

HOW TO BUILD YOUR OWN FOG WATER COLLECTOR: A PRACTICAL GUIDE

DELIVERABLE FOR C1 ACTION AT LIFE19 CCM/ES/001199
PROJECT



MODULAR i-FWC VERSION. SUBJECT TO
IMPROVEMENTS.



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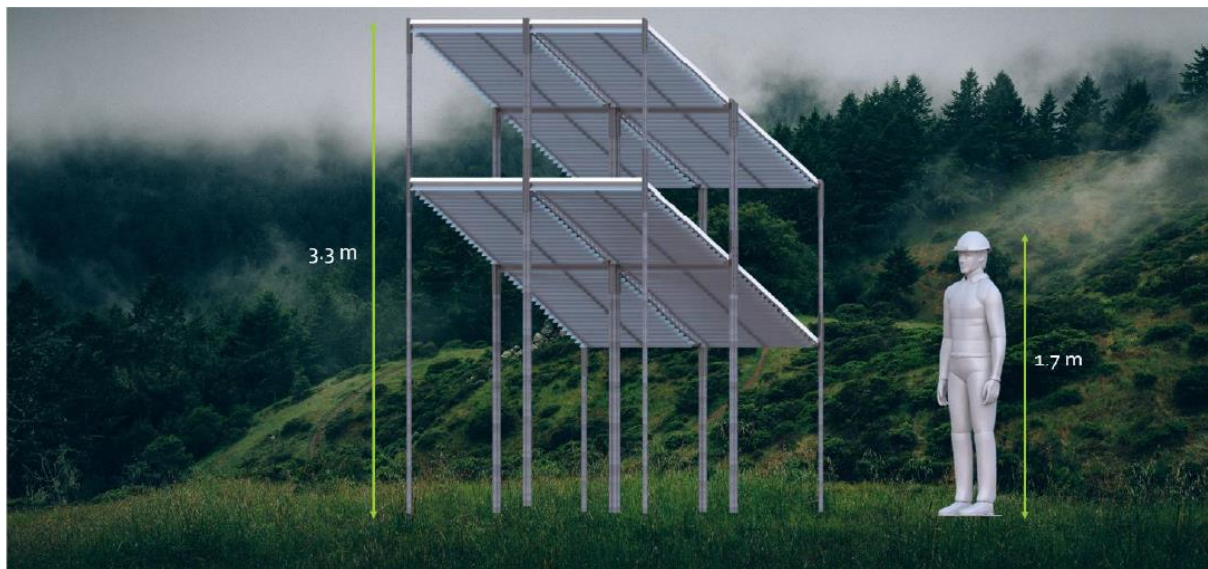
Necessary tools and materials

Materials List (review blueprints for further clarifications)

Tools List

Manufacturing/part preparation

Structure Assembly



Necessary tools and materials

Materials List (review blueprints for further clarifications)

- Middle-height module (2 units). Per each unit:
 - 1 x 1 m ISO Rectangle 30 x 10 x 1.5 mm
 - 4 x 42 cm ISO Square 30 x 30 x 1.5 mm
 - 2 x 1 m ISO Angle 30 x 30 x 3 mm
 - 2 x 1.066 m ISO Angle 30 x 30 x 3 mm
- Top module (2 units). Per each unit:
 - 1 x 1 m ISO Rectangle 30 x 10 x 1.5 mm
 - 2 x 1 m ISO Angle 30 x 30 x 3 mm
 - 2 x 1.066 m ISO Angle 30 x 30 x 3 mm
 - 4 x 24 cm ISO Square 30 x 30 x 1.5 mm
- Mezzanine bars:
 - 8 x 1 m ISO Square 25 x 25 x 1.5 mm
- Structure's legs and reinforcement bars:
 - Rear legs (2 units). Per each unit:
 - 1.10 m ISO Square 25 x 25 x 1.5 mm
 - Middle legs (4 units). Per each unit:
 - 1.65 m ISO Square 25 x 25 x 1.5 mm
 - Front legs (2 units). Per each unit:
 - 2.15 m ISO Square 25 x 25 x 1.5 mm
 - Reinforcement bars (2 units). Per each unit:
 - 1.35 m ISO Square 25 x 25 x 1.5 mm
- Water collection plate:
 - 2 x 1.85 m ISO Angle 30 x 30 x 3 mm
 - 2 x 1.064 m ISO Angle 30 x 30 x 3 mm
 - 2 x (50 cm x 6 cm x 3 mm) cut Galvanised Steel Sheet
 - 4 x 5 cm ISO Square 25 x 25 x 1.5 mm
 - 1 x (1 m x 2 m x 10 mm) Polycarbonate sheet.
- Reinforcement angles:
 - 4 x 5 cm ISO Angle 30 x 30 x 3 mm
- Bolts, nuts, and screws:

- M8 x 20 bolts → 4 units
- Hexagon M8 nut → 10 units
- M8 x 50 bolts → 52 units
- M8 Wing Nut (DIN 315) → 48 units
- M8 Threaded Rod, 12 cm long → 1 unit
- Stainless steel screening mesh with the following or similar characteristics:
 - Wire diameter: 1.2 mm
 - Wire horizontal spacing: 1.5 mm
 - Wire height: 50 mm (5 cm).
 - Provider example: Nuba Screening Media. Mesh used:
 - Width: 1.060 m
 - Length needed (mesh comes as a continuous rolled sheet): 5 m
 - Filament diameter: 1.2 mm
 - Filament height: 50 mm
 - Filament spacing: 1.5 mm
- Structure – to – ground fixing means:
 - 8 x 1 m anchor spikes (Ø12 mm reinforcing bar):

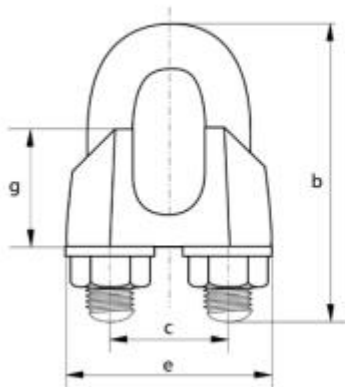


- Pike tip: Lance-shaped, formed by welded galvanized steel plate. If it is too expensive to manufacture, alternative spike tips that offer adequate grip on the terrain can be chosen (for example, one or two pieces of triangularly cut sheet welded to the tip of the corrugated iron).

- Fixing of the spike to the structure: 6 mm threaded rod that can surround a 25 mm x 25 mm square profile, anchored by means of a nut to a galvanized steel plate (images below).



Also, a DIN 741 Commercial Grip (U-Bolt Grip) is suitable for the task of anchoring if can be found a size that would surround completely the 25 x 25 mm square profile (image below).



- Hydraulic parts:

- 40 mm sink valve kit:



- Hydraulic accessories necessary to carry the water collected to a water tank (elbows, pipe adapters, T-Bars...)

Tools List

- Measuring tape.
- Marker.
- Wrench.
- Drilling machine.
- 40 mm crown drill for valve kit.



- Drill and screwdriver accessories briefcase.
- Grinder machine with steel cutting discs.
- Any tool to measure angles.
- Protection clothing and goggles.
- Welding equipment.
- 2 x Sikaflex 11FC tubes.
- **Recommended: 2 to 4 people involved in the assembly process.**

Manufacturing/part preparation

1. Prepare (cut if necessary) the galvanised steel profiles with the dimensions required in the **materials list**.
2. Once all the tubes and profiles are cut and prepared, drill the holes as shown on the blueprints.
3. Cut the mesh into sections as defined by the red lines below, and group them in piles of 19.



4. Manufacture the top and middle-height module as shown in blueprints and cut in the lateral angles (1 m length) 19 slots spaced 5 cm between them, to later weld the 5 cm height mesh sections into the slots. Also remember to cut slots into the slower part of ISO Rectangle 30 x 10 x 1.5 mm for the mesh to have a middle support for welding.

