHOUT FINISHES**



#### **COMPOSITE MADE WITH MATERIALS AND FINISHES**



#### **BIRCH**



Fire retardant treatment available

Acoustic version available \*

FRONT SURFACE: Birch plywood | 4mm

#### **CHARACTERISTICS:**

High quality aesthetic and structural performance. Light color with amber hue

#### **FINISHES AVAILABLE ON BIRCH:**

- + transparent varnish
- + veneer (wide variety)
- + laminate (any color)
- + anodized aluminum

**COLOURS:** natural

**SUGGESTED APPLICATION:** 

indoor application

**BACK SURFACE:** Birch plywood | 4mm

#### OKUMÈ



Fire retardant treatment available

) Acoustic version available \*

FRONT SURFACE: Okoume plywood | 4mm

#### **CHARACTERISTICS:**

High quality marine plywood with warm hue. Dimensionally stable and resistant to moisture. Lightweight

#### FINISHES AVAILABLE ON OKUMÈ:

- + transparent varnish
- + veneer (wide variety)
- + laminate (any color)
- + anodized aluminum

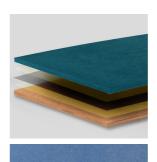
**COLOURS:** natural

#### SUGGESTED APPLICATION:

indoor application

**BACK SURFACE:** Okoume plywood | 4mm

#### **COLOURED MDF**



Fire retardant treatment available

) Acoustic version available \*

FRONT SURFACE: Coloured MDF | 5 - 8mm

#### **CHARACTERISTICS:**

Wide range of colors and finishes possibilities. Moderately hydrophobic

#### **FINISHES AVAILABLE ON MDF:**

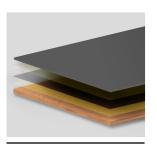
- + transparent varnish
- + veneer (wide variety)
- + laminate (any color)
- + anodized aluminum

COLOURS: wide variety
SUGGESTED APPLICATION:

indoor application

**BACK SURFACE:** Okoume plywood | 4mm

#### LAMINATE



Acoustic version available

FRONT SURFACE: Laminate | 0.7 - 1.2mm

**CHARACTERISTICS:** 

An innovative nanotech material for interior design: a smart, extremely matt, anti- fingerprint, very resistant, soft touch surface.

**FINISHES AVAILABLE ON LAMINATE:** 

+ No finish

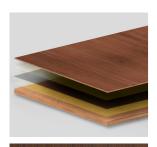
**COLOURS:** any color

**SUGGESTED APPLICATION:** 

indoor application

**BACK SURFACE:** Okoume plywood | 4mm

#### **ULTRA-THIN RECONSTITUTED WOOD**



Fire retardant treatment available

) Acoustic version available

FRONT SURFACE: Reconstituted wood | 1.8mm

**CHARACTERISTICS:** 

High-quality and aesthetic

FINISHES AVAILABLE ON RECONSTITUTED WOOD:

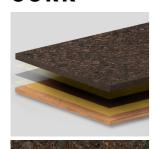
+ transparent varnish **COLOURS:** wide variety

**SUGGESTED APPLICATION:** 

indoor application

**BACK SURFACE:** Okoume plywood | 4mm

#### CORK



FRONT SURFACE: Cork | 20mm

**CHARACTERISTICS:** 

100% natural, lightweight

**FINISHES AVAILABLE ON CORK:** 

+ transparent varnish

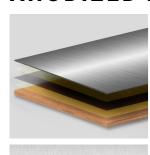
**COLOURS:** wide variety

**SUGGESTED APPLICATION:** 

indoor application

**BACK SURFACE:** Okoume plywood | 4mm

#### **ANODIZED ALUMINUM**



FRONT SURFACE: Aluminum | 0.6 - 1mm

**CHARACTERISTICS:** 

High quality and resistance

FINISHES AVAILABLE ON ALUMINUM:

+ No finish

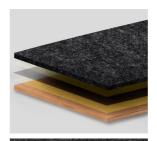
**COLOURS:** wide variety

**SUGGESTED APPLICATION:** 

Indoor and outdoor application

**BACK SURFACE:** Okoume plywood | 4mm

#### SYNTHETIC FELT



) Acoustic material

**FRONT SURFACE:** Synthetic felt

**CHARACTERISTICS:** 

The acoustically highly effective fibrereinforced composite ensures a high level of sound absorption, even with a low material thickness.

**FINISHES AVAILABLE ON SYNTHETIC FELT:** 

+ No finish

**COLOURS:** wide variety **SUGGESTED APPLICATION:** 

indoor application

**BACK SURFACE:** Okoume plywood | 4mm

#### **BAMBOO**



Fire retardant treatment available

Acoustic version available

FRONT SURFACE: Cork | 3 - 5mm **CHARACTERISTICS:** 

100% natural, lightweight

FINISHES AVAILABLE ON BAMBOO:

+ transparent varnish **COLOURS:** wide variety **SUGGESTED APPLICATION:** 

indoor application

**BACK SURFACE:** Okoume plywood | 4mm



# MATERIAL AVAILABILITY BASED ON PATTERN

			MESH	MESH SHEETS																	TAILOR MADE								
			CLAS	SSIC										BAS	ıc		DIGI	TAL			DEC	OR							
			,	<b>A</b> $\left\langle \cdot \right\rangle$		В		c 🔀			D			A <b> </b>			A 💥		В		A			В (		>			
		SIZE	S	М	L	М	L	S	М		S	M	L	S	М	L	М	L	М	L	S	М	L	S	Μ	L	SMALL	MEDIUM	LARGE
MATERIALS	BIRCH		•			•	•	•			•			•			•		•		•	•		•	•	•	•	•	•
Ψ E	OKOUME		•	•	•	•	•	•		•	•			•		•	•	•	•		•	•		•	•	•	•	•	•
	COLOURED MDF		•	•	•	•	•	•			•			•		•	•	•	•		•	•		•	•	•	•	•	•
	LAMINATE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	RECONSTITU WOOD	JTED	•	•		•	•	•			•			•		•	•	•	•	•	•	•		•	•	•	•	•	•
	● CORK			•	•	•	•			•						•												•	•
	ANODIZED ALUMINUM		•	•		•	•	•						•		•	•	•			•	•		•	•	•	•	•	•
	SYNTHETIC FELT					•	0															•			•	•	•	•	•
	ВАМВОО		•	•	•	•	•	•			•			•		•	•	•	•		•	•		•	•	•	•	•	•

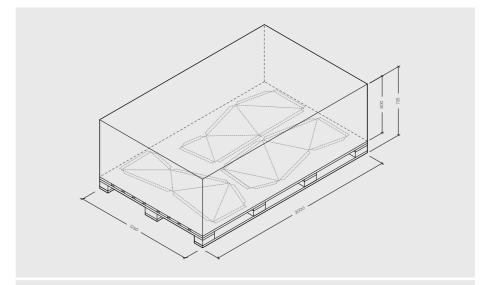
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# **3 STORAGE AND HANDLING**

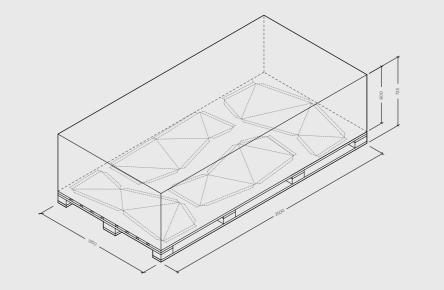
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## 3.1 PACKAGING AND SHIPPING

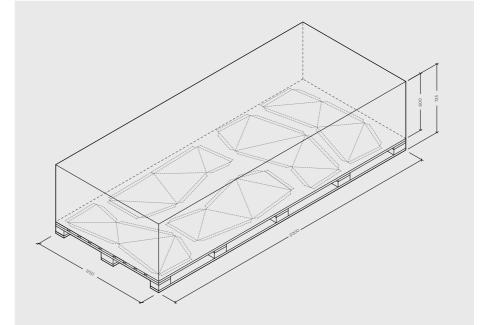
WOOD-SKIN products arrive in wooden boxes on pallets shipped by plane or boat. The crates come in three sizes which generally depend on the amount and type of order.



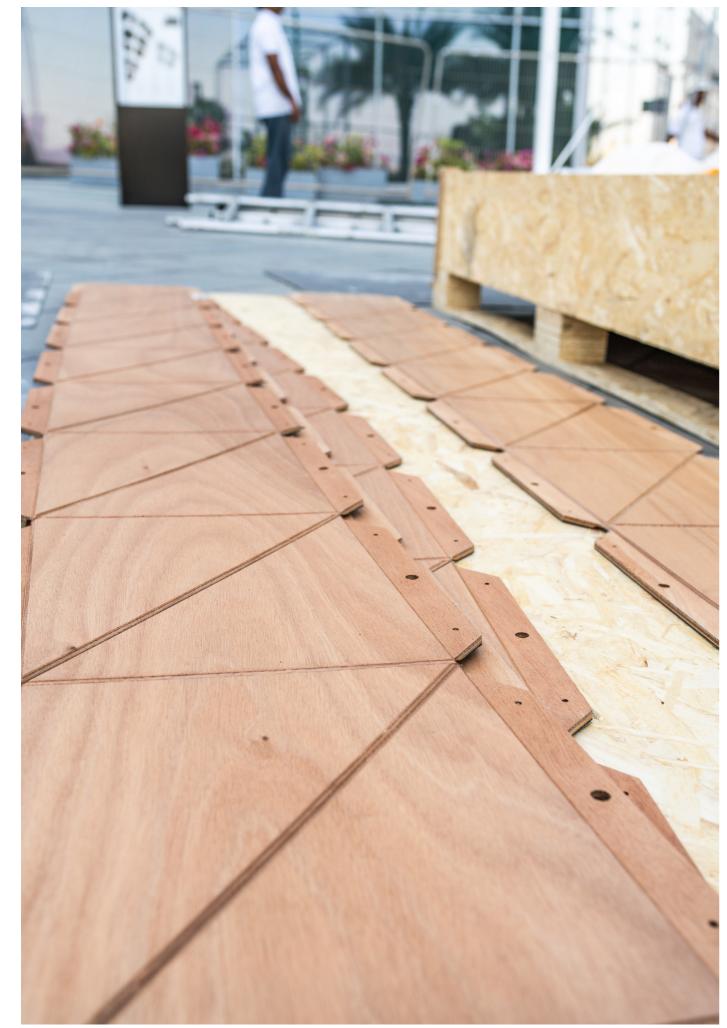
CUSTOM I Small W1250 x L2000 x H~600



CUSTOM II Medium W1250 x L2500 x H~600



STANDARD Large W1250 x L3000 x H~600



Parametric Surface, Dubai

## **3.2 HANDLING**

Due to the nature of the materials, WOOD-SKIN sheets must be stored in a dry place with proper ventilation to avoid changes in color and performance. All pieces are delivered with the back side facing up and a plastic protective film on the front side. Instruction sheets for the assembly are provided.

#### Unboxing:

- 1. Space for assembly should be provided
- 2. All pieces should be taken out of the box and placed on a soft material in order to protect the surfaces
- 3. The pieces should be placed with the back side facing up so that all symbols and numbers are visible
- 4. Assembly should be done according to the instruction sheet

# 4 JOINING WOOD-SKIN SHEETS

36

## **4.1 TOOLS**

The assembly process of WOOD-SKIN sheets depends largely on the type of product and the application. Specific technical information about the assembly and installation of the various typologies are provided further in this manual.

Together with the product itself, WOOD-SKIN also provides the necessary hardware for the assembly. Mesh Sheets, Fold Panels and Tailor Made surfaces are joined together with M4 bolts, washers and nuts. For some particular applications screws, glue, nails and other hardware might be needed.

#### TOOLS:

- M4 Bolts with 3mm hexagonal socket head
- M4 washers
- M4 nuts
- Wooden screws various dimensions
- Drywall screws
- Metal angular brackets
- Metal flat plate
- Electric screwdriver and bits:
- HEX3 (3 mm ALLEN BIT)
- PZ2 (POZIDRIV 2)
- PH2 (PHILLIPS 2)
- 7mm wrench
- GRIPPLE® suspension system

M4 system

Screws

Brackets and plates

Electric screwdriver bits

Wrench

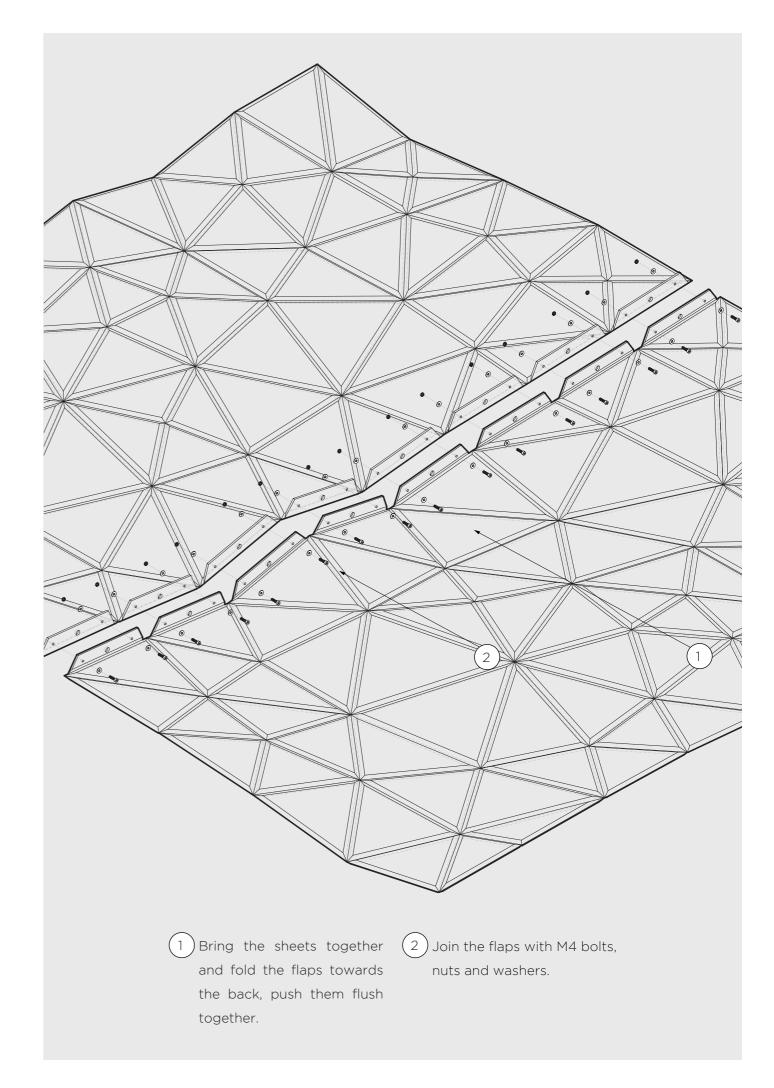
GRIPPLE®

Three main types of joinery are used for assembling WOOD-SKIN sheets (to be explained in the coming pages) to each other or to supporting items. The flaps are embedded in the sheets and come with standard dimensions, designed to ensure a seamless and resistant joint. Custom flaps are designed and fabricated according to the application and installation requirements.

## **4.2 FLAP-TO-FLAP JOINT**

This type of joint is present in all WOOD-SKIN surfaces. Mesh Sheets, Fold panels and Tailor made surfaces are all connected using the standard flap-to-flap joinery system, specifically for the inner joints. Mesh Sheets and some Tailor Made surfaces feature a hanging hole for suspension. M4 bolts, nuts, washers and a screwdriver are needed for the assembly. This joinery type also allows easy disassembling and reassembling the panels.

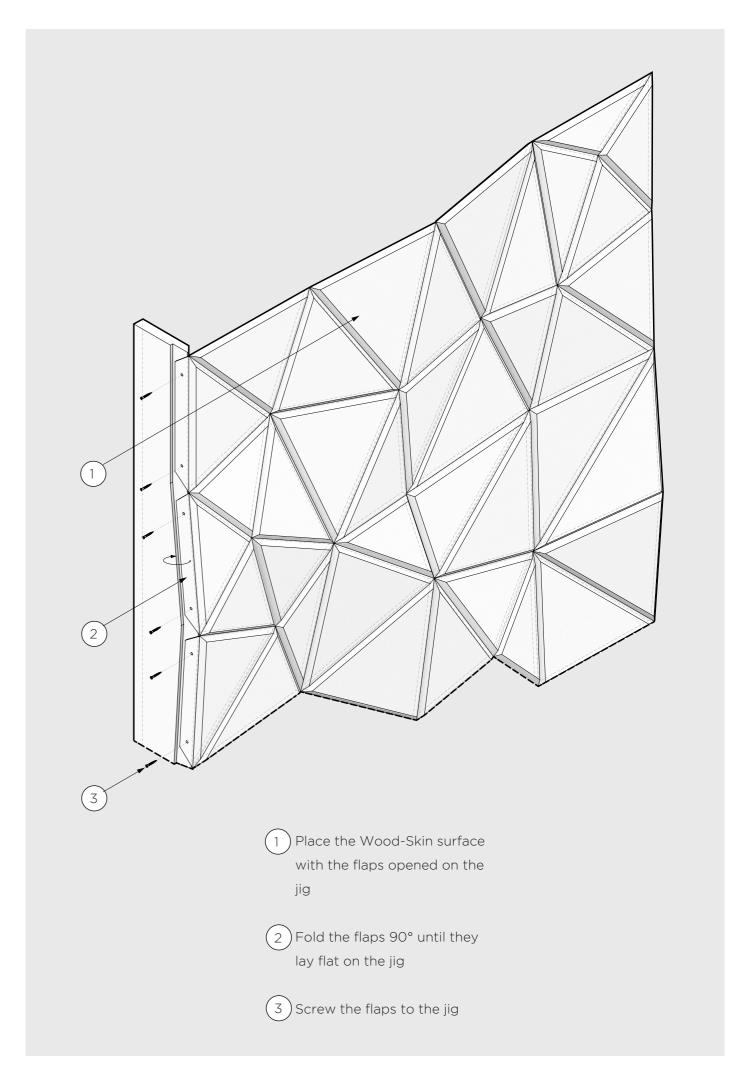




## **4.3 FLAP-TO-JIG JOINT**

This type of joint is used for attaching the border flaps of WOOD-SKIN sheets to a supporting frame/jig. The MDF or Okoume jigs are custom milled to accommodate the geometry of the sheets and are provided by WOOD-SKIN. The flaps are joined to the jig with screws.

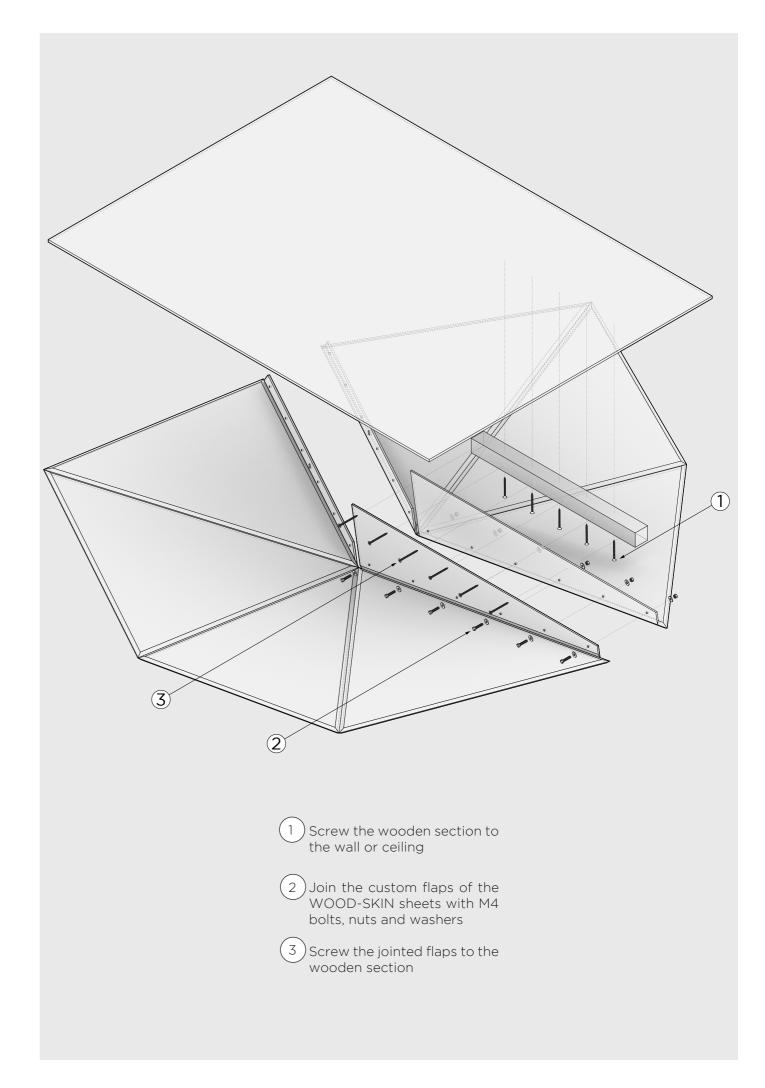




The custom flap-to-jig joinery is mainly used for for joining Tailor Made sheets to a supporting structure on the ceiling. This joint type uses M4 bolts, nuts, washers for joining and screws for attaching them to the supporting structure. This system is used only for the interior flaps. The custom flaps are embedded in the WOOD-SKIN sheets and are produced to exact measure.



DIOR Boutique, Monaco





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# PART II

**INSTALLATION AND TECHNOLOGICAL DETAILS** 

# **5 PRE-INSTALLATION REQUIREMENTS**

#### **5.1 PRE-EXISTING CONDITIONS**

In the typical scenarios for installing WOOD-SKIN on ceilings, walls, etc. certain pre-installation conditions must be ensured. These include the pre-installation of jigs in plywood, reinforcements in cases the existing ceiling/wall do not provide the needed resistance. In addition, this section of the installation manual provides information about the required scaffolding and tools needed.

#### Notes

The WOOD-SKIN team evaluates the structure to which the surfaces are attached Supporting structure might be needed - plywood, steel reinforcement etc.

If there is no possibility for installing supporting structure, WOOD-SKIN might refuse the project

WOOD-SKIN is not load-bearing, fixers must work from an independent support system

#### Additional Loads:

The installation of additional loads is not foreseen in the systems documented here. The substructure is to be attached by appropriate means to structural components. Additional loads (lights, ventilation elements among other things) are to be attached separately whenever possible. The substructure as well as the top layer must not be walked on. For special applications, a reinforcement of the system construction is feasible for additional loads. The direct consultation of WOOD-SKIN is a mandatory prerequisite for this. The determination of corresponding additional loads and their definition in writing shall be done by the customer. For all types of installations, the regulations documented here are to be observed.

#### **5.2 SCAFFOLDING**



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# 6 TECHNICAL DETAILS FOR DESIGN AND INSTALLATION

The following section describes the most typical technical and installation details related to the WOOD-SKIN technology. The details are based on projects developed and realised by WOOD-SKIN throughout various parts of the world.

This part of the manual provides detailed technical information for the different Mesh Sheets and Tailor Made surfaces. The versatility of WOOD-SKIN® technology allows for the same products to be installed as ceiling, walls, counters or canopies. These can be realised as suspended systems using aircraft cables or directly attached to the structure using custom cut jigs. Additional customisations, like doors and inspection openings, integration of other materials (e.g. plexiglass), of light fixtures and sprinklers, are also described.

Each section contains a section drawing with the most relevant technical details, a visual reference of the realised project and an isometric drawing describing essential installation steps.

despite this manual including the most common cases for installing woodskin, some projects require specific customisations. Our team's know-how helps us to carefully examine each design brief and provide the designers, architects and general contractors with the most appropriate assembly information and installation details.

mes A SHEETS

#### SUSPENDED CEILING



SUSPENDED WALL



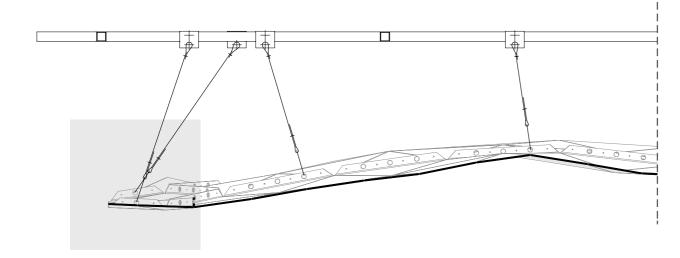
DIRECTLY ATTACHED
WALL

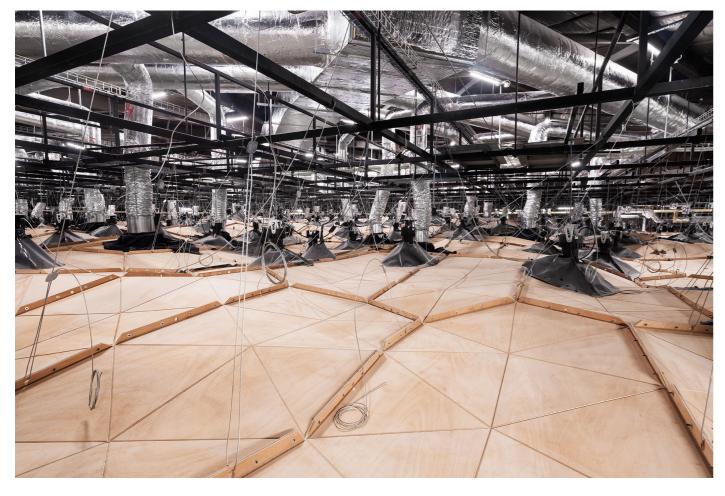


COUNTER

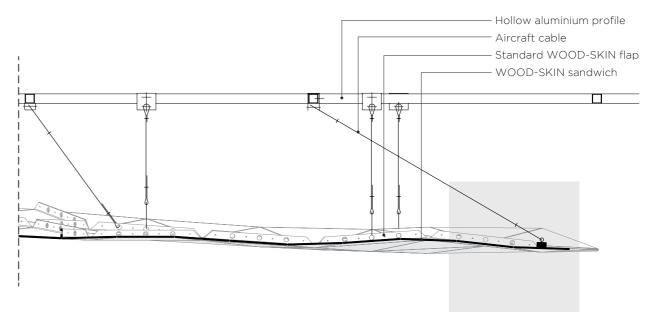


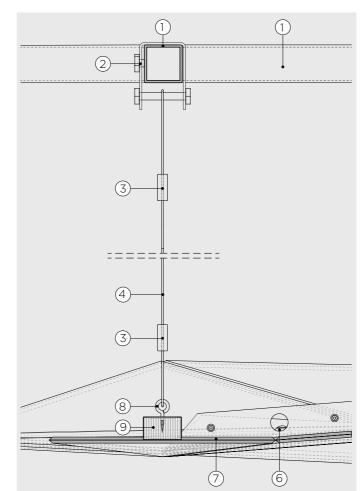
## M1 SUSPENDED CEILING

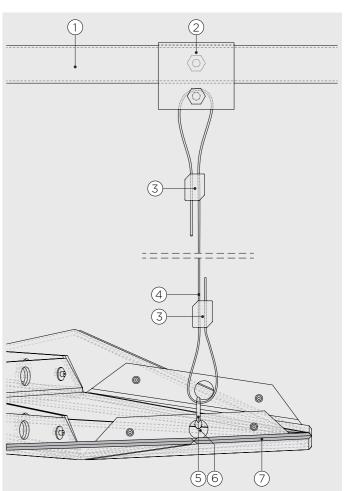




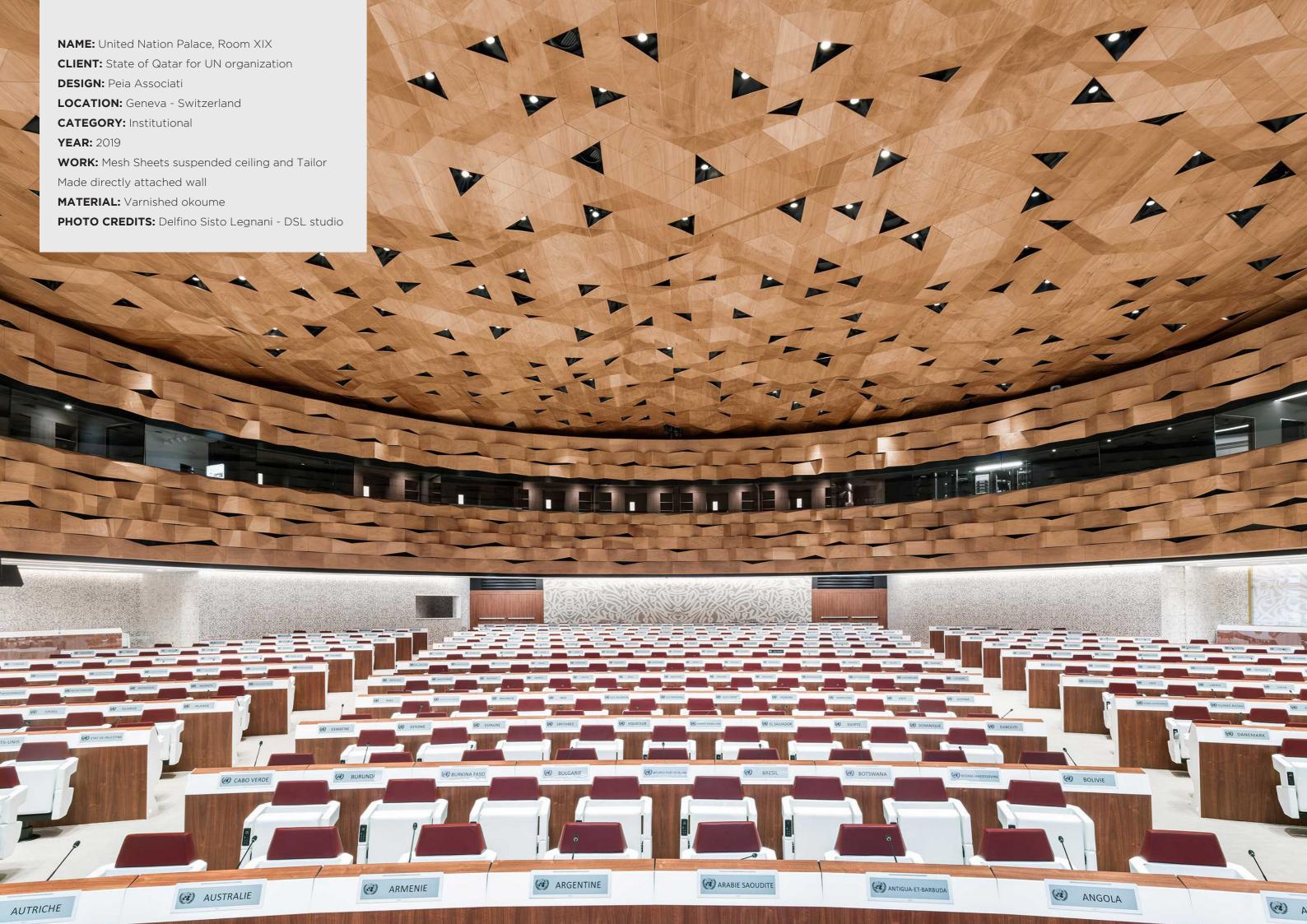
Suspended ceilings realised in WOOD-SKIN create a soft three-dimensional continuous surface. The flaps embedded in the Mesh Sheets make the assembly and installation process of the ceilings an easy task, also allowing for a seamless joint. the sheets are suspended using adjustable locking steel cables. To achieve the desired three-dimensionality, it was necessary to increase the total surface area of the Mesh Sheets by only 1%.







- 1. Hollow aluminium profile
- 2. Steel bracket
- 3. Adjustable self-locking wire rope grip
- 4. Aircraft cable
- 5. Shackle
- 6. Hanging hole
- 7. WOOD-SKIN sandwich
- 8. Self-tapping screw with eyelet
- 9. Glued wooden profile



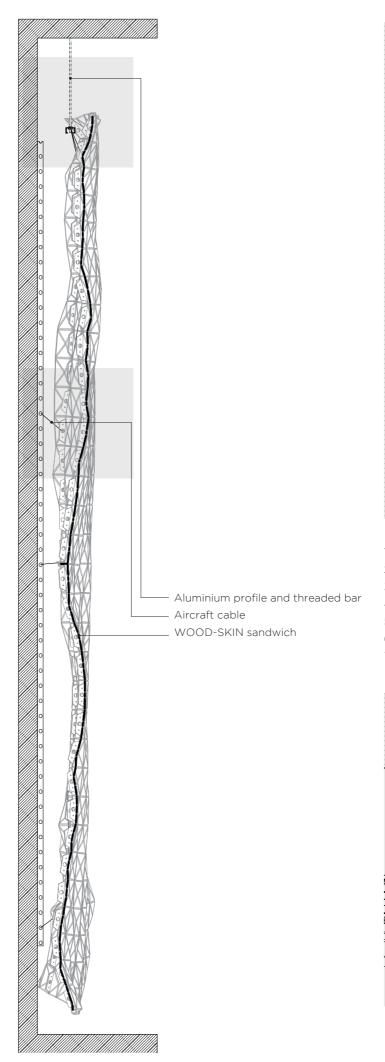
INSTALLATION INSTALLATION **DETAILS** D1 Joined flaps to aircraft cable D2 Jagged edge with glued wooden profile 5 D3 Flat edge with custom WOOD-SKIN sheet Two or three WOOD-SKIN sheets are joined together by the flaps 1. The steel brackets and aircraft cables are installed only in a portion of the ceiling 2. The Mesh Sheets are attached to the aircraft cables by the dedicated holes in the flaps 3. Always try to keep the cables in tension!

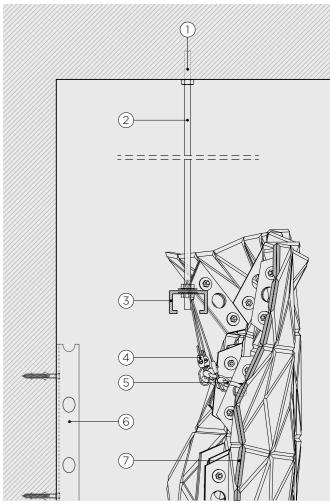
Two options are provided for the ceiling boundaries. For a straight edge, custom cut WOOD-SKIN sheets are provided. They are attached to the aircraft cable through standard hanging holes **4**. For a jagged edge, the WOOD-SKIN sheets are attached to the aircraft cable by wooden profiles glued to the back surface, allowing the aircraft cable to be concealed **5**.

## **M2 SUSPENDED WALL**

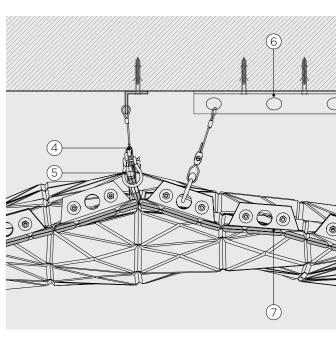


Similar to the suspended ceiling, for creating a soft curtain-like wall in WOOD-SKIN, a suspension wire system is used. The additional elements needed for realising a suspended wall are the vertical and horizontal L-profiles priorly attached to the existing wall, to which the aircraft cables are connected. The fixing elements are selected by the WOOD-SKIN installation team based on the wall typology.