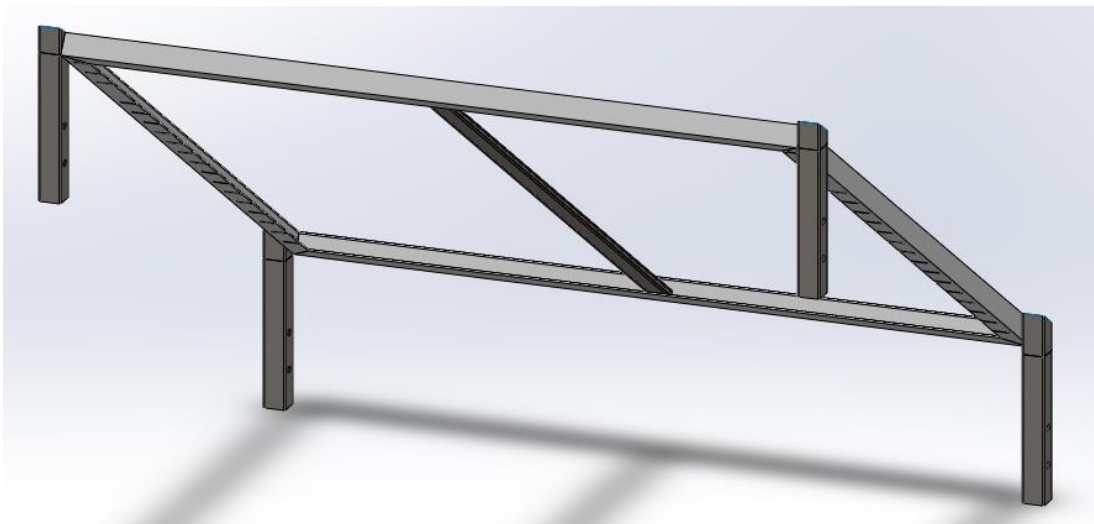


Figure 1. Top module.

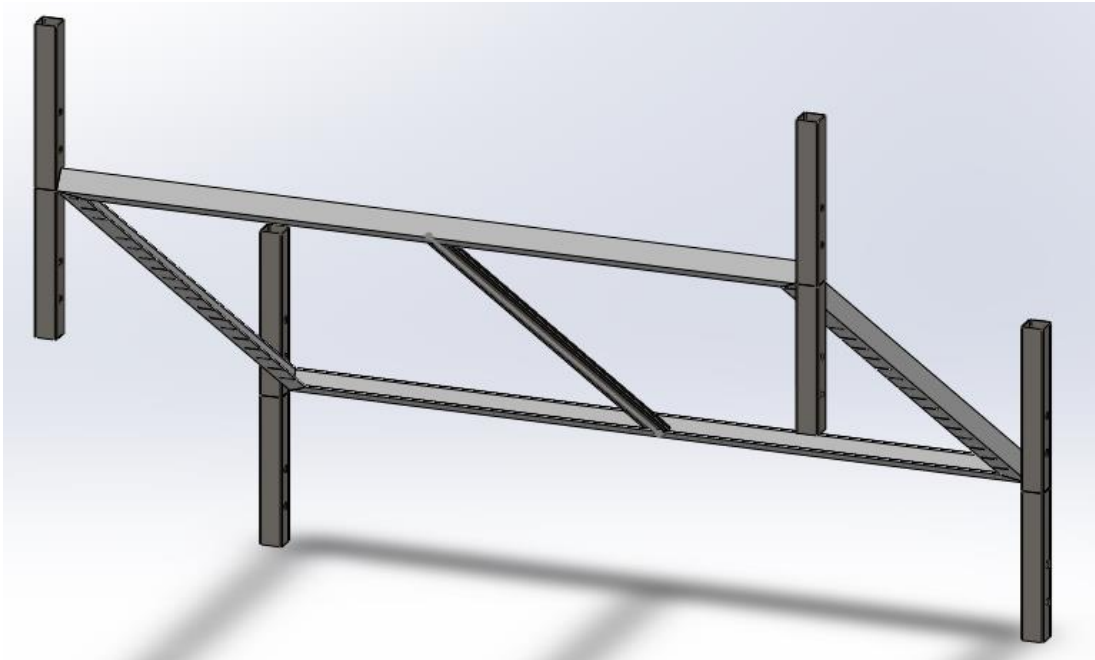


Figure 2. Middle - height module.



Figure 3. Mesh welding process.

5. Manufacture the perimeter of the water collection plate.
6. Once all the steel parts are manufactured and welded, apply to each one of them (including all the legs and bars) anticorrosion coating for galvanised steel, and when

this coating is dry, apply green paint (like the example below), and let it dry for 24 hours.



Figure 4. Green paint example for the structure and painting process.

7. Once all the parts are dry, proceed to cut and carefully fit with Sikaflex the Polycarbonate sheet that will be used as second water collector. When the Sikaflex is dry, on one of the front corners of the Polycarbonate sheet, drill a hole to fit the 40 mm sink, far enough from the lower part of the steel structure of the collection plate, so the sink does not have fitting issues. Seal the perimeter of the hole with Sikaflex with
8. Weld the mesh sections to the manufactured modules.
9. When all the pieces necessary for the assembly are manufactured

Structure Assembly

1. Join the two middle – height modules with 4 M8x20 bolts. Ensure a good tightening between nut, bolt, and structure.

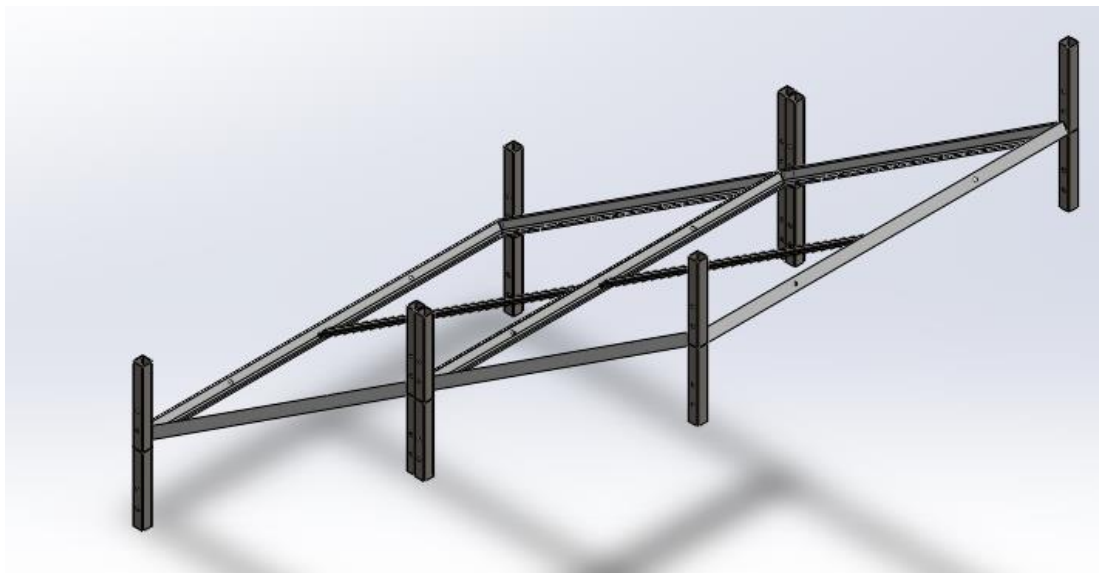


Figure 5. Isometric view of middle - height modules assembled.