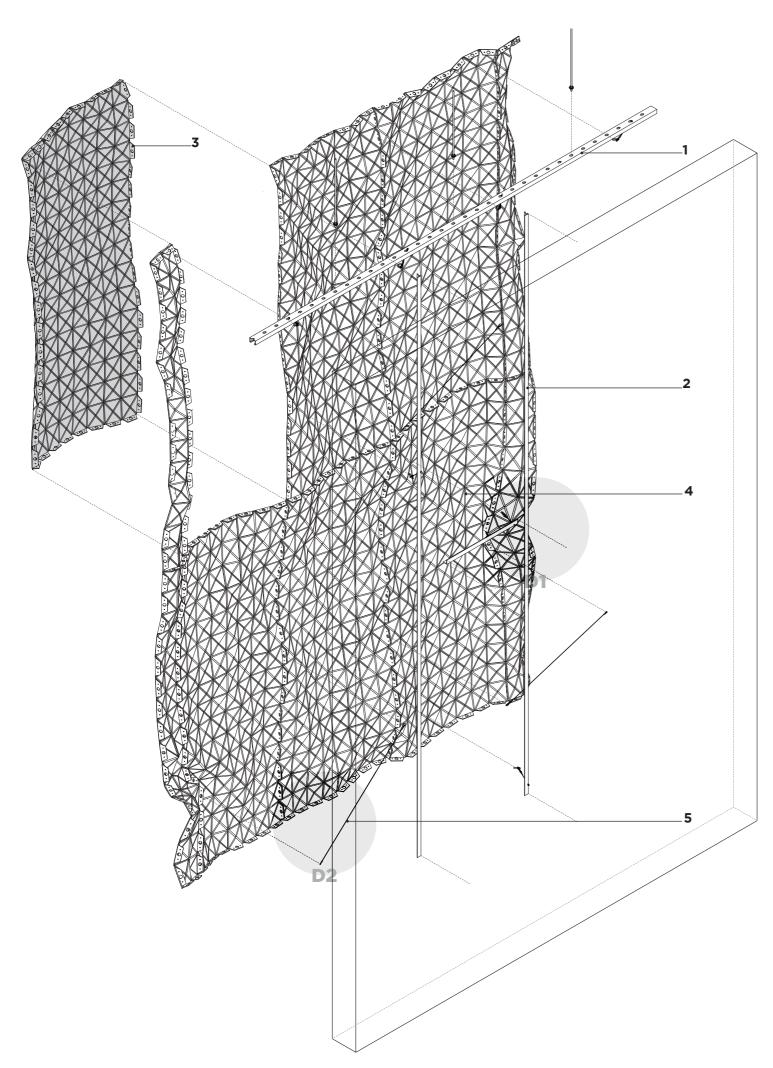




- 1. Anchor bolt
- 2. Threaded bar
- 3. U-shaped metal profile (aluminium)
- 4. Aircraft cable with adjustable self-locking wire rope grip
- 5. Shackle
- 6. L-shaped metal profile (aluminium)
- 7. WOOD-SKIN sandwich





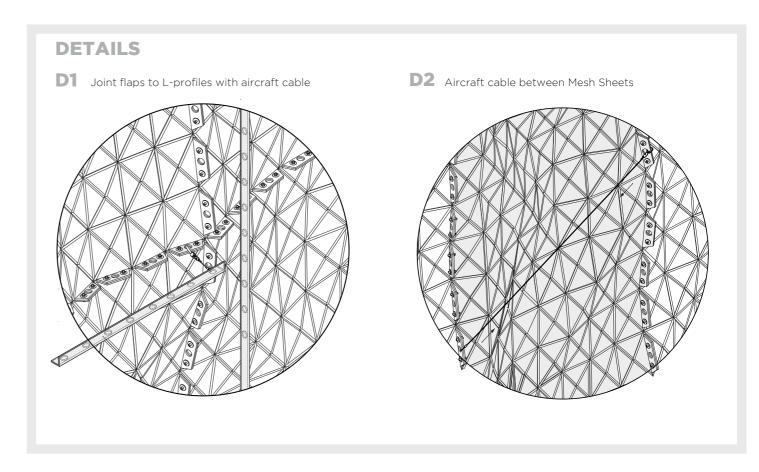


The installation of Mesh Sheets in a suspended wall configuration involves a step-by-step process.

Horizontal U-shaped metal profile is first installed at the desired heigh to the ceiling with anchor bolts and threaded bars 1. The vertical L-shaped metal profiles are installed to the wall. The perforated side must remain perpendicular to the wall 2.

Two or four WOOD-SKIN sheets are joined by their flaps such as to form a section which can be easily installed **3**. The joined Mesh Sheets are first attached to the aircraft cables by the dedicated holes in the flaps, and then attached to the L-shaped profiles **4**. The cables should remain slightly tensioned. Once installed, additional aircraft cables are attached between the flaps of the Mesh Sheets; they serve only for shaping purposes **5**.

Once the section is installed, the aircraft cables are tensioned such as to obtain the desired three-dimensional effect. The process is repeated until all sections are installed.

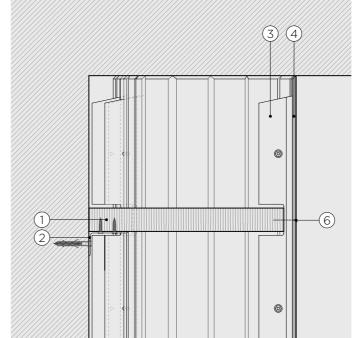


# M3 DIRECT ATTACHMENT TO WALL — BASIC A PATTERN

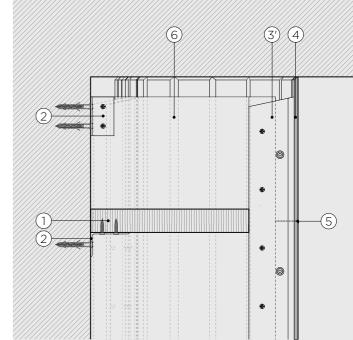


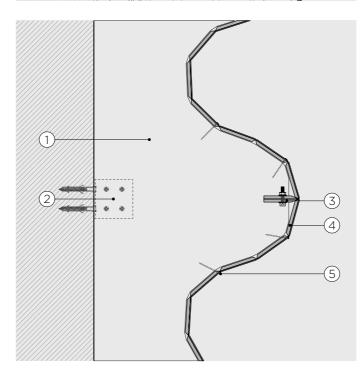
Various aesthetics can be achieved with the same WOOD-SKIN sheets by changing only the pattern by the CNC process. In this example the Mesh Sheets are fixed to the existing wall thanks to custom cut horizontal wooden elements (jigs). The WOOD-SKIN sheets are discreetly nailed to the jigs creating continuous waves.

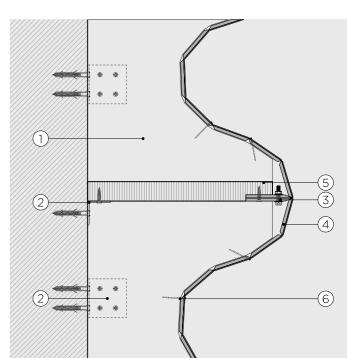
D1 Attachment with horizontal jigs







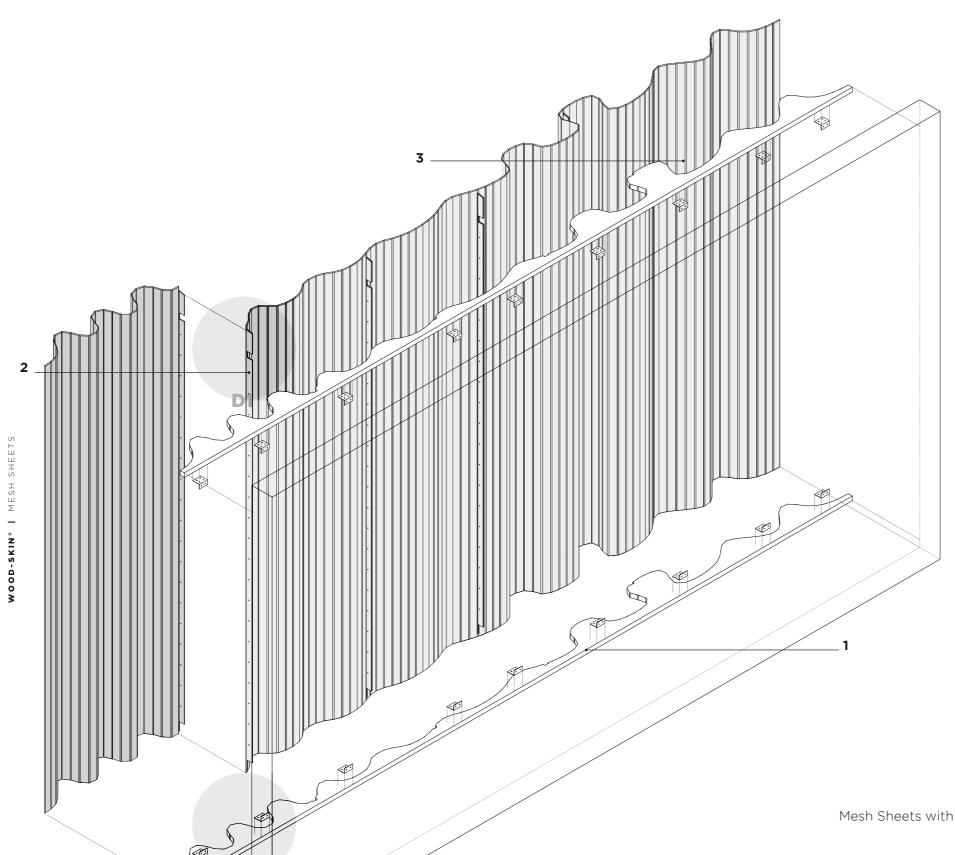


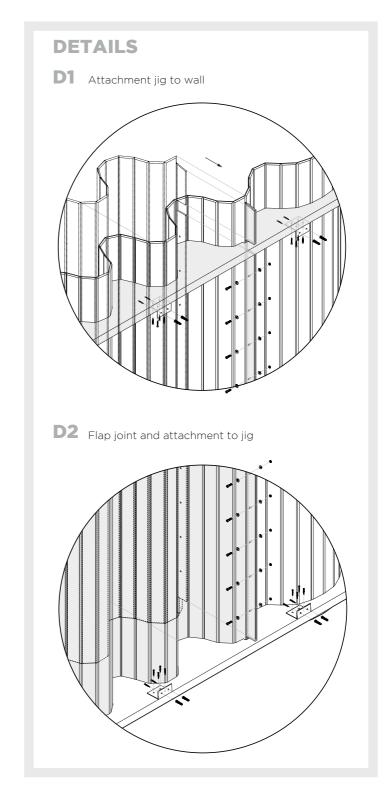


- 1. Custom cut horizontal plywood jig (thickness=30 mm)
- 2. L-shaped metal profile (aluminium)
- 3. WOOD-SKIN flap with custom cut
- 3'. WOOD-SKIN flap
- 4. WOOD-SKIN sandwich
- 5. Custom cut vertical plywood jig (thickness=25 mm)
- 6. Brad/Finishing nail

**NAME:** Milano Today Apartment **CLIENT:** Pier Lomascolo **DESIGN:** Pier Lomascolo and WOOD-SKIN team **LOCATION:** Milano - Italy **CATEGORY:** Residential **YEAR:** 2018 **WORK:** Mesh Sheets directly attached wall **MATERIAL:** Japanese Cedar reconstituted wood by Alpi Wood PHOTO CREDITS: Pier Lomascolo

INSTALLATION





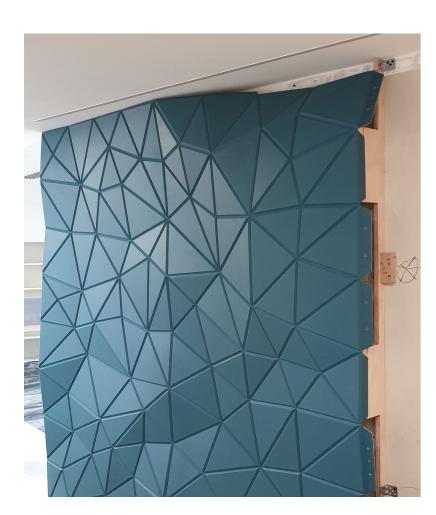
Mesh Sheets with Basic pattern allow for fast assembly with minimal effort.

The horizontal custom cut jigs provided by WOOD-SKIN are installed to the wall with L-shaped metal bracket 1.

Two Mesh Sheets are joined by the flaps **2**. The joined sheets are then placed on the jigs. Starting from the side and proceeding along the length, the sheets are fixed onto the jig with brad nails **3**.

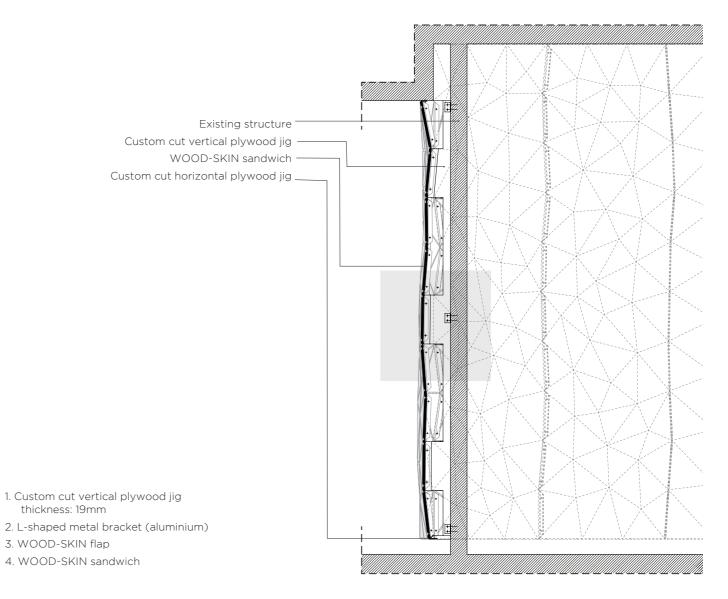
The Mesh Sheets match the shape of the jig precisely thanks to the digital fabrication process!

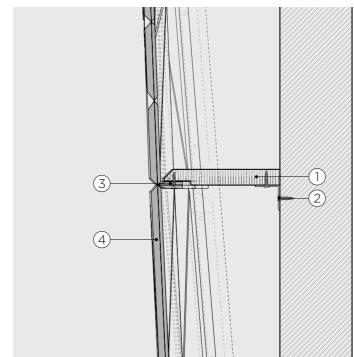
# M3 DIRECT ATTACHMENT TO WALL — OTHER PATTERNS

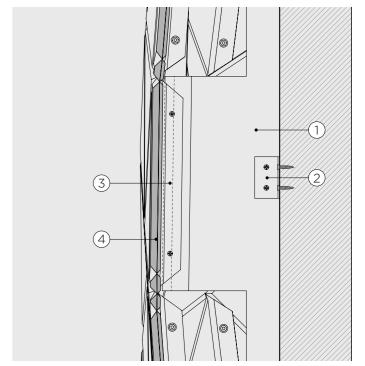




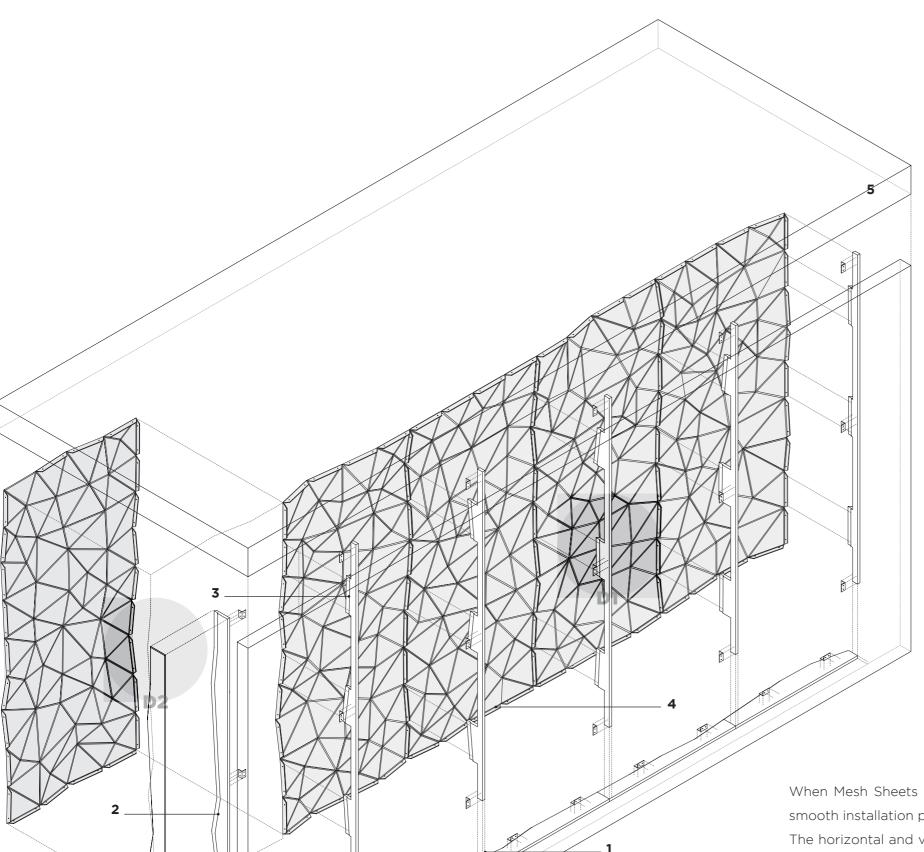
One of the biggest advantages of Mesh Sheets is the possibility to create complex geometry from a flat rectangular sheet without wasting any material. In order to constrain the flexible sheets, custom designed and CNC-cut vertical jigs are used. The digital-to-physical workflow used for the manufacturing allows WOOD-SKIN to produce all these elements in a fast and efficient process - each different from one another and case-specific for each project.