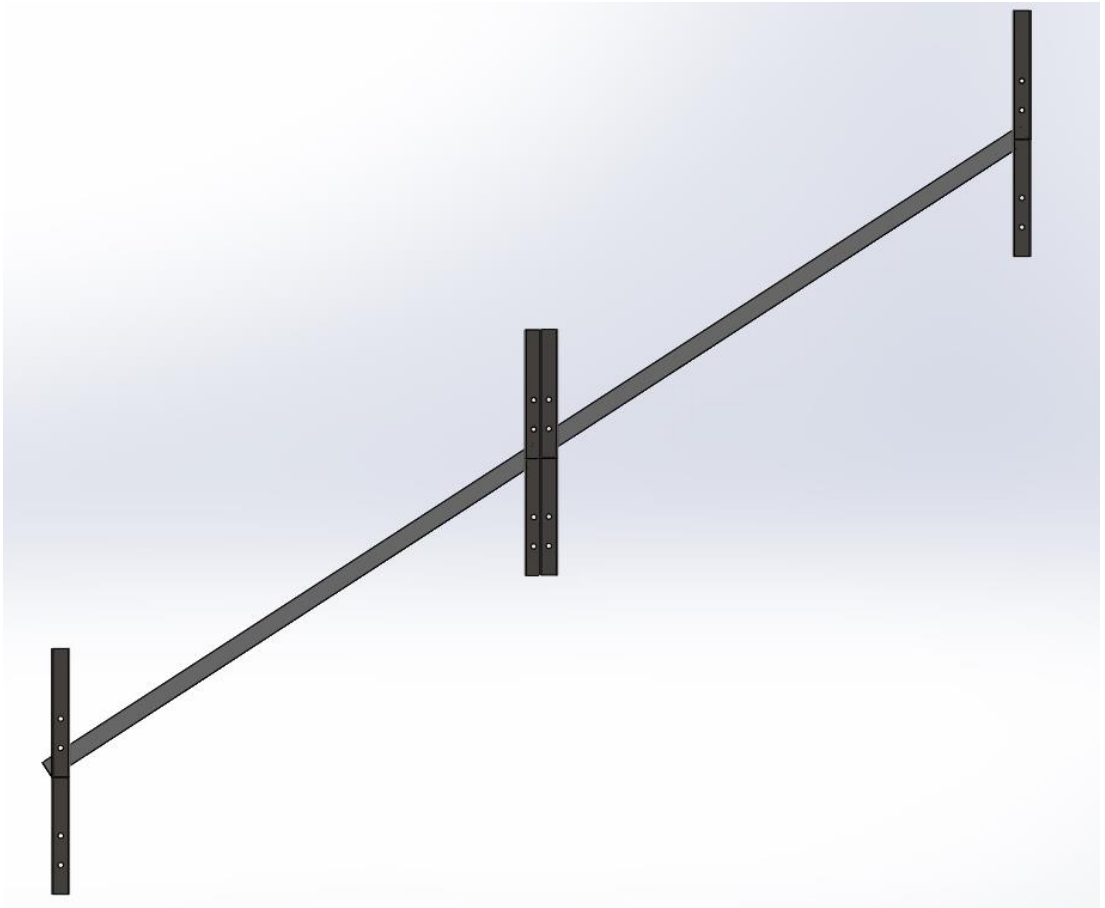


Figure 6. Lateral view of middle - height modules assembled.

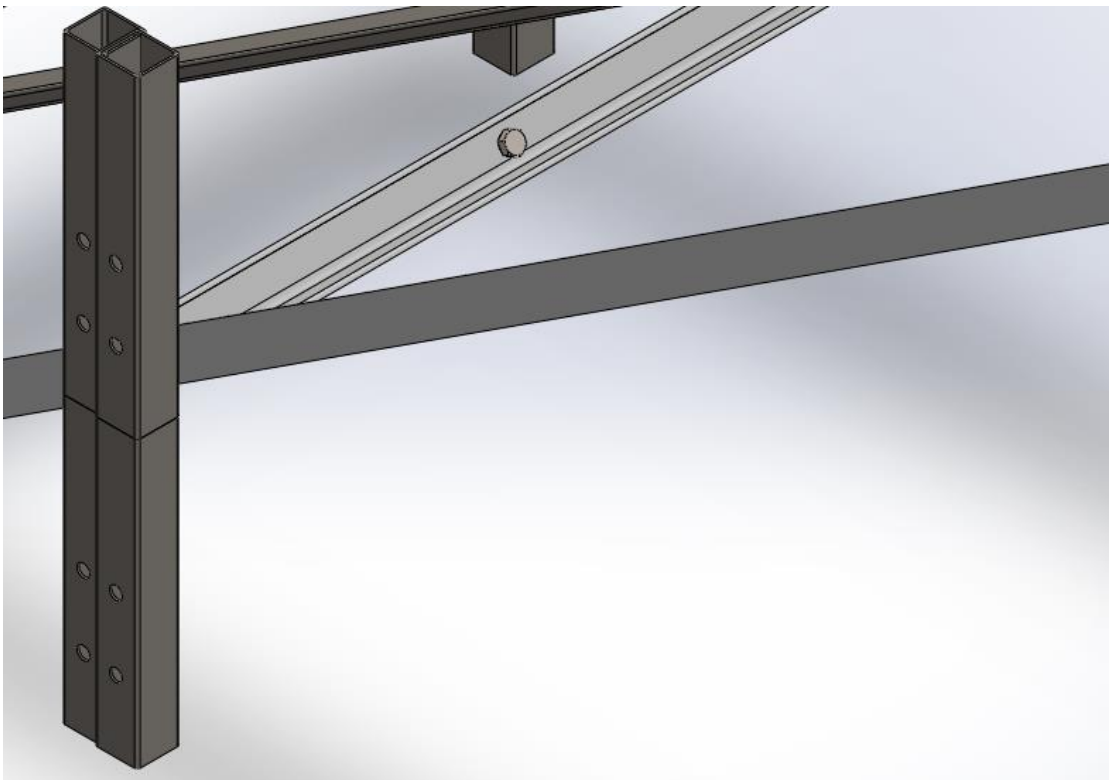


Figure 7. Isometric view of one of the M8 x 20 bolts fixing both middle - height modules.