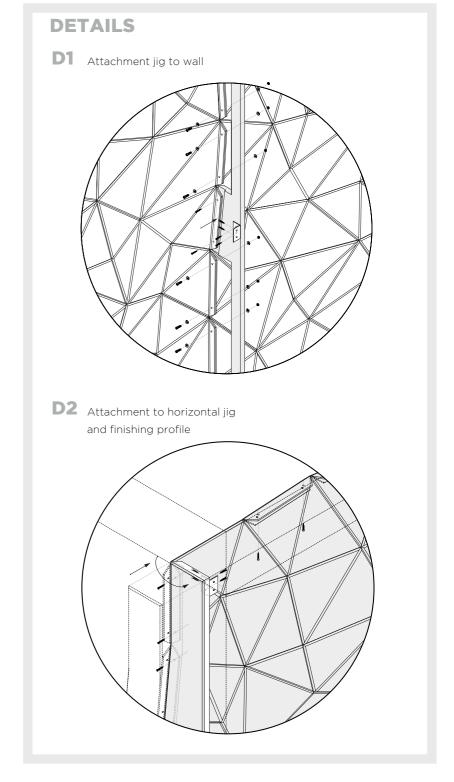










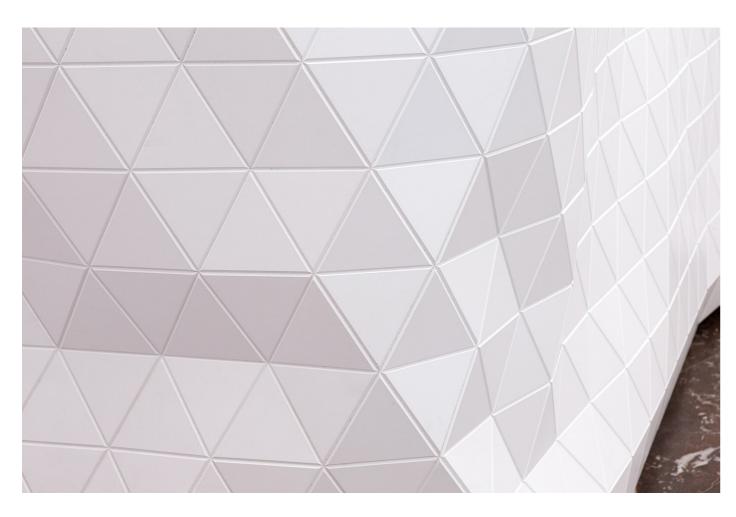


When Mesh Sheets are attached to the wall with jigs, the surface becomes rigid. In order to achieve a smooth installation process, a specific sequence of assembly should be followed.

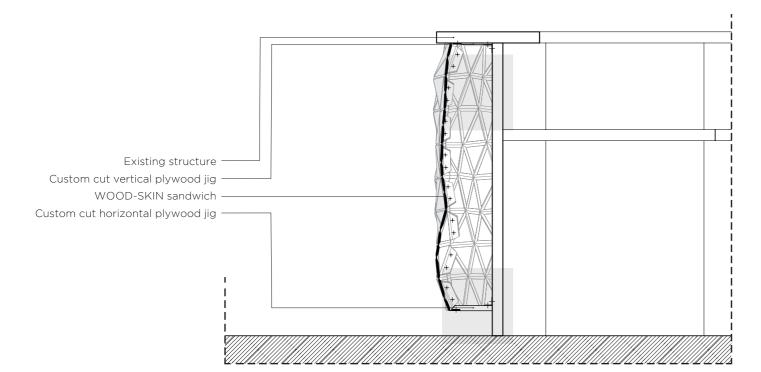
The horizontal and vertical custom cut jigs provided by WOOD-SKIN should be installed to the wall with L-shaped metal brackets 1. The cut-outs in the jigs ensure the installation of the pieces in a precise position. The installation of the Mesh Sheets should start from the side. The first sheet is attached to first vertical side jigs by screwing all the flaps following the area 2. Once the first side is fixed, proceed with bringing the second Mesh Sheet and bolting the flaps to each other. The flaps are attached to the vertical jigs with screws 3. The top and bottom flaps are then screwed to the horizontal jigs 4.

Finally, a finishing custom-cut covering element, provided by WOOD-SKIN is glued to the exposed vertical jig **5**.

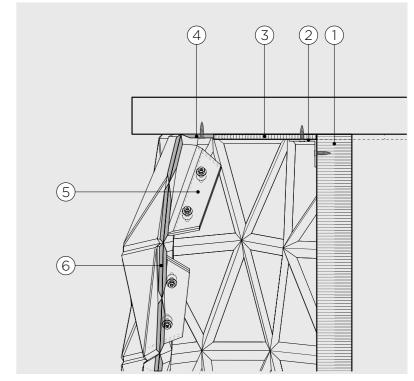
# M4 COUNTER

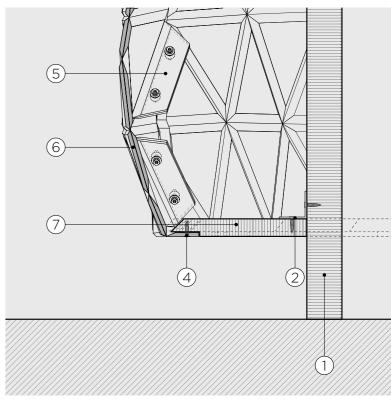


The counters realised in Mesh Sheets can be shaped according to many design requirements. They can be installed over new or existing counter structures. Two horizontal jigs with areas accommodating the flaps ensure the stability and geometry of the counter.

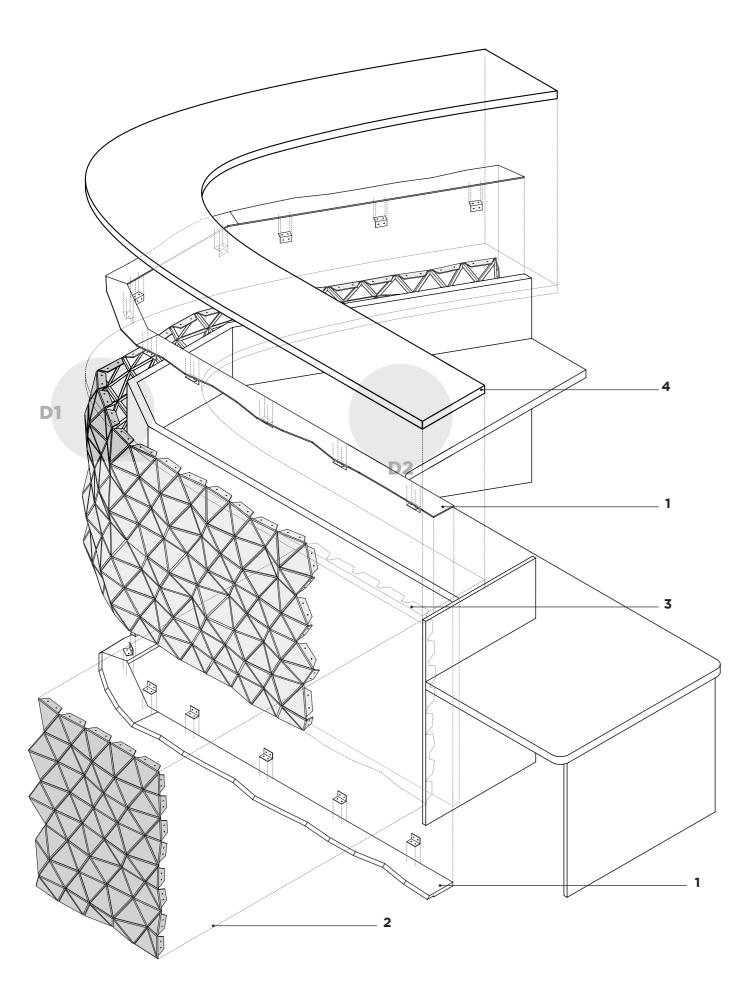


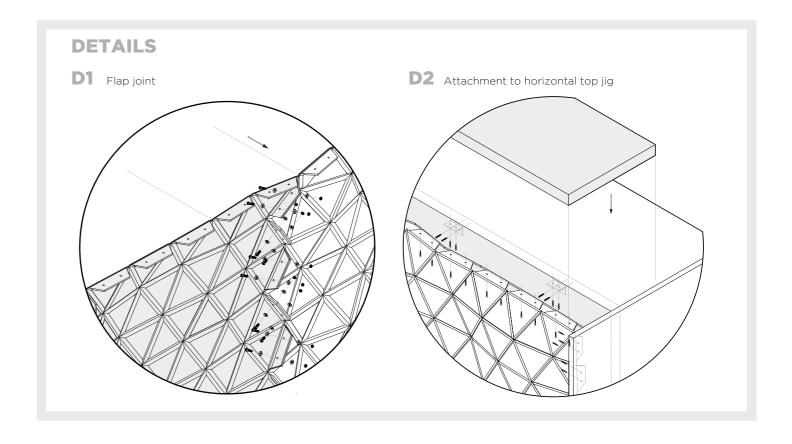
- 1. Existing counter structure
- 2. L-shaped metal bracket (aluminium)
- 3. Custom cut top plywood jig (thickness=6 mm)
- 4. WOOD-SKIN border flap
- 5. WOOD-SKIN flap
- 6. WOOD-SKIN sandwich
- 7. Custom cut bottom plywood jig (thickness=19 mm)









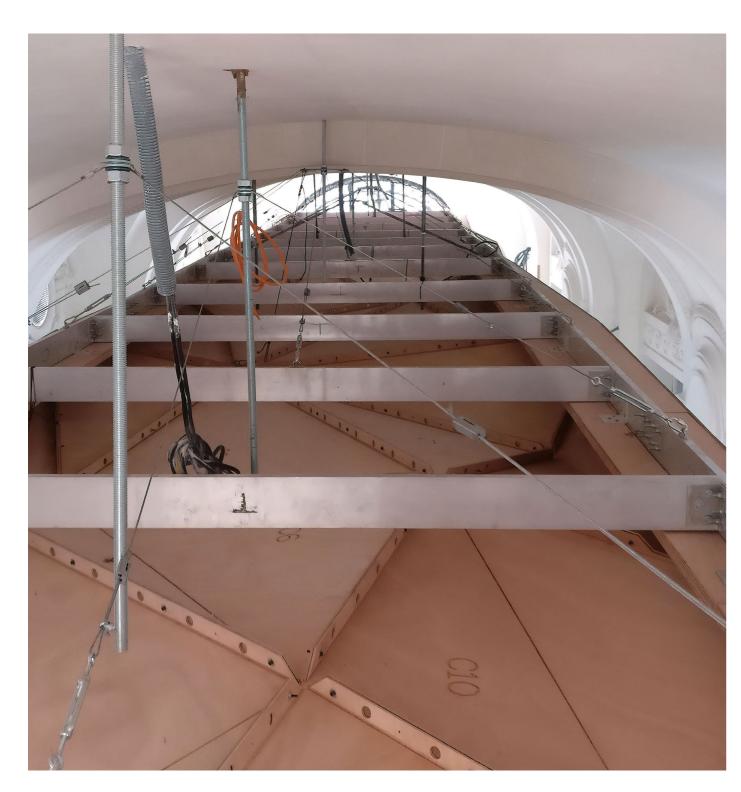


Installing Mesh Sheets on a counter with existing supporting structure requires a section-by-section process.

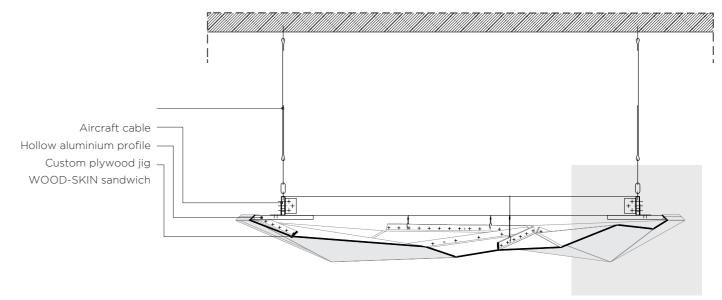
The horizontal custom shaped jigs provided by WOOD-SKIN are attached to the top and bottom of the existing supporting structure with L-shaped metal brackets **1**. A first section is assembled joining two to three WOOD-SKIN sheets by their flaps **2**. The installation to the jigs starts from the side by screwing each flap to the top and bottom jigs **3**. Once all Mesh Sheets are assembled and installed, a counter top is installed **4**.

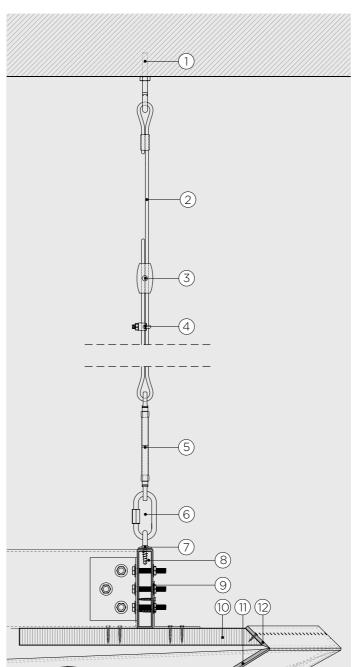
# TAILOR M A D E

### **T1 SUSPENDED CEILING**

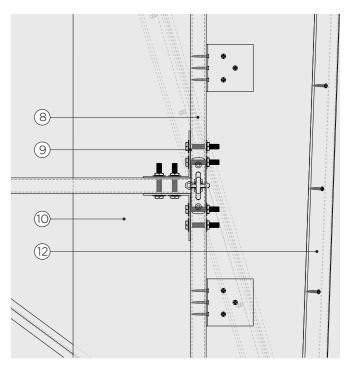


Our Tailor Made product allows the generation and design of complex geometric surfaces, which can then be easily installed through many techniques. For the installation of suspended ceilings, custom cut jigs and an aluminium supporting structure are used. The Tailor Made sheets are attached to the jigs with their border flaps which remain concealed thanks to the special angle of milling.

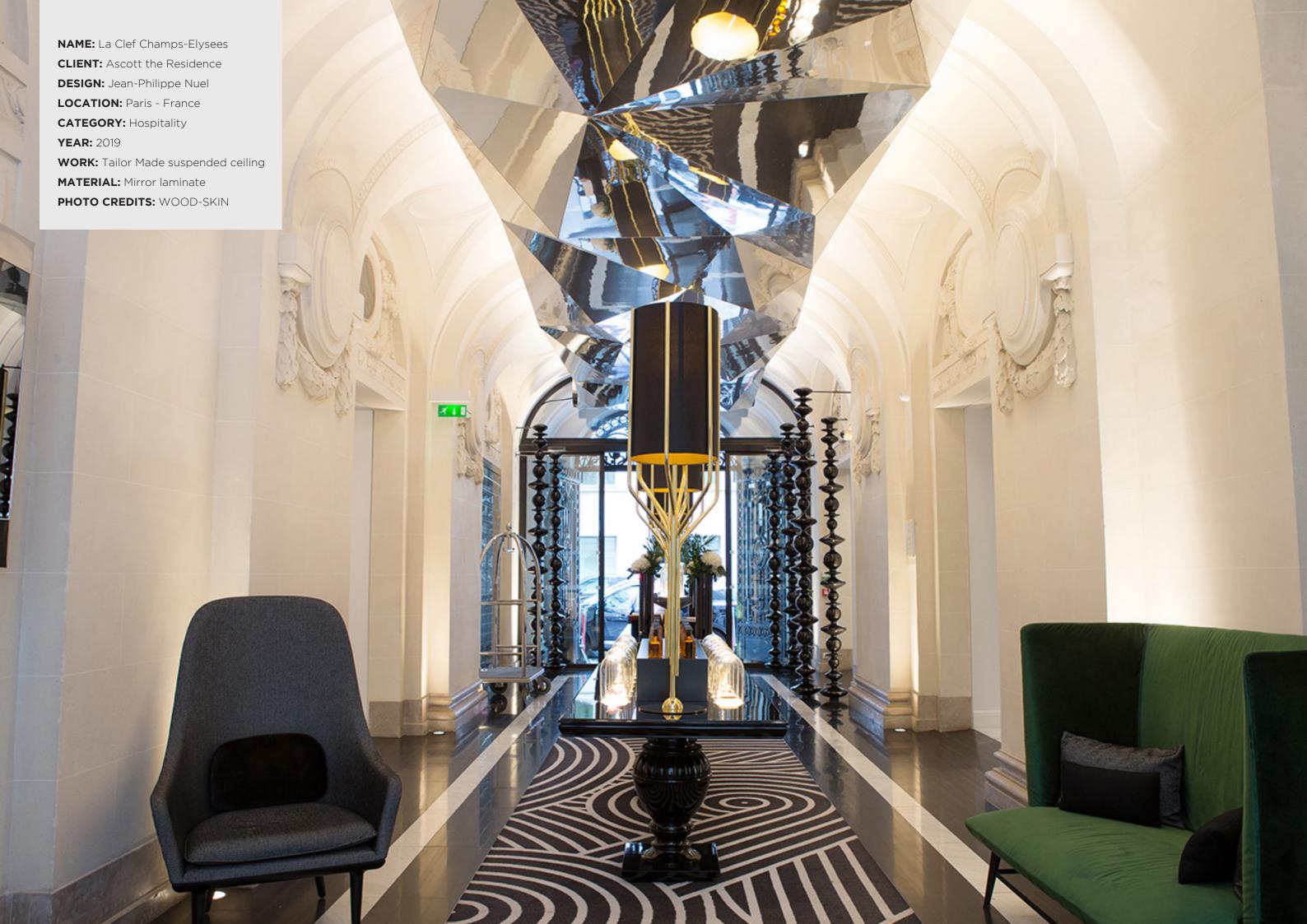




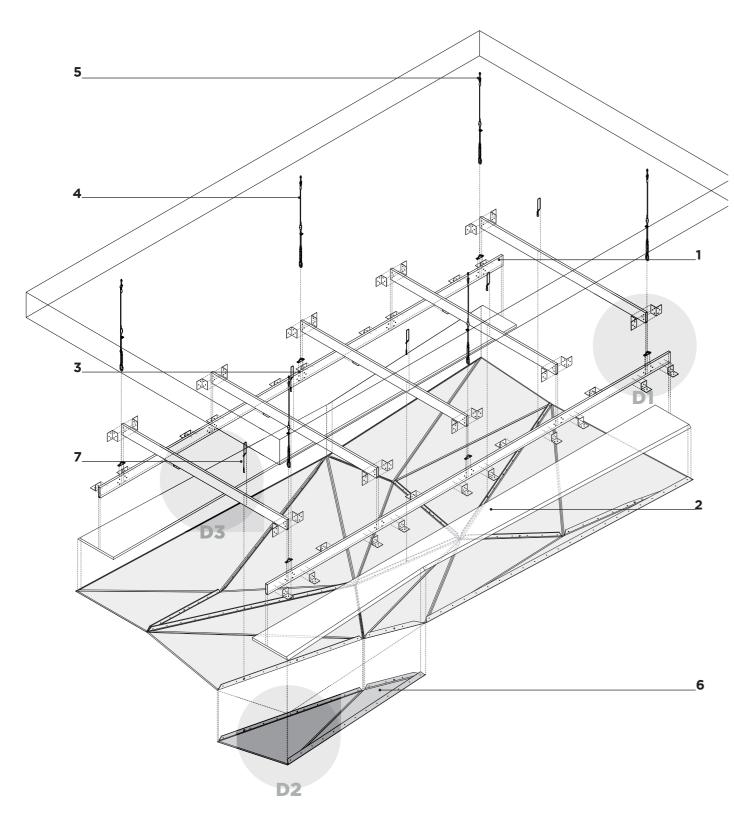
- 1. Anchor bolt with eyelet
- 2. Aircraft cable
- 3. Adjustable self locking wire rope grip
- 4. Wire rope grip
- 5. Cable tensioner
- 6. Quick link
- 7. Oval eye plate with self-tapping screws
- 8. Hollow aluminium profile
- 9. L-shaped metal bracket (aluminium)
- 10. Custom cut plywood jig h=25 mm
- 11. WOOD-SKIN sandwich
- 12. Standard Wood-Skin flap screwed to the jig