2. Join the two top modules with 4 M8x20 bolts. Also ensure a good tightening between nut, bolt, and structure.

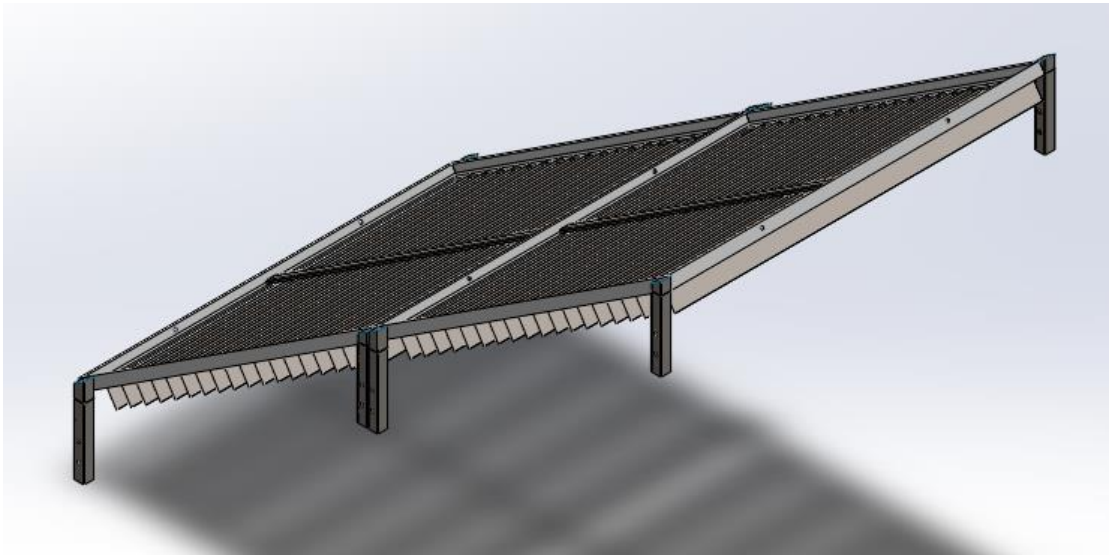


Figure 8. Isometric view of top modules assembled

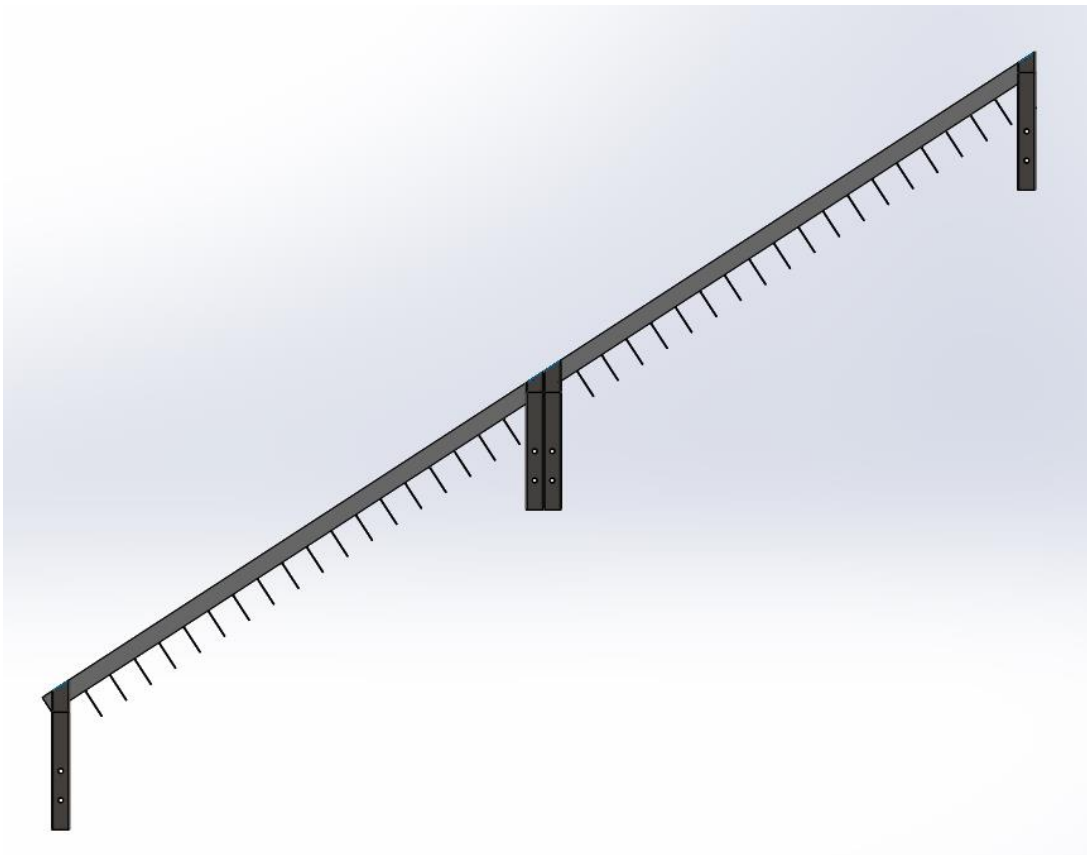


Figure 9. Lateral view of top modules assembled.

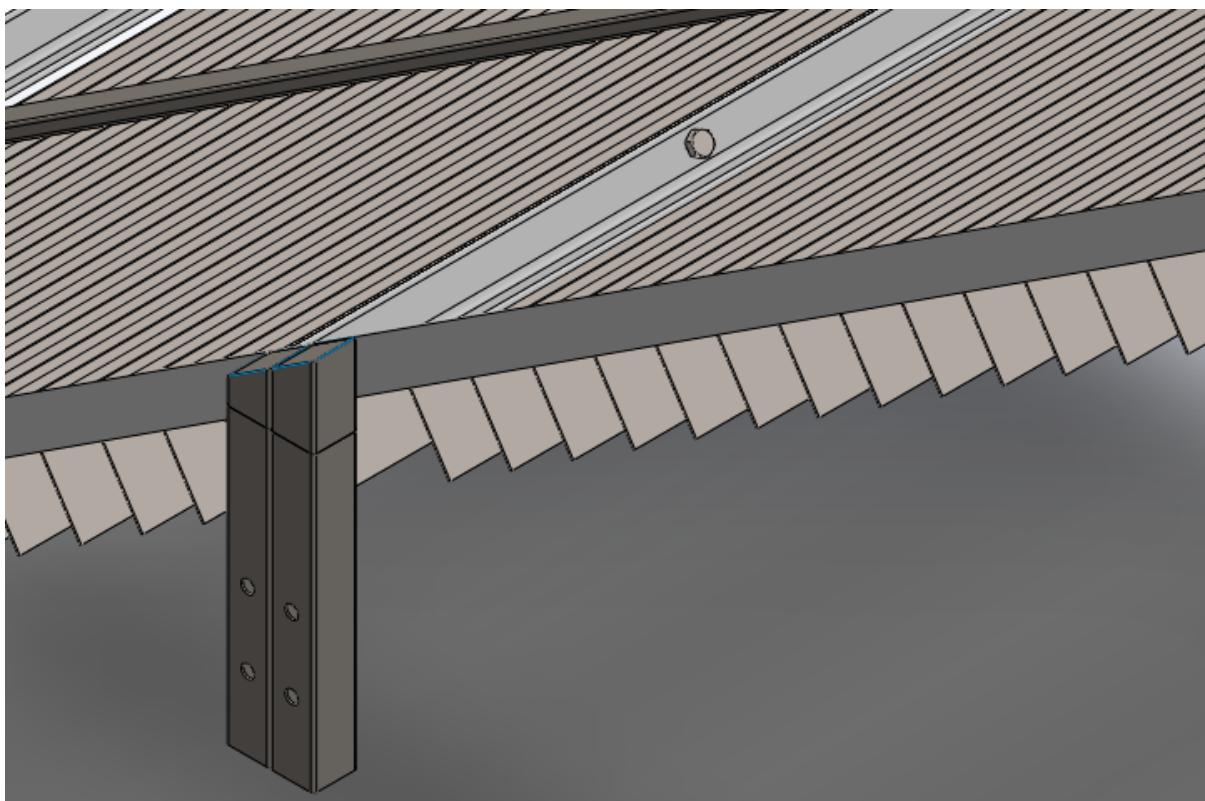


Figure 10. Isometric view of one of the M8 x 20 bolts fixing both top modules

3. Position and secure (with M8 x 50 bolts and M8 wing nuts) the intermediate bars in the upper inserts of the middle – height module.

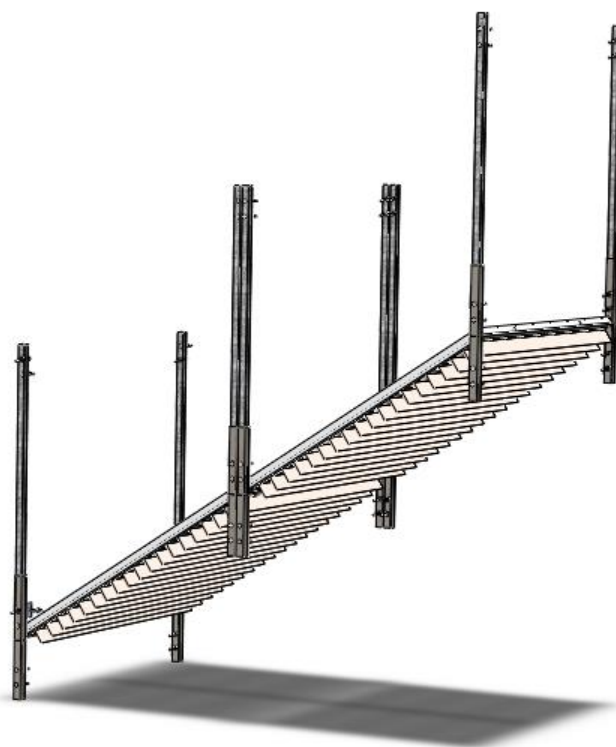


Figure 11. Perspective of middle - height modules and mezzanine (intermediate) bars mounted.

4. Join both top modules with the rest of the assembly by the upper drills of the mezzanine bars (with M8 x 50 bolts and M8 wing nuts).