85

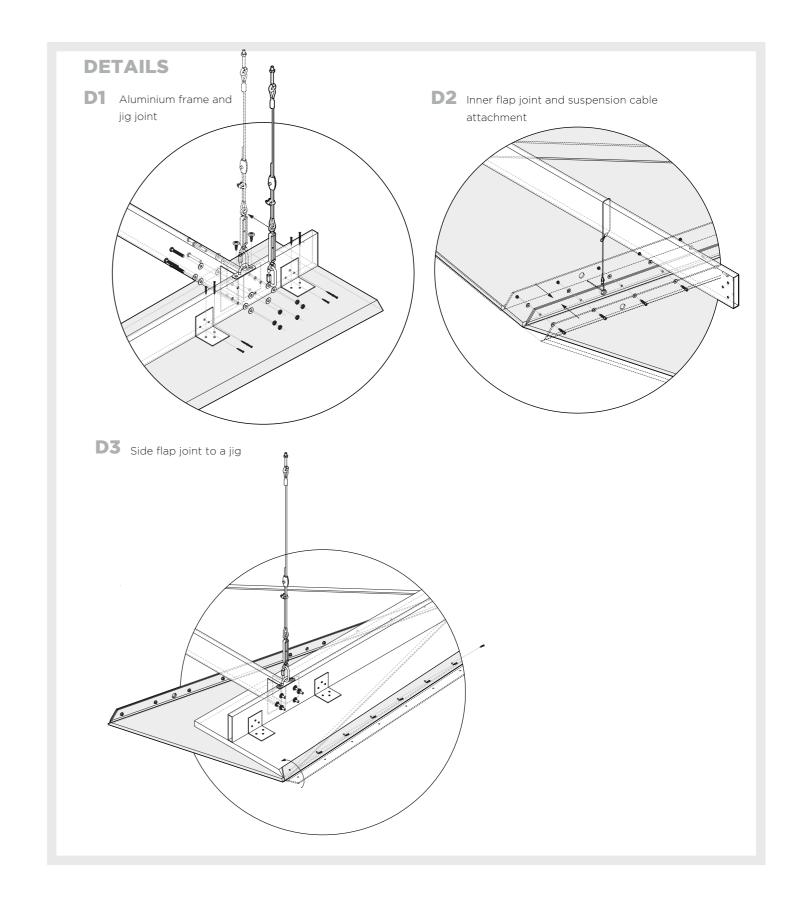


INSTALLATION

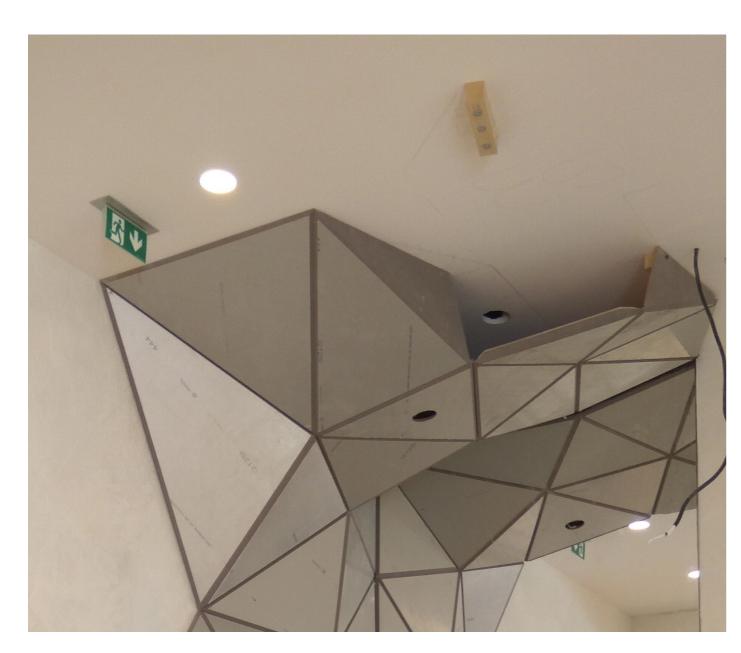


The installation of Tailor Made surfaces on a suspended ceiling sub-structure involves a step-by-step process.

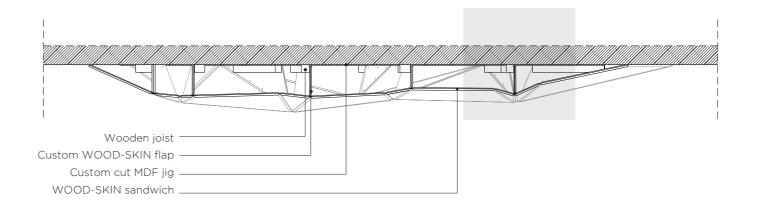
The sub-sctructure should be assembled first. The hollow aluminium profiles are bolted together with L-shaped metal brackets to form a rigid frame 1. The custom cut horizontal jigs are attached to the bottom of the long sides of the aluminium frame by L-shaped metal brackets 2. Oval eye plates are screwed to the top side of the aluminium profiles 3. Next, the aircraft cables are attached 4. Once the sub-sctructure is fully assembled it is attached to the ceiling with anchor bolts 5. Two or three Tailor Made sheets are first joined together by the flaps and then screwed to the jigs 6. Additional aircraft cables are attached to the WOOD-SKIN sheets through the holes in the flaps and tensioned for additional stability 7. The last two steps are repeated until all Tailor Made sheets are installed in place.

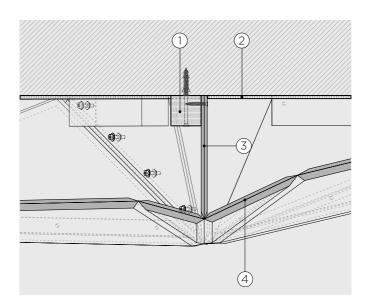


# **T2 DIRECT ATTACHMENT TO CEILING**

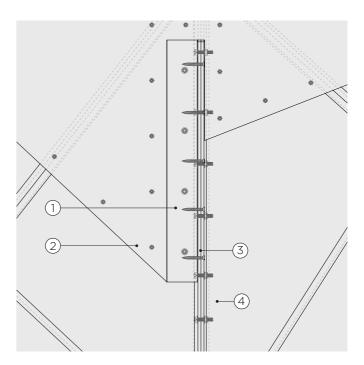


The installation of a Tailor Made surface flushed to the ceiling requires a wooden (tracing) jig. This custom cut wooden element serves as a tracing guide for the correct position of the WOOD-SKIN supporting structure elements (wooden joists). The (tracing) jig can be removed once the supporting structure is installed.

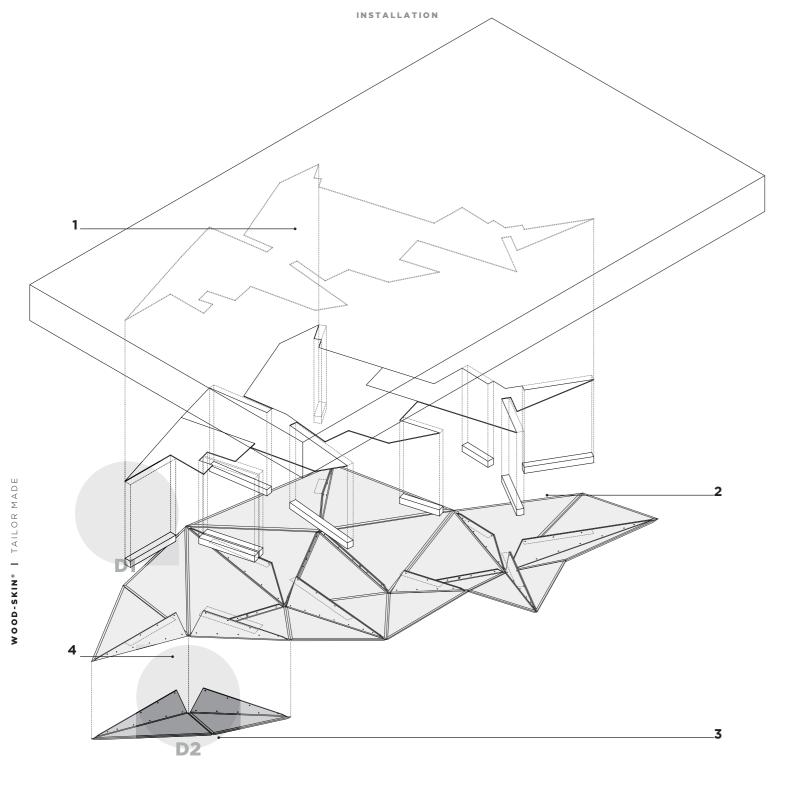




- 1. Wooden joist fixed with self-tapping screw and wall plug
- 2. Custom cut MDF jig (thickness=4 mm)\*
- 3. Custom cut WOOD-SKIN flap
- 4. WOOD-SKIN sandwich
- \* installation tracing guide only



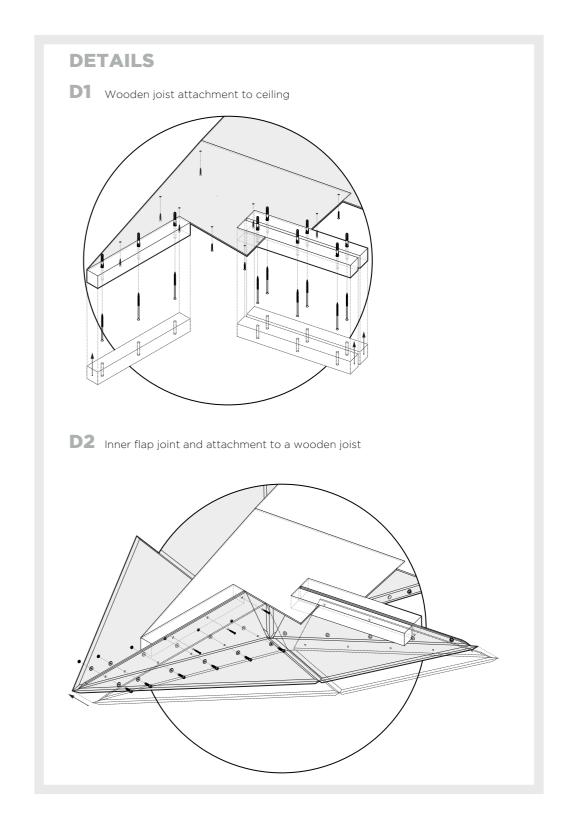




Installing Tailor Made surfaces flush to the ceiling requires the correct positioning of the supports.

The guiding jig which is custom cut and provided by WOOD-SKIN is attached to the ceiling **1**. The correct poisiton is found and they are fixed to the ceiling **2**. Once the supporting elements (usually wooden joists) have been placed and fixed, the tracing guide jig can be removed.

This method of installation requires a precise sequence to be followed, which is evaluated during the design phase and it is case-specific for each project. Two or more sheets are joined together by the flaps with standard M4 bolts, washers and nuts system **3**. Then the flaps are screwed on the side to the already installed wooden joists **4**. The specific geometry of the custom cut flaps alows them to lay precisely on the wooden joists, making the installation easy and intuitive.

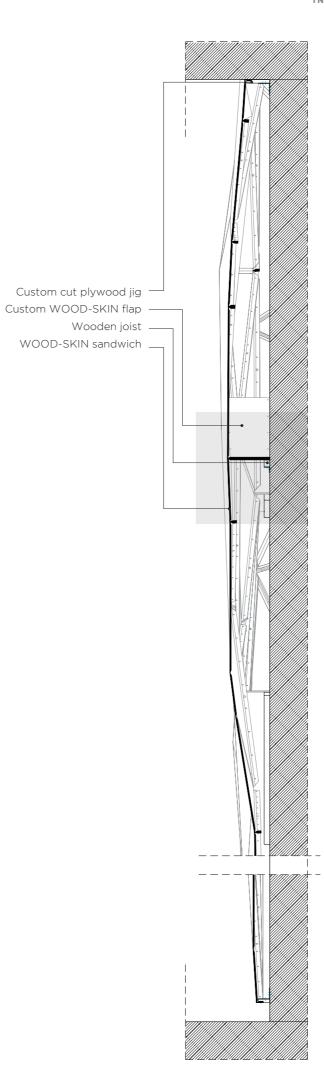


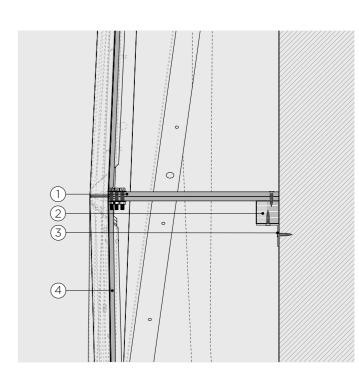
# **T3 DIRECT ATTACHMENT TO WALL**



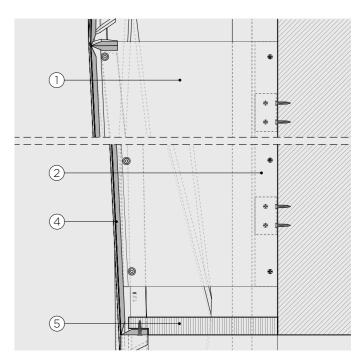


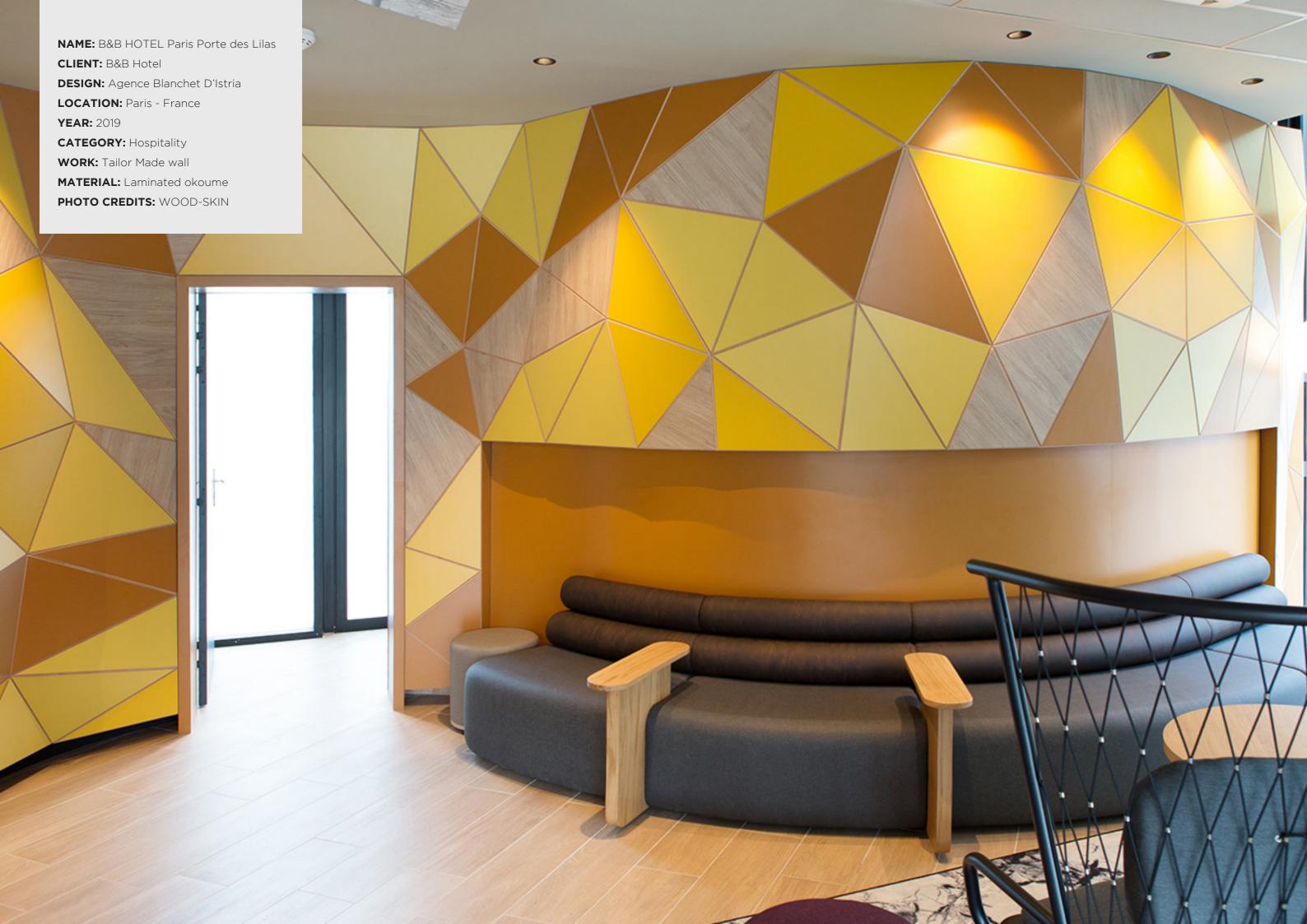
The WOOD-SKIN team developed a specific detail for installing the complex Tailor Made surfaces to the wall. Special flaps are cut only on some elements and the position is decided during the design phase.

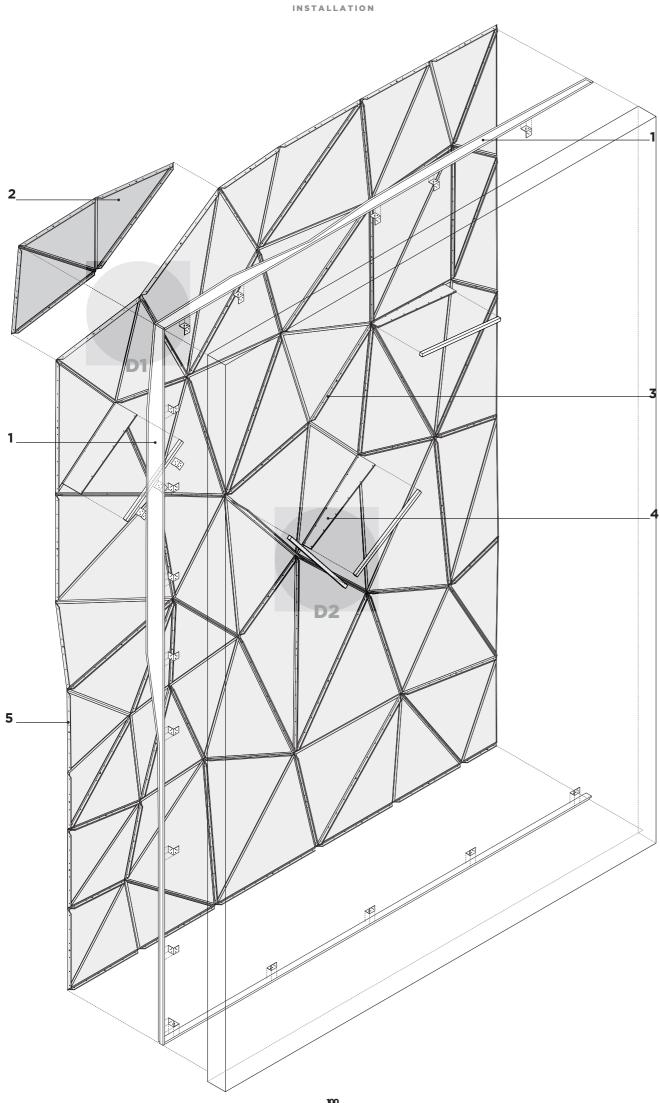


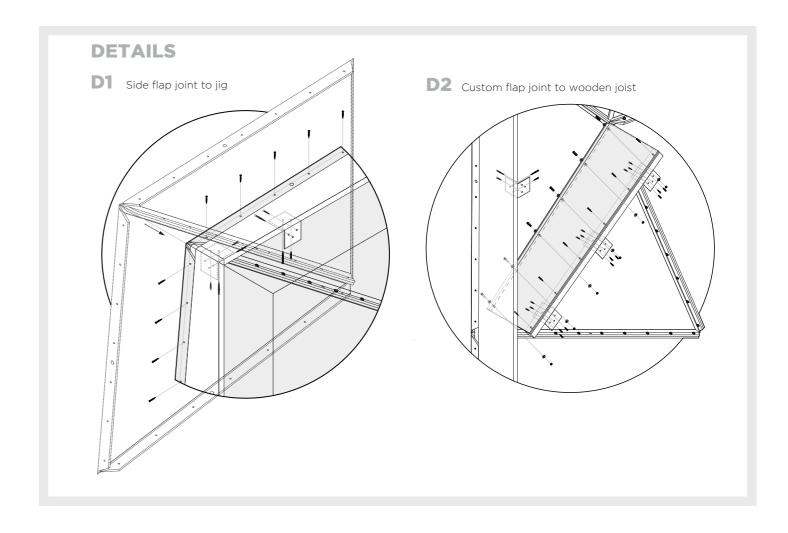


- 1. Custom cut Wood-Skin flap
- 2. Wooden joist
- 3. L-shaped metal bracket (aluminium)
- 4. WOOD-SKIN sandwich
- 5. Custom cut vertical plywood jig (thickness=19 mm)









Installing Tailor Made surfaces on a wall requires following a simple step-by-step process. A rigid frame is created by attaching the custom cut vertical and horizontal jigs provided by WOOD-SKIN to the wall using L-shaped metal brackets 1.

The installation of the Tailor Made surfaces should start from one of the edges and proceed along. The first element is screwed to the horizontal and vertical jigs 2. The next elemets are joined to the installed one by one by bolting the inner flaps to each other 3. The Tailor Made sheets with custom cut flaps should be screwed to wooden joists attached to the wall by L-shaped metal brackets 4.

Once all WOOD-SKIN surfaces are in place, the side flaps are screwed to the horizontal and vertical jigs 5.

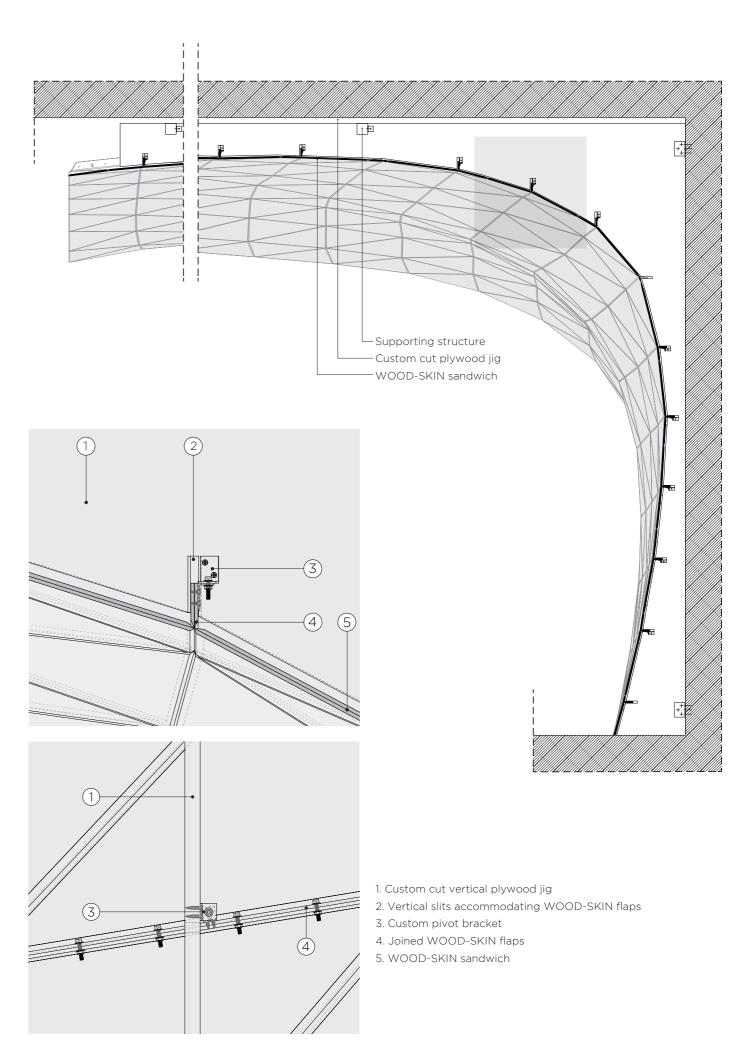
Flush installation with adjacent walls/ceiling can also be achieved by just slightly adapting this technique.

### **T4 CANOPY**

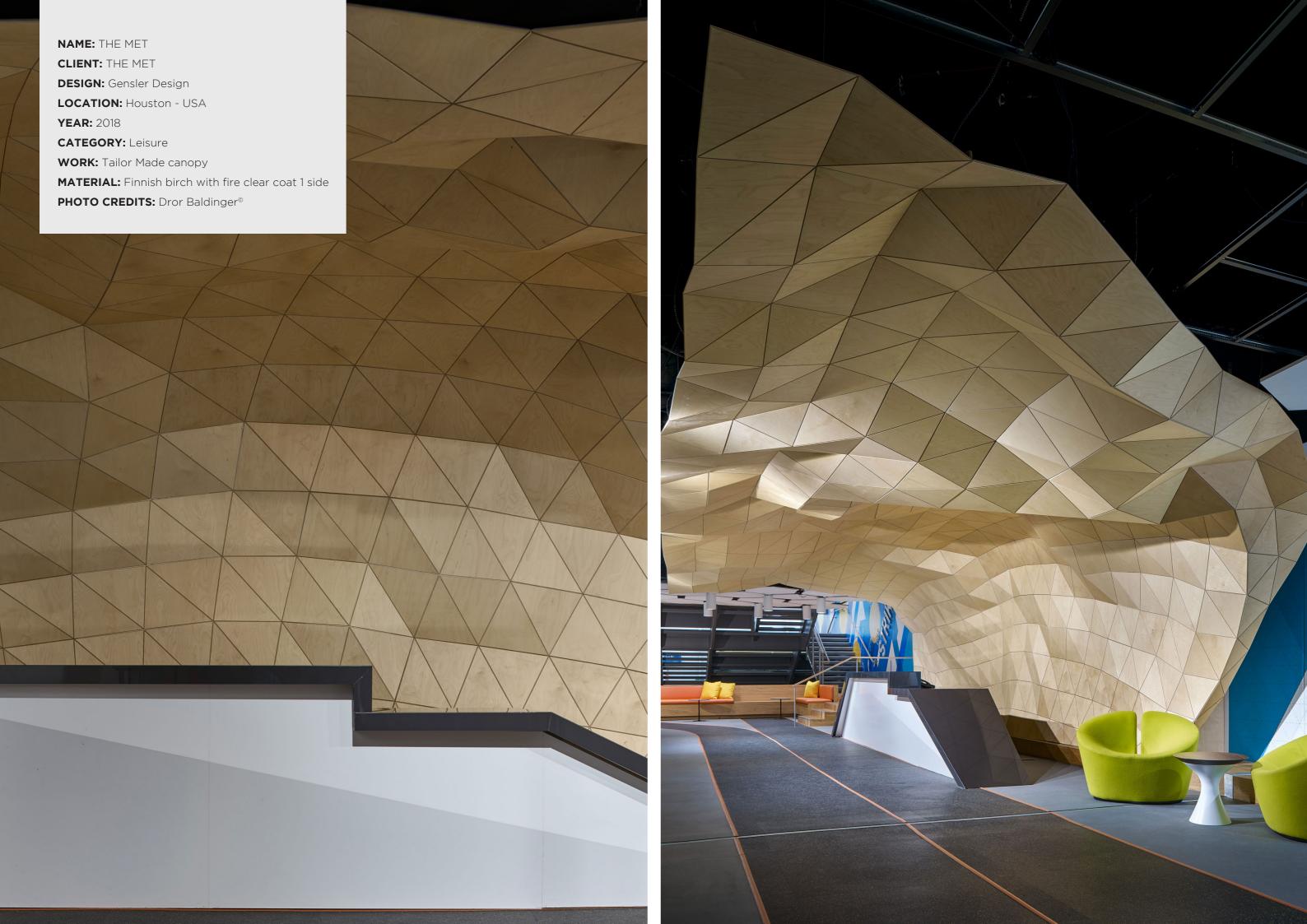




The canopies and similar installations are realised with vertical supporting jigs with cutouts accommodating the WOOD-SKIN flaps. The special pivoting system joining the flaps to the jigs ensures that even the most complex geometry can be installed. Additional suspension cables can be added depending on the complexity of the surface and the supporting structure density.



102

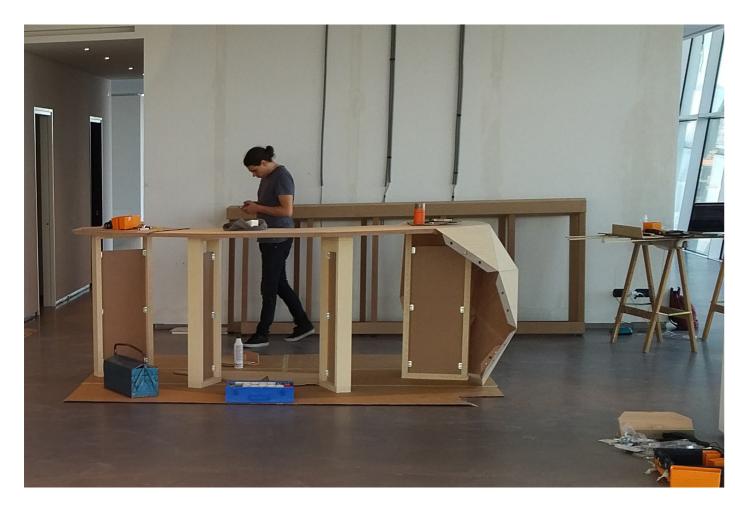


pivoting joining system are bolted together 4. Finally, aircraft cables can be installed through the hanging

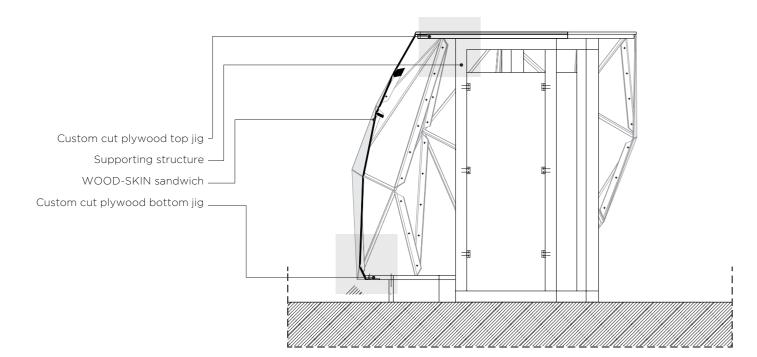
holes at specific points on the Tailor Made surface and then attached to the ceiling for extra stability 5.

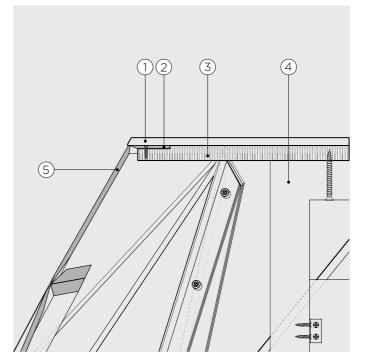
INSTALLATION

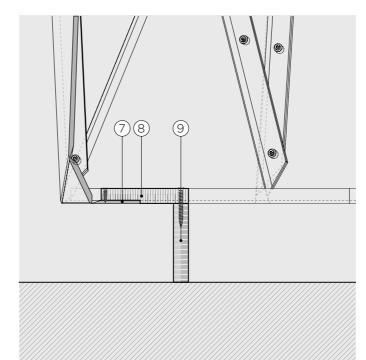
### **T5 COUNTER**

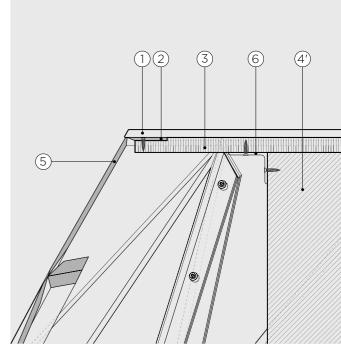


Same approach of walls and ceiling applies for Tailor Made counter surfaces, where top and bottom jigs with custom cut geometry are used for the installation of Tailor Made counters on existing or new supporting structures. This system ensures that the installed product retains the shape requested by the client, achieving sturdy furniture elements.