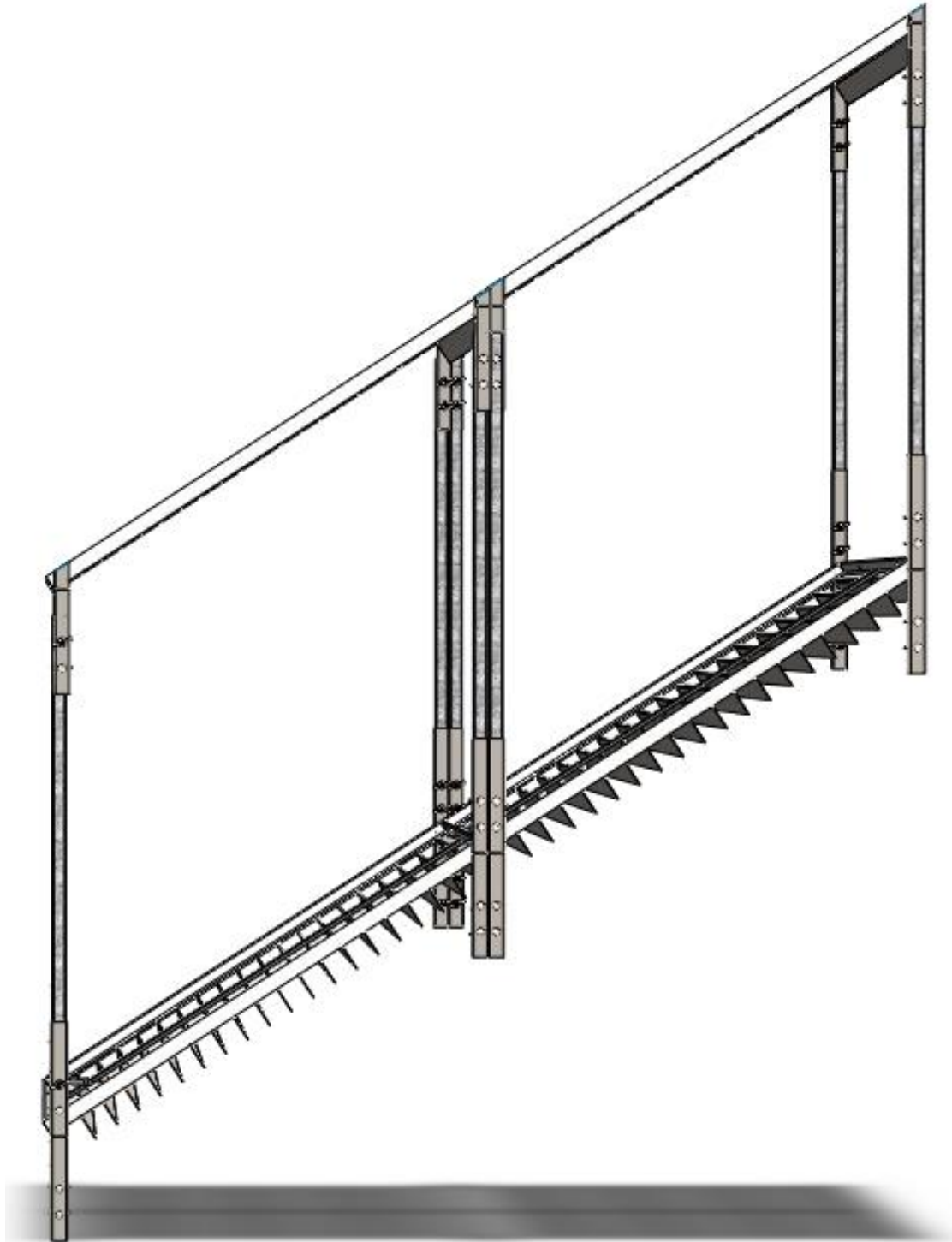


Figure 12. Figure 11 mounted with both top modules.

5. Mount the reinforcement crossbars on the rear part of the structure (with M8 x 50 bolts and M8 standard nuts). Secure the crossbar with the M8 threaded rod at its centre.

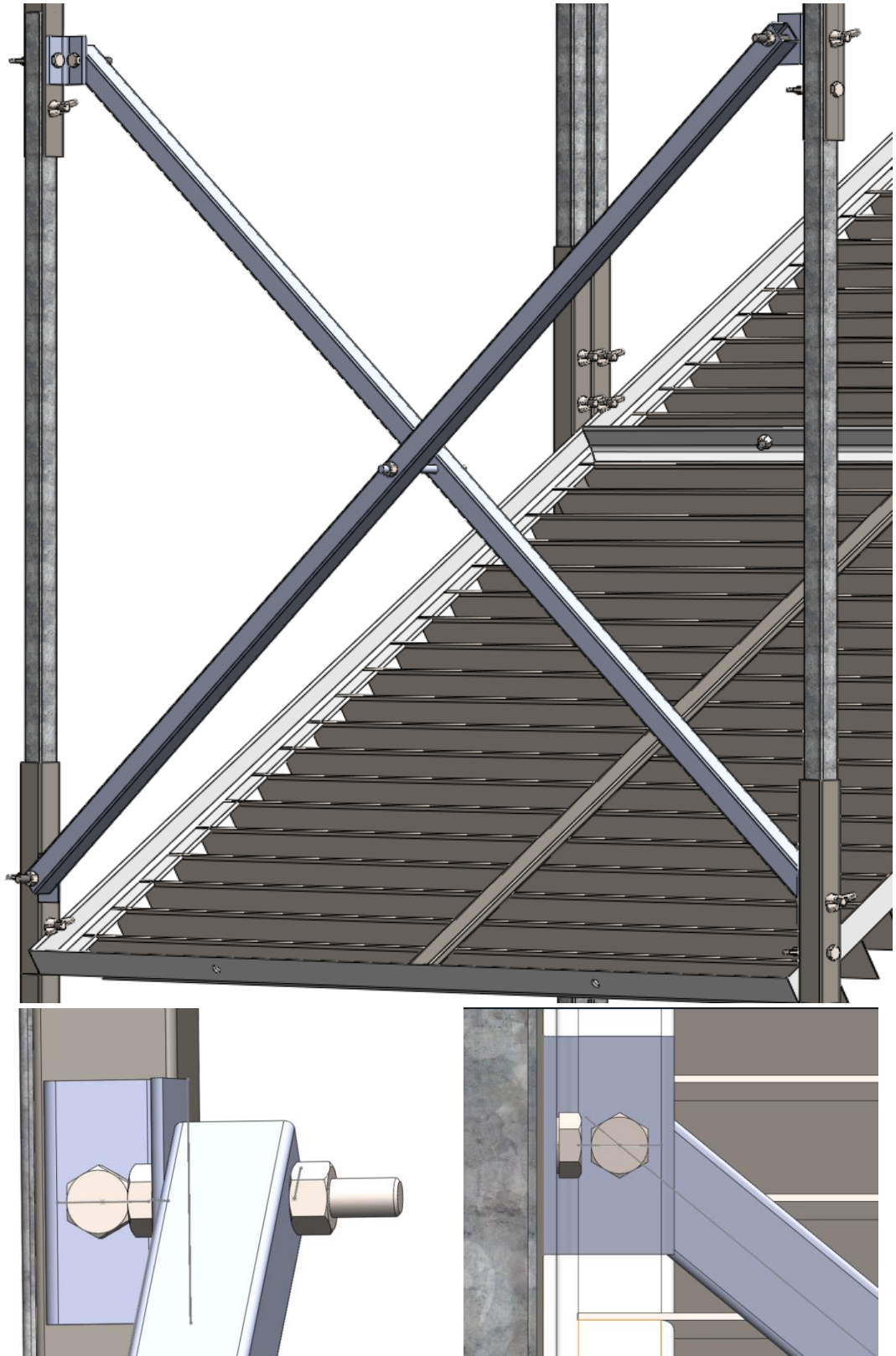


Figure 13. Detail of structure reinforcement characteristics.