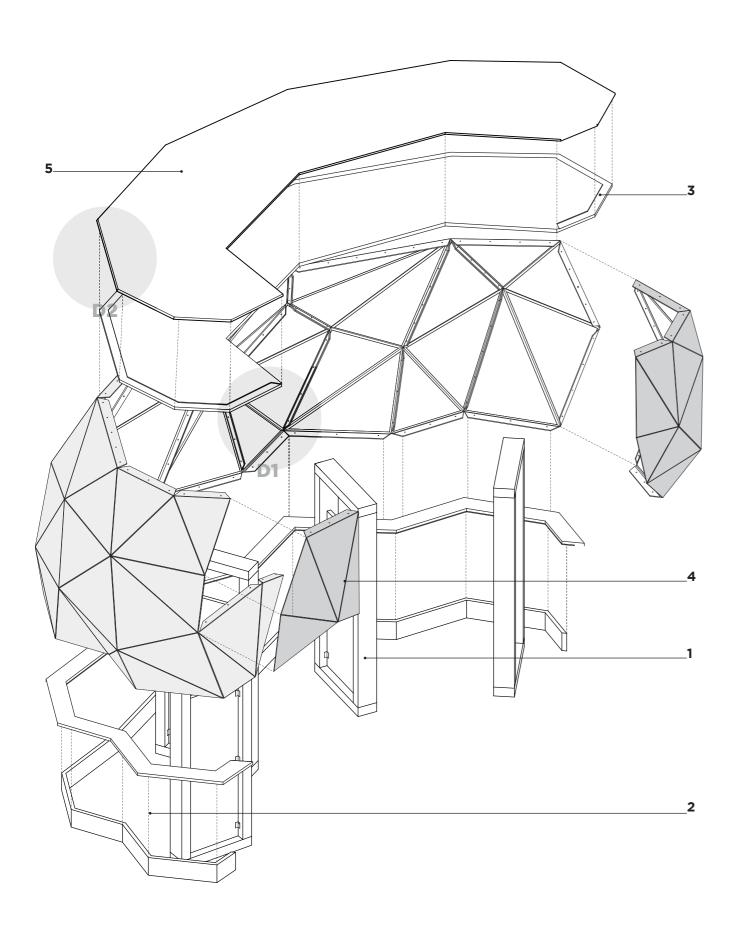


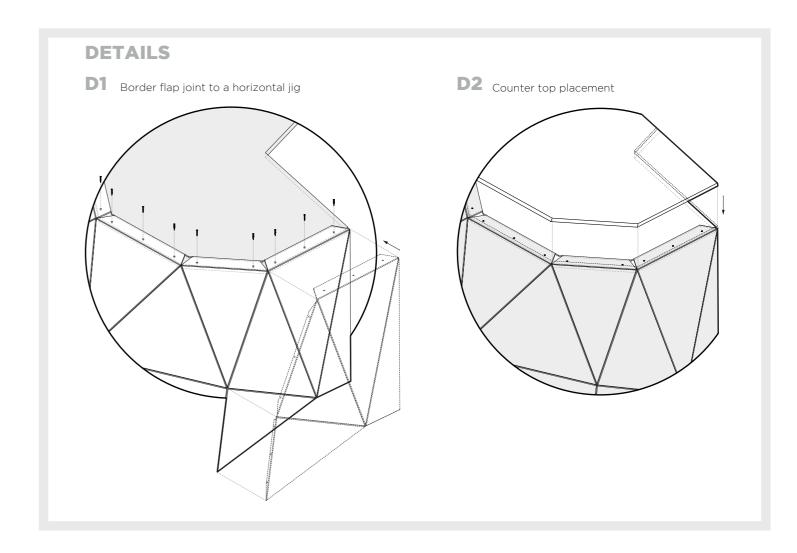




- 1. Counter top
- 2. Standard top WOOD-SKIN flap
- 3. Custom cut plywood top jig (thickness=19 mm)
- 4. Supporting structure (wooden studs and MDF boards)
- 4'. Existing structure
- 5. WOOD-SKIN sandwich
- 6. L-shaped metal bracket
- 7. Standard bottom WOOD-SKIN flap
- 8. Custom cut plywood bottom jig (thickness=19 mm)
- 9. Wooden skirt (thickness=19 mm)







Counters with Tailor Made surfaces can be attached to existing or specifically crated sub-structure following a few steps.

The sub-sctructure is first assmebled and installed in place **1**. The bottom jigs provided by WOOD-SKIN are screwed together **2**. The top jig is screwed to the substructure **3**. The installation of the WOOD-SKIN sheets can start from either side, screwing the border flaps to the top and bottom jigs. The next Tailor Made sheet is joined to the already installed one by bolting the inner flaps together **4**. Once the Wood-Skin panels are installed the counter top is glued to the top jig **5**.

# 7 ADDITIONAL CUSTOMISATIONS

Integrating elements like doors, light fixtures, sprinklers and others is an important part in the design and installation of WOOD-SKIN surfaces.

The following examples describe the technical details and installation of typical integrations developed by our design team.

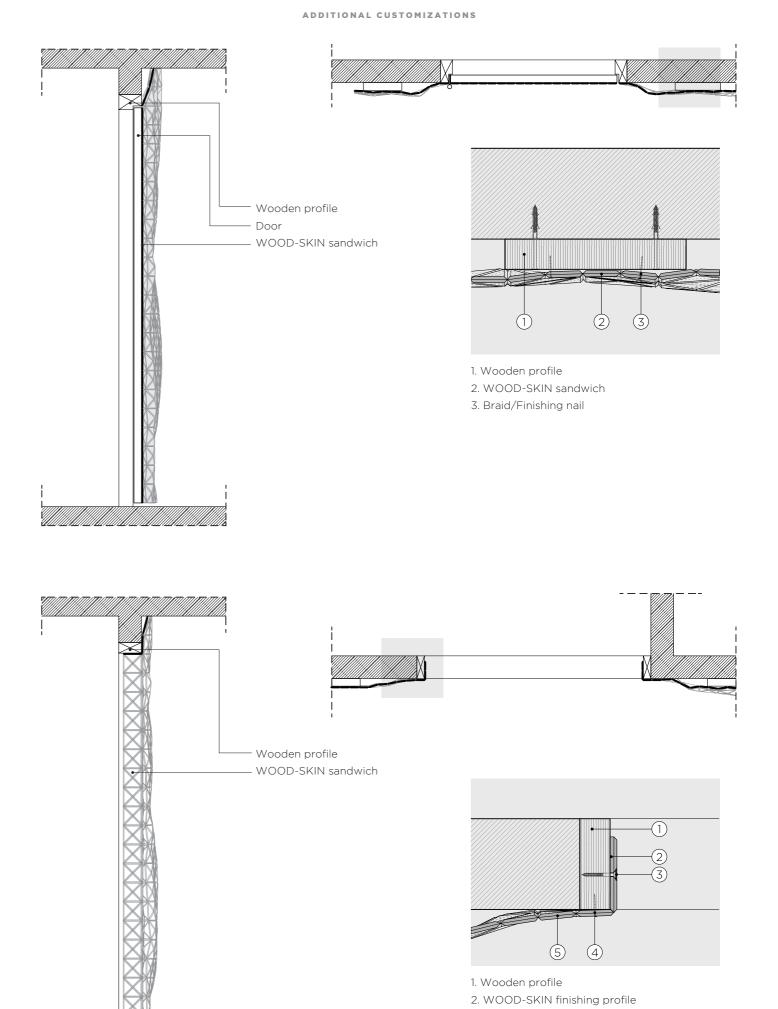
The versatility of the WOOD-SKIN system allows for many more additional customisations to be made with ease thanks to the digital design and fabrication processes we use.

Each of these should be discussed with our design team and realised based on the specific design brief.

# 7.1 DOORS AND OPENINGS



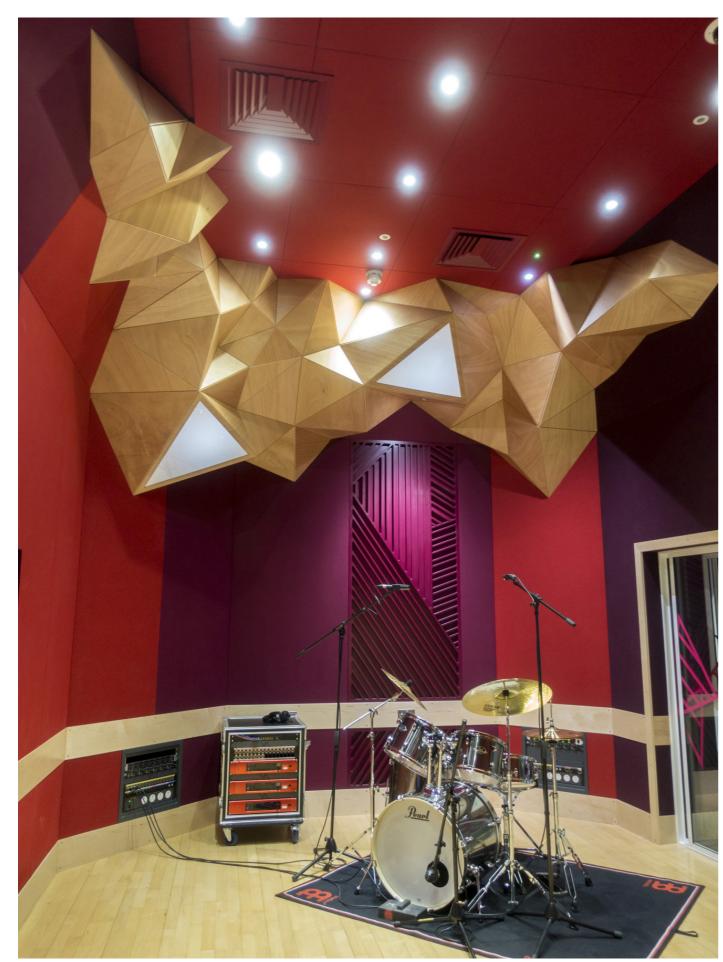
Lebkov&Sons, Amsterdam



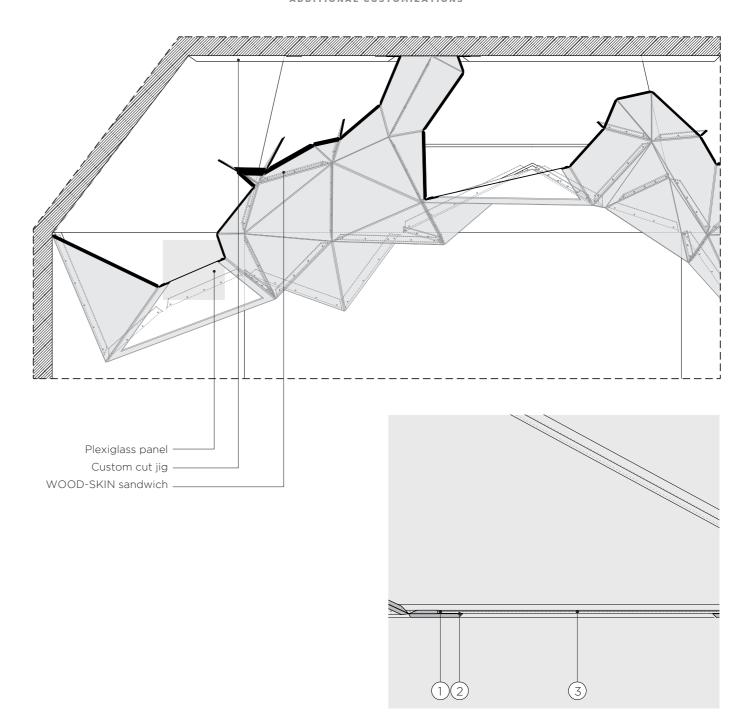
3. Custom cut cap with seamless aesthethic

finishing detail once placed 4. Brad/Finishing nail 5. WOOD-SKIN sandwich

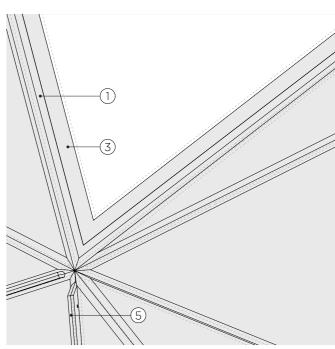
# 7.2 INTEGRATION OF OTHER MATERIALS



University of Winchester, Whincester

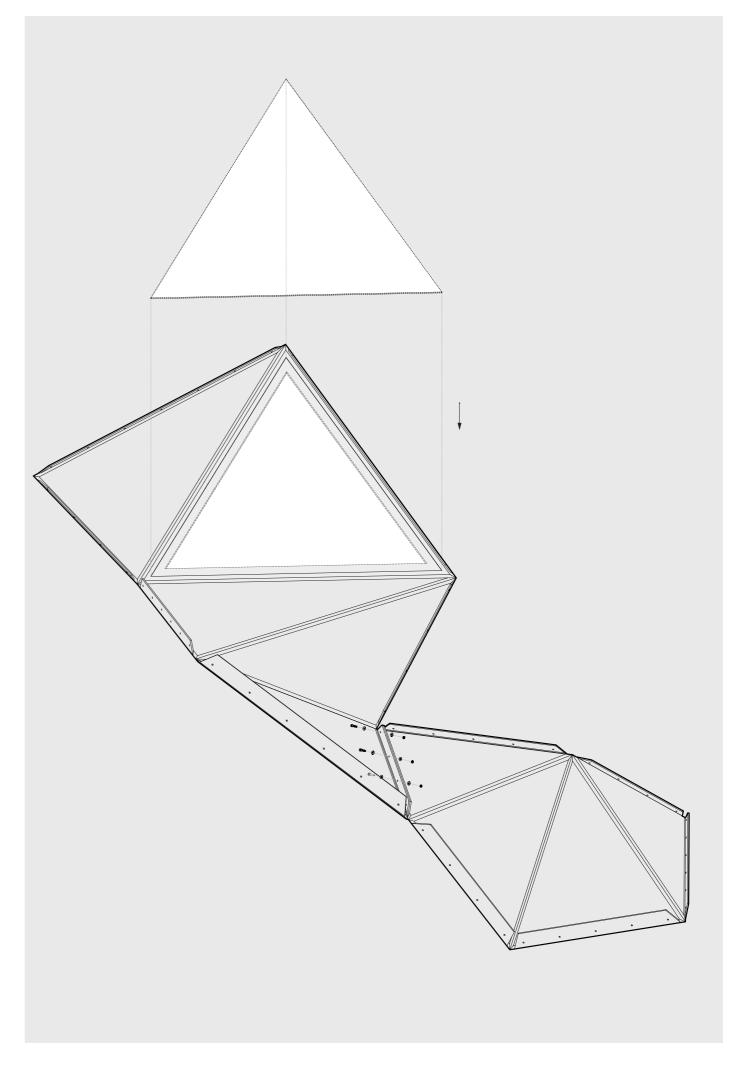


- 1. Custom milled WOOD-SKIN sandwich
- 2. Glue
- 3. Plexiglass panel
- 4. WOOD-SKIN sandwich
- 5. WOOD-SKIN inner flaps

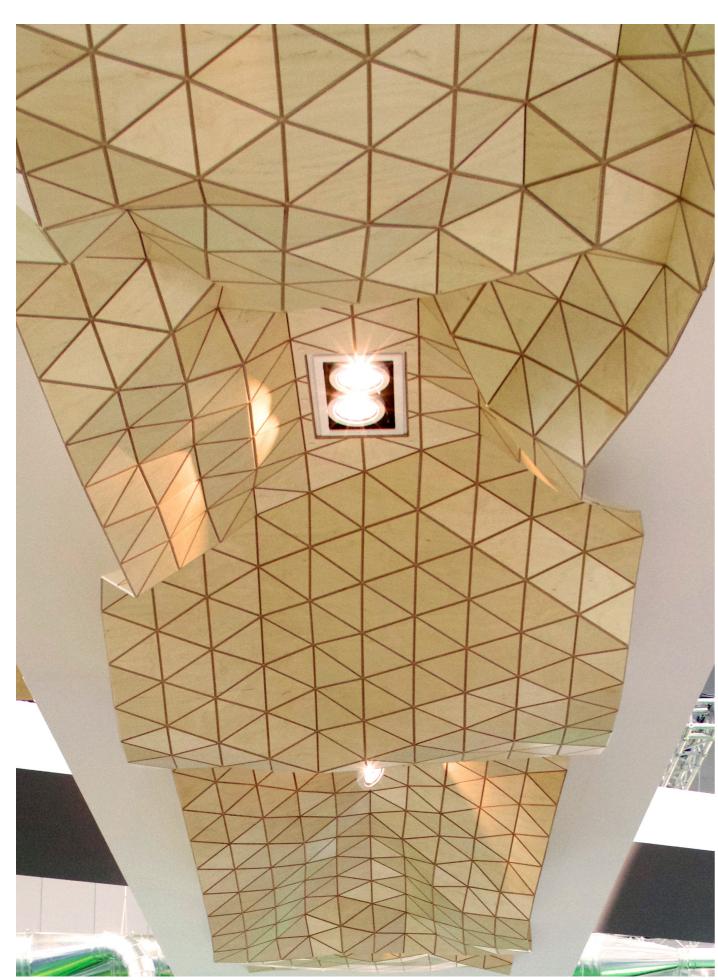


ADDITIONAL CUSTOMIZATIONS

The WOOD-SKIN sheet where plexiglass (or any other material) can be placed is provided with custom milled slot and cut-outs **1**. The plexiglass sheet is glued to the surface in the slot before the installation is fully completed **2**.

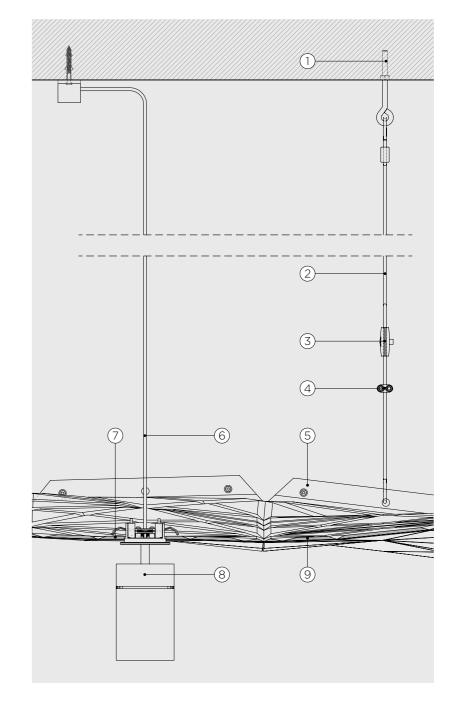


## 7.3 FIXTURES AND LIGHTING



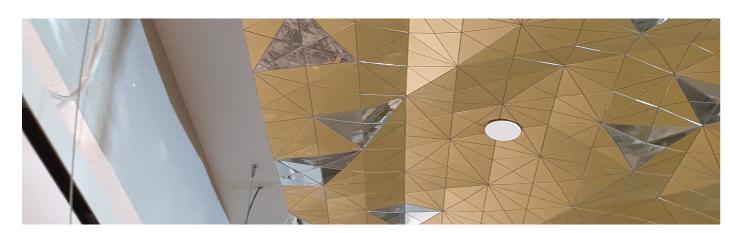
Orientable spotlight fixture
WOOD-SKIN sandwich
Aircraft cable

- 1. Anchor bolt with eyelet
- 2. Aircraft cable
- 3. Adjustable self locking wire rope grip
- 4. Wire rope grip
- 5. WOOD-SKIN inner flap
- 6. Power cord
- 7. WOOD-SKIN panel with milled opening\*
- 8. Spotlight fixture
- 9. WOOD-SKIN sandwich
- \* Holes for the lighting fixtures can either be CNC-cut during production process, or be cut on site with standard woodworking tools.