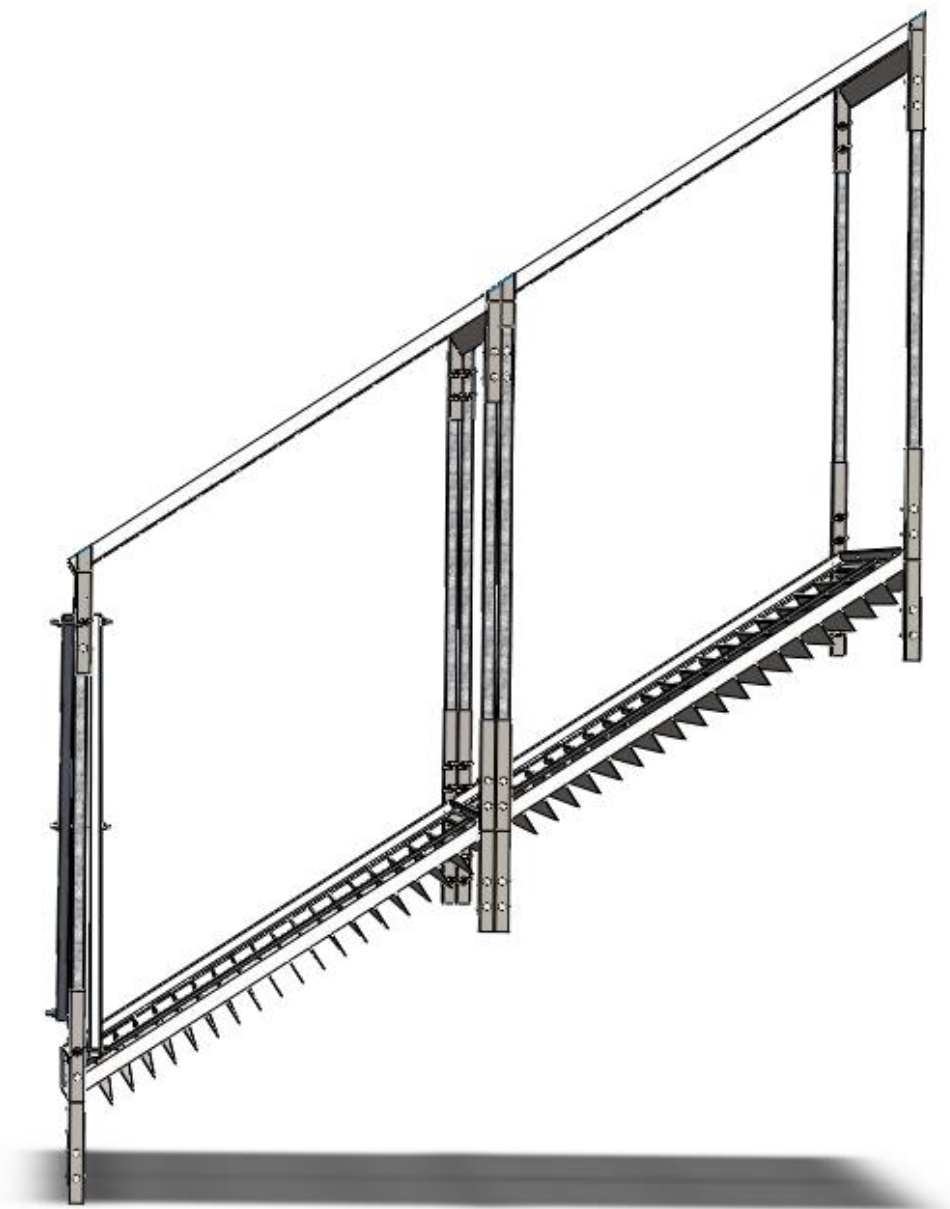
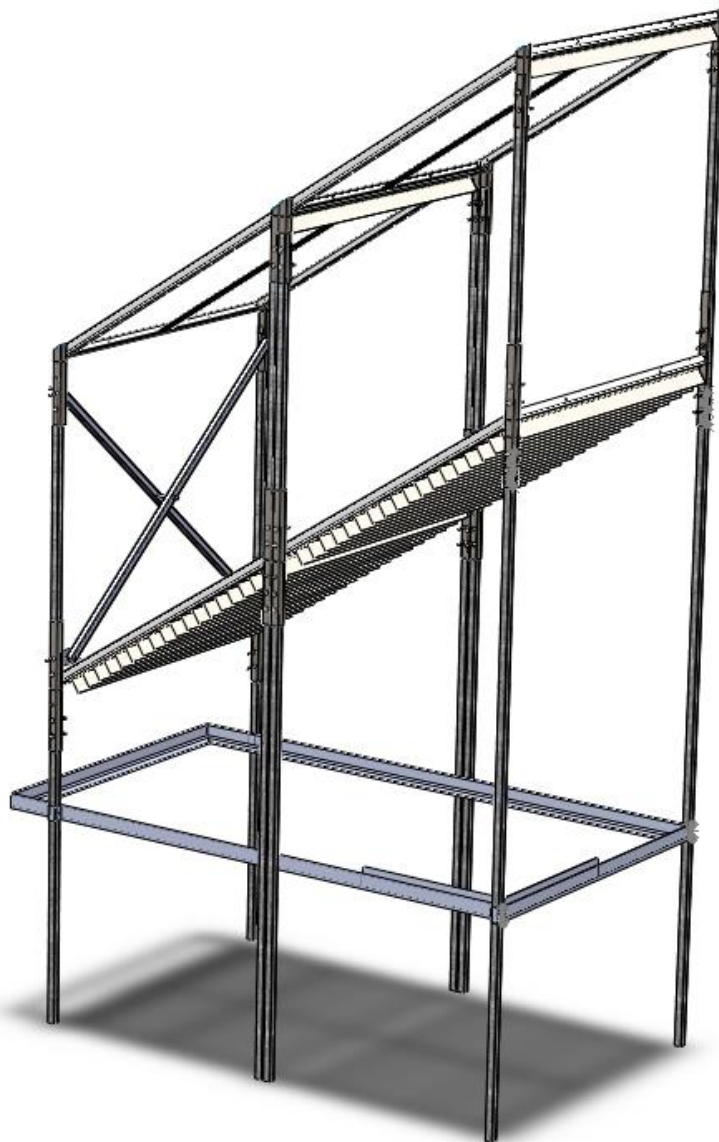


Figure 14. Figure 12 mounted with the reinforcements.

6. Lay the partially assembled frame on its side and assemble the legs (with M8 x 50 bolts and M8 wing nuts).
7. Stand the structure upright and support all the weight on its legs. Insert the legs into the squared inserts on the water collection plate, which will be resting on the ground. Make sure that the overhang of the collection plate protrudes behind the structure, and not in front of it.
8. Raise the water collection plate guided by the square inserts and the structure's legs. Fix a height for the front part of the plate and place one (1) self-tapping M5 screw on each squared insert with the drill. Then proceed to lower the rear part, where the corner with the hole with the sink must be lower than the other (to have enough inclination for the collected water stream). Keep in mind that the unevenness with a few centimetres (3 cm to 5 cm) is more than enough. After this, fix the front self-tapping screws.

Important: The water collection plate must not be extremely lower, otherwise the structure won't be correctly fixed to the ground (due to the lack of available height to bury the structure's legs into the ground) and there will be difficulties while attaching hydraulic accessories to the sink valve, as they will be lower than the collection plate.

9. Mount the sink valve and make a leak test to the collection plate, to prevent water losses.
10. Fixing the structure to the ground:
 - a. Open one hole on the ground for each one of the legs of the structure, with enough space to place the anchor – spikes.
 - b. Place the structure aligned with the ground holes.
 - c. Place pikes beside each one of the structure's legs and bury them as much as it is possible to. Then attach each leg-pike pair with a U-Bolt Grip.
 - d. If necessary, reinforce the structure by applying steel cables and tensioners, tensioned with anchor stakes to the substrate.
11. Mounting the necessary hydraulic system (pipes, accessories, and water storages).
12. Final product (CAD, Quality Testing and First Field Deployment):







BLUEPRINTS



ID	PIECE NAME	DESCRIPTION	QTY.
1	MIDDLE - HEIGHT MODULE	GALVANISED STEEL	2
2	MEZZANINE BAR	ISO Tube 25 x 25 x 1.5 mm Galvanised Steel	8
3	FOG COLLECTION MESH	SUPPLIED BY NUBA SCREENING MEDIA / MALLAS DMR. MATERIAL: AISI 304 STEEL	76
4	HIND LEG 1.1 m	ISO Tube 25 x 25 x 1.5 mm Galvanised Steel	2
5	MIDDLE LEG 1.65 m	ISO Tube 25 x 25 x 1.5 mm Galvanised Steel	4
6	TOP MODULE	GALVANISED STEEL	2
7	FRONT LEG 2.15 m	ISO Tube 25 x 25 x 1.5 mm Galvanised Steel	2
8	WATER COLLECTION PLATE	Galvanised Steel + PolyCarbonate plate 10 mm thickness	1
9	DIN EN 24018 - M8 x 20-WC	TO JOIN MODULES	4
10	Hexagon Nut ISO 4034 - M8 - N		10
11	MODULAR REINFORCEMENT ANGLE	ISO Angle 30 x 30 x 3 mm Galvanised Steel	4
12	REINFORCEMENT BEAM	ISO Tube 25 x 25 x 1.5 mm Galvanised Steel	2
13	DIN EN 24016 - M8 x 50 x 50-WC		52
14	DIN 315-M8-GT-C-N	WING NUT	48
15	M8 THREADED REINFORCEMENT ROD	Length = 12 cm	1

IF NOT OTHERWISE STATED: THE DIMENSIONS ARE EXPRESSED IN MM

SURFACE FINISH:

TOLERANCES:

LINEAR:

ANGULAR:




FINISH:

NATURAL

ANTI-CORROSION PAINT

DEBURRING AND BREAKING SHARP EDGES

Innovative Modular Fog Water Collector (Modular i-FWC)

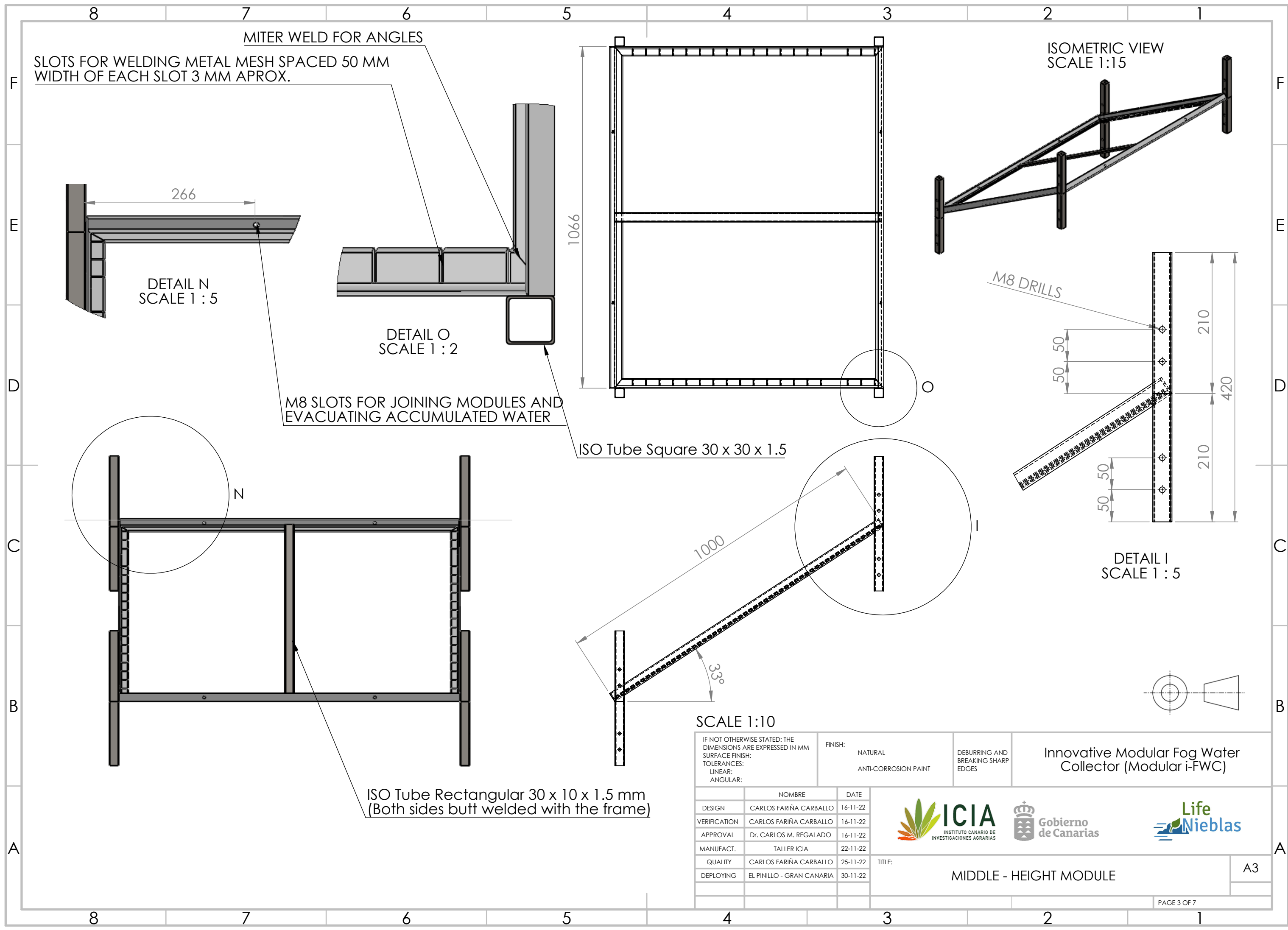
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APPROVAL	Dr. CARLOS M. REGALADO	16-11-22	
MANUFACT.	TALLER ICIA	22-11-22	
QUALITY	CARLOS FARIÑA CARBALLO	25-11-22	
DEPLOYING	EL PINILLO - GRAN CANARIA	30-11-22	