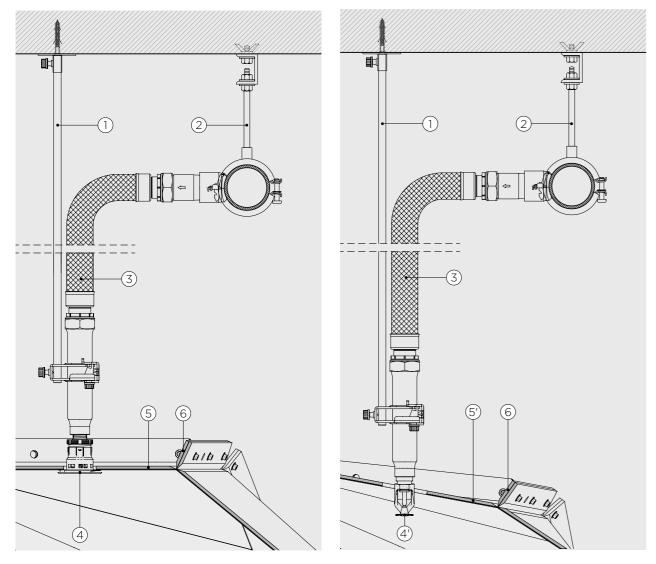
Ligna 2015, Hannover

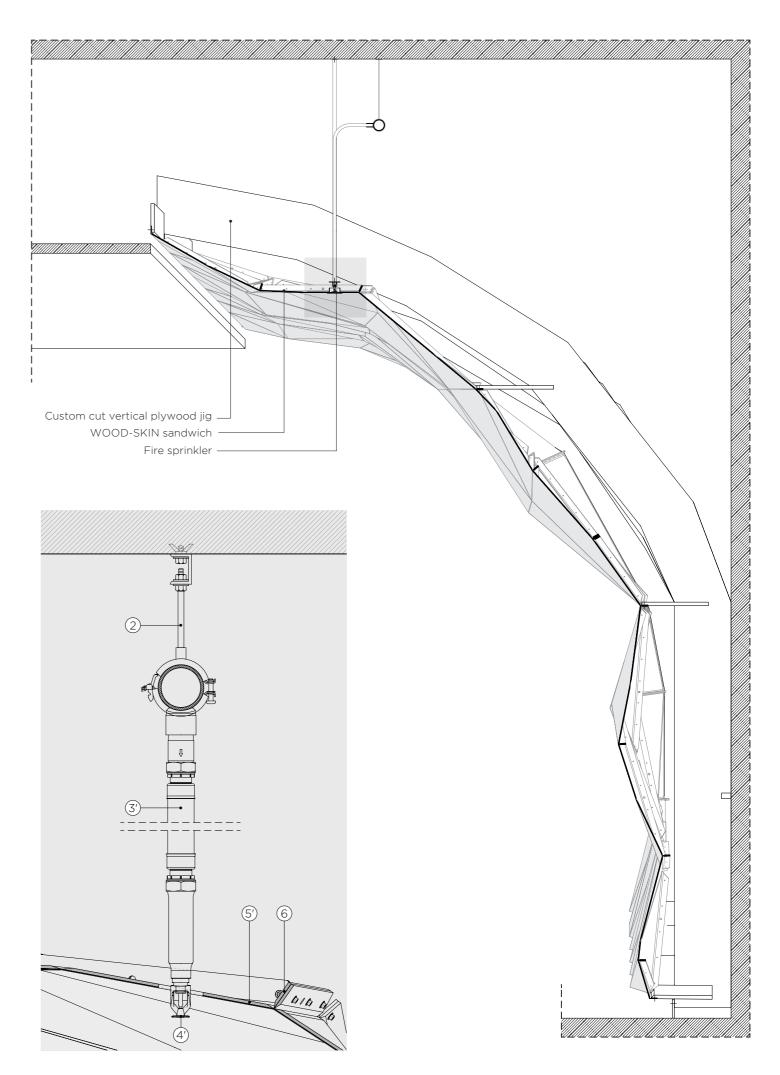
# 7.4 SPRINKLER



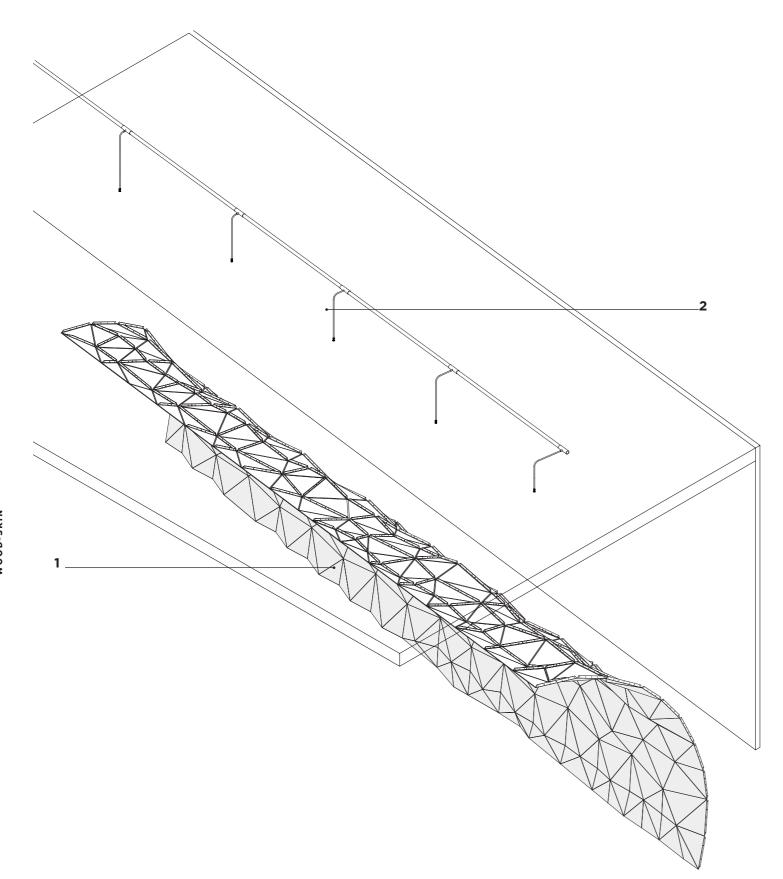
- 1. Fixing bracket\*
- 2. Pipe fixture profile\*
- 3. Flexible pipe\*
- 3'. Rigid pipe\*
- 4. Flat concealed pendent sprinkler\*
- 4'. Conventional pendent sprinkler\*
- 5. WOOD-SKIN sandwich with custom cut opening (Flat)
- 5'. WOOD-SKIN sandwich with custom cut opening (inclined)
- 6. WOOD-SKIN inner flaps

\*elements NOT provided by WOOD-SKIN





ADDITIONAL CUSTOMIZATIONS ADDITIONAL CUSTOMIZATIONS



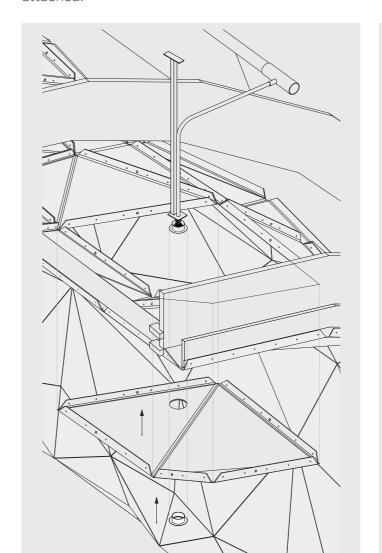
# The WOOD-SKIN® technology 1 allows embedding of sprinklers with both flexible and rigid piping 2. The

surfaces that interact with the sprinklers can be both parallel or inclined depending on the provided sprinkler

head.

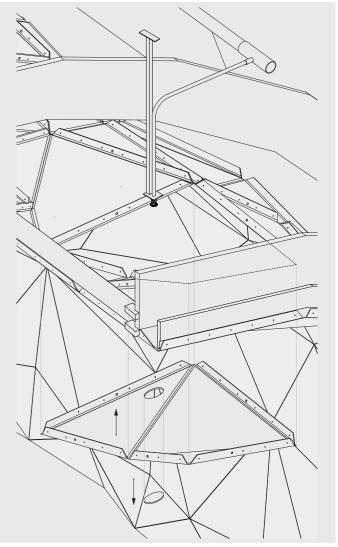
# **SPRINKLER**

based on the designed position of the sprinkler. Once the horizontal WOOD-SKIN panel is installed, the cap of the concealed pendent sprinkler can be attached.



### INSTALLATION OF A CONCEALED PENDANT INSTALLATION OF A STANDARD PENDANT **SPRINKLER**

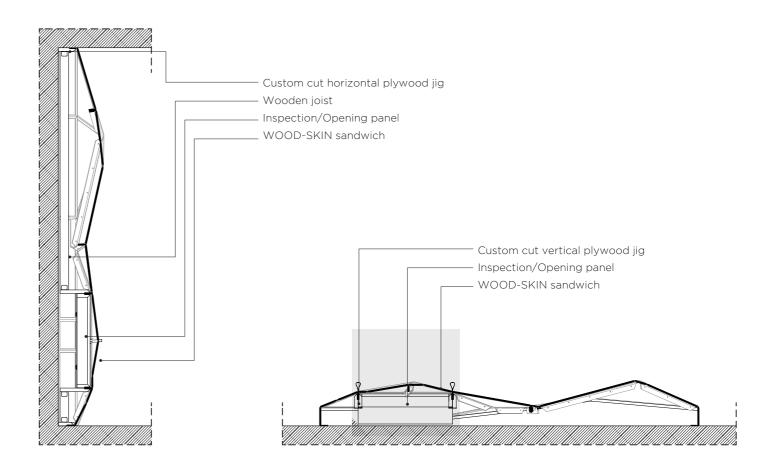
The WOOD-SKIN sheet is provided with an opening 
The opening for the sprinkler is cut during the installation of the WOOD-SKIN sheet based on the position of the already fixed sprinkler.



# 7.5 INSPECTION OPENINGS

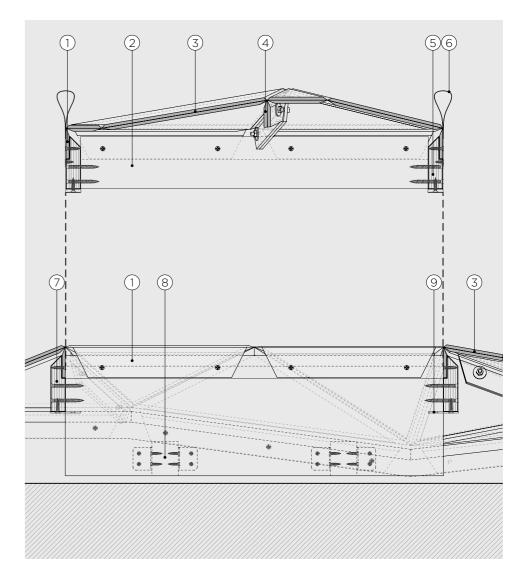


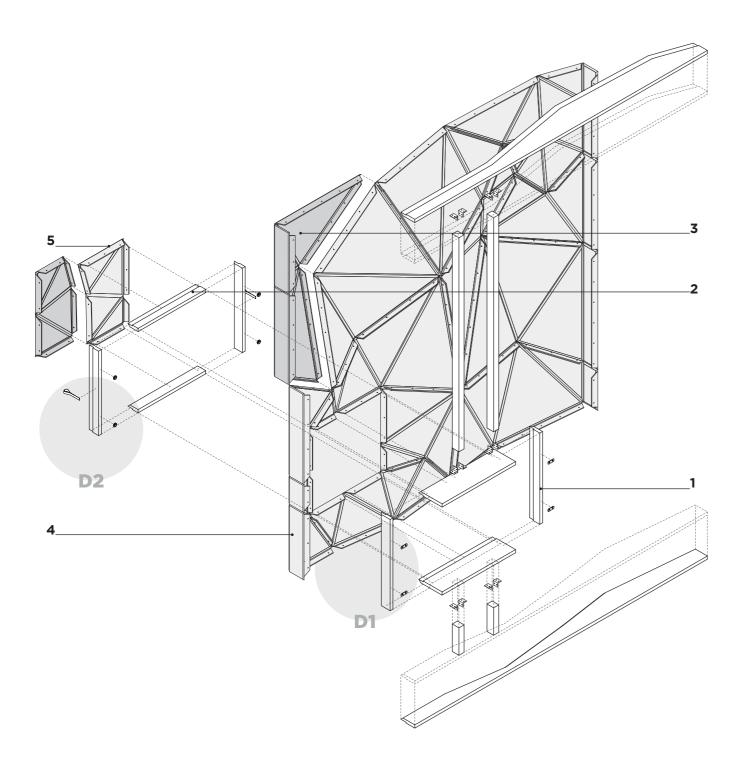




ADDITIONAL CUSTOMIZATIONS

- 1. Wood-Skin border flap
- 2. Custom cut horizontal plywood jig (thickness=19 mm)
- 3. WOOD-SKIN sandwich
- 4. WOOD-SKIN inner flaps
- 5. Custom cut vertical plywood jig (thickness=19 mm)
- 6. Handle
- 7. Custom cut vertical plywood jig (h=19 mm)
- 8. Wooden joist
- 9. Magnet

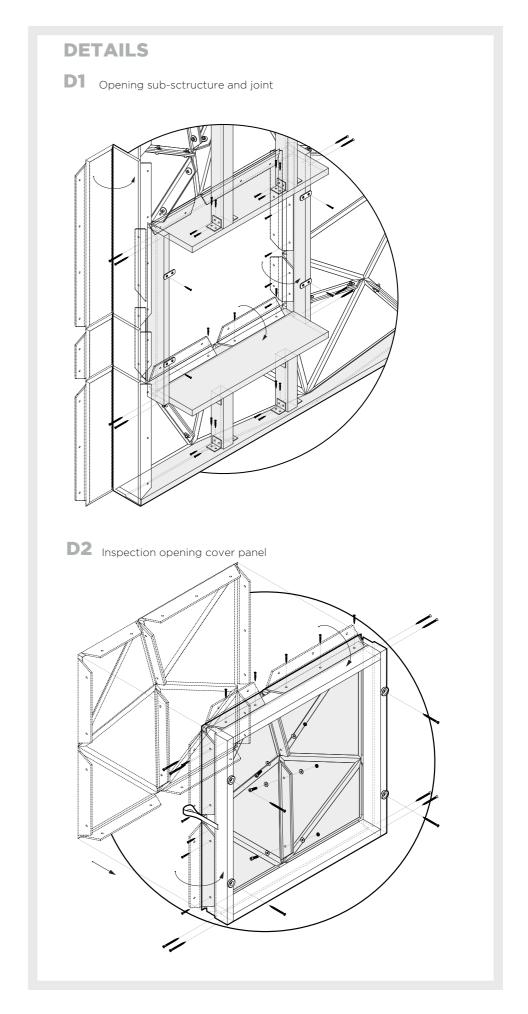




The sub-sctructure where the inspection opening will be located is first assembled by joining the wooden joists with L-shaped metal brackets **1**. Then the openable section frame is assembled indipendently in the same way **2**. The magnets and ferrous plates are screwed to the back of each supporting structure respectively.

The WOOD-SKIN surfaces are joined together by their inner flaps and installed onto the supporting structure

- **3**. The custom cut side surfaces are screwed to the supporting structure before closing all the elements
- **4**. Finally, the Wood-Skin sheets of the inspection opening cover are added to their supporting wooden structure and subsequently inserted in place, giving the overall installation a precise and seamless look **5**.



# 8 CERTIFICATIONS

#### ACOUSTIC

UNI EN ISO 254



tested at Zeta Lab

ASTM C 423-17 tested at Zeta Lab



#### FIRE REACTION

Available in Class A according to US standard ASTM E 84

tested at Intertek



Available in Bs-2d-0 according to European standard UNI EN 13501-1

tested at CSI



### UNIAXIAL TENSILE TEST

UNI ISO EN 1421:2017

tested at Politecnico di Milano



### MECHANICAL TEST - OPENING AND CLOSING CYCLES

Resistance to repeated hinges stress

tested at Catas



Fire reaction certifications available for Russian and English market

The illustrated certifications are subject to constant revisions and continuous research.

For any further information about certifications and material tests contact us at info@wood-skin.com

### WOOD-SKIN

is a product of Wood-Skin s.r.l. via Marcantonio dal Re - 24 20156 - Milano - Italy C.F. / P.IVA 08311500964

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### MATERIALS AND FINISHES INDEX

MDF by Valchromat

valchromat.pt | gruppobonomipattini.com

Cork by Tecnosugheri

tecnosugheri.it

Bamboo by Moso
gruppobonomipattini.com

Ultra thin reconstituted wood by Alpi Wood

alpiwood.com
Aluminum by Alucobond

alucobond.com Metal laminates by Almeco almecogroup.com

Metal laminates by Formica

formica.com Metal laminates by Sadun sadun.it

Ultra matte laminates by Fenix NTM fenixforinteriors.com

Laminates by Arpa Industriale arpaindustriale.com

Laminates by Abet Laminati abetlaminati.com

Laminates by Formica formica.com

Veneers by Alpi Wood alpiwood.com

The illustrated products are subject to constant revision in terms of their functional details. Continuous research goes into the finishing treatments. The products presented in this catalogue, as well as the descriptions and specifications, are illustrative and subject to changes by WOOD-SKIN srl.

Non-contractual document.

### **PROJECT CREDITS**

Lebkov&Sons, Amsterdam Studio Akkerhuis | Photos: Ronald Smiths®

LinkedIn, Madrid

Il Prisma Studio

luter Store, Ibiza

WOOD-SKIN | Photos: WOOD-SKIN

Arches Pavilion, Milan

Indexlab | Photos: Satè studio®

United Nation Palace - Room XIX, Geneva PEIA Associati | Photos: DSL studio®

Parametric surface. Dubai

SUPERFUTUREDESIGN | Photos: Oana Maria

*Minuti*<sup>©</sup>

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Ligna 2015, Hannover

WOOD-SKIN | Photos: WOOD-SKIN