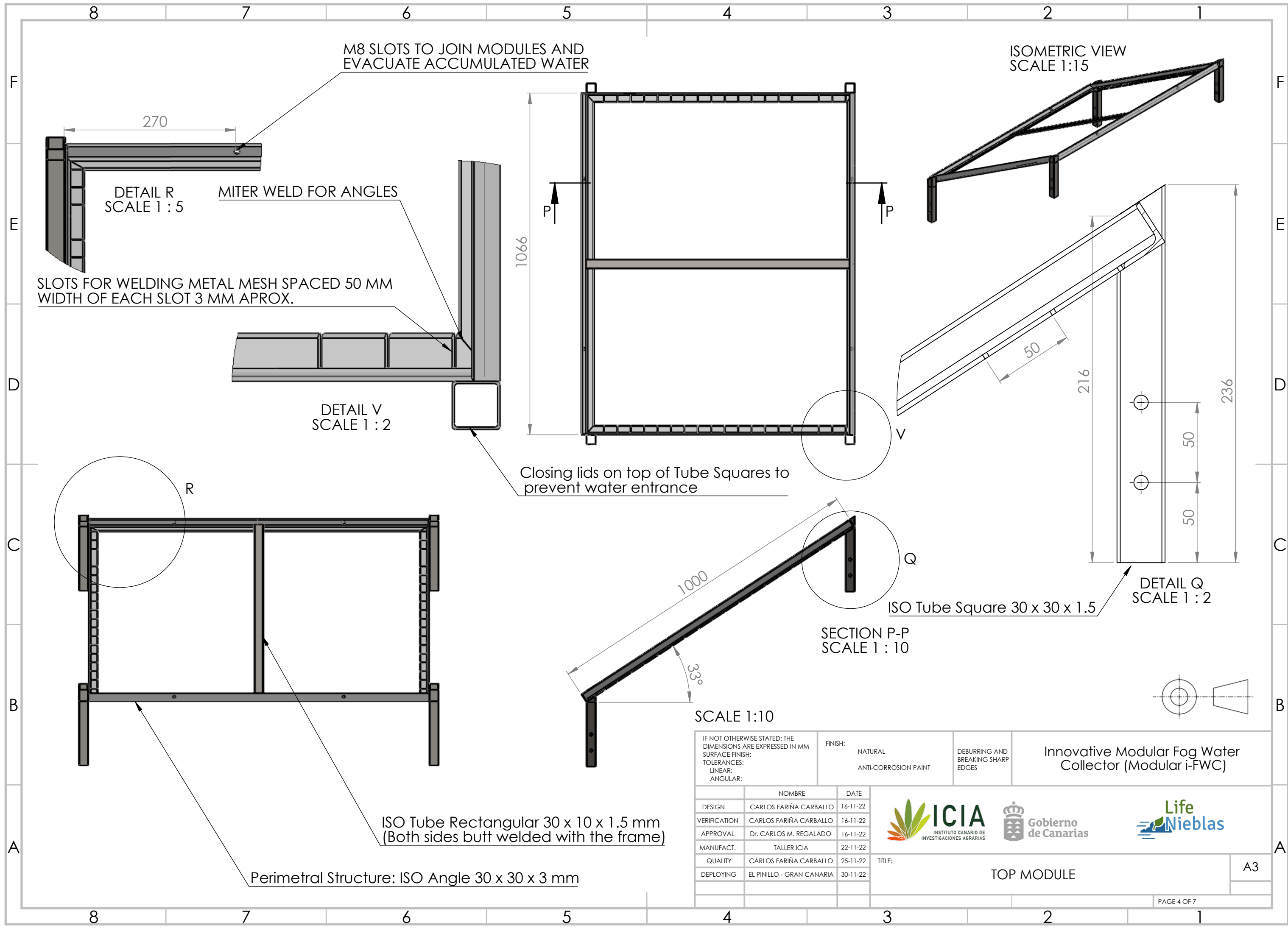
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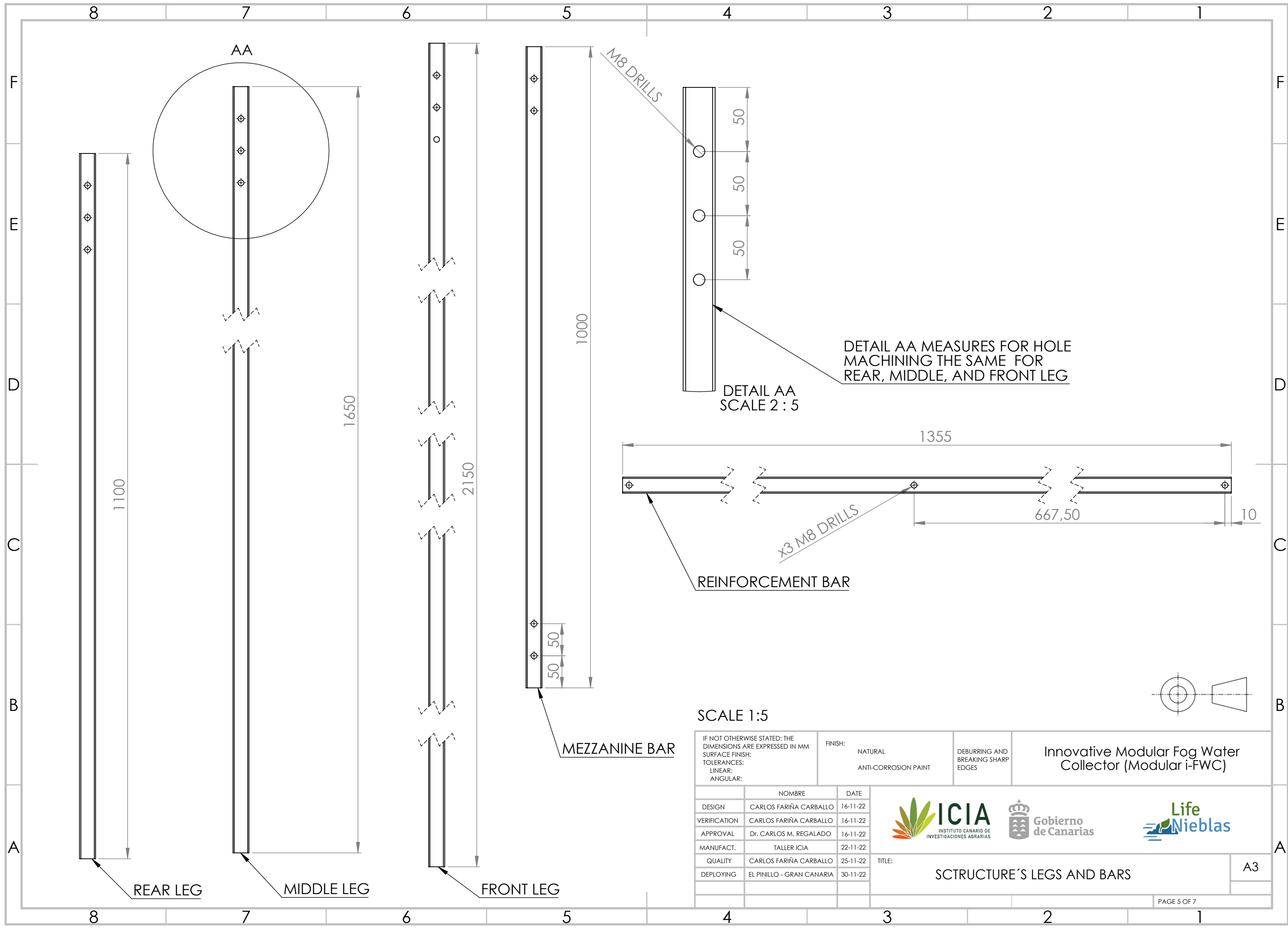
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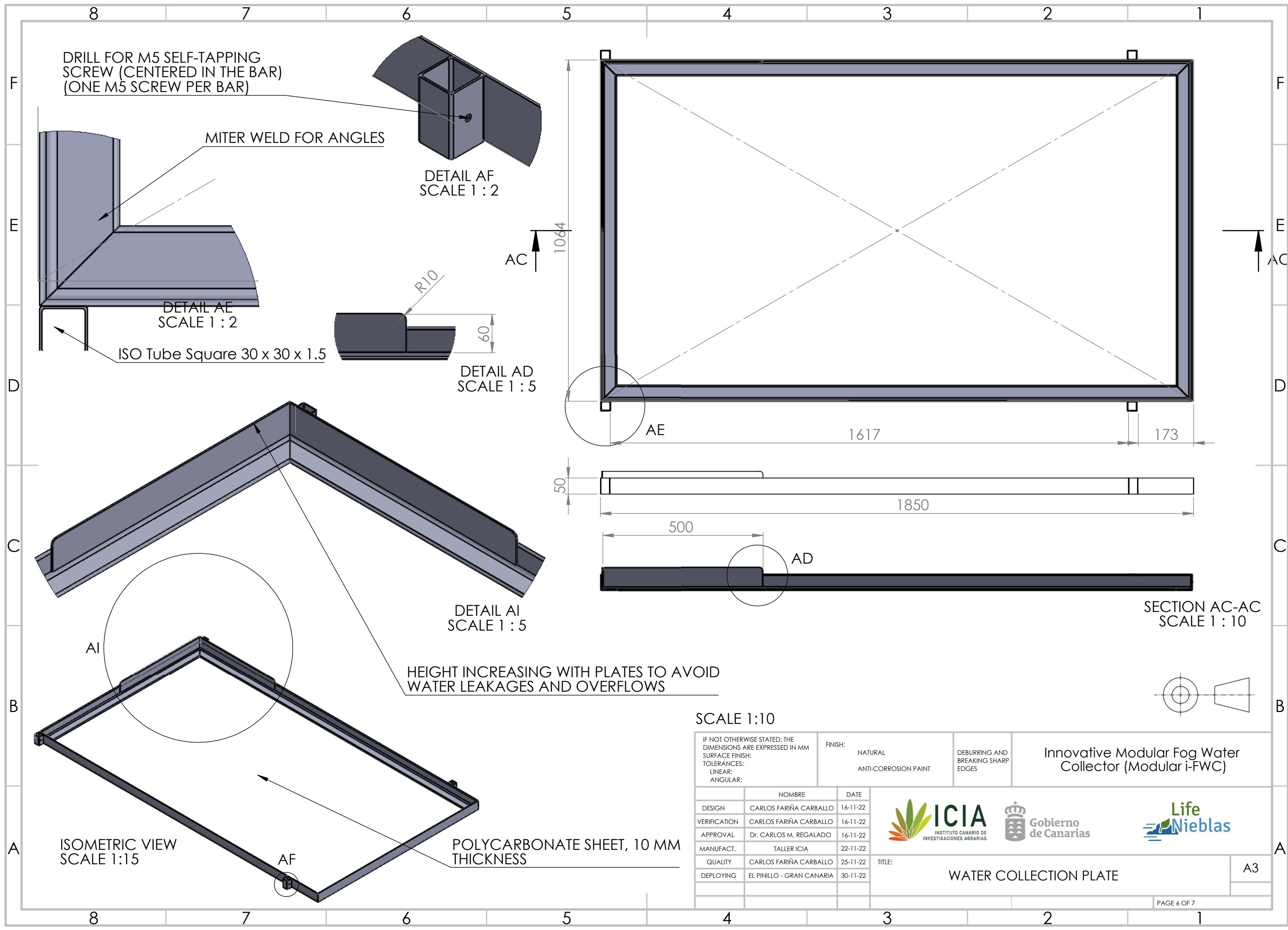
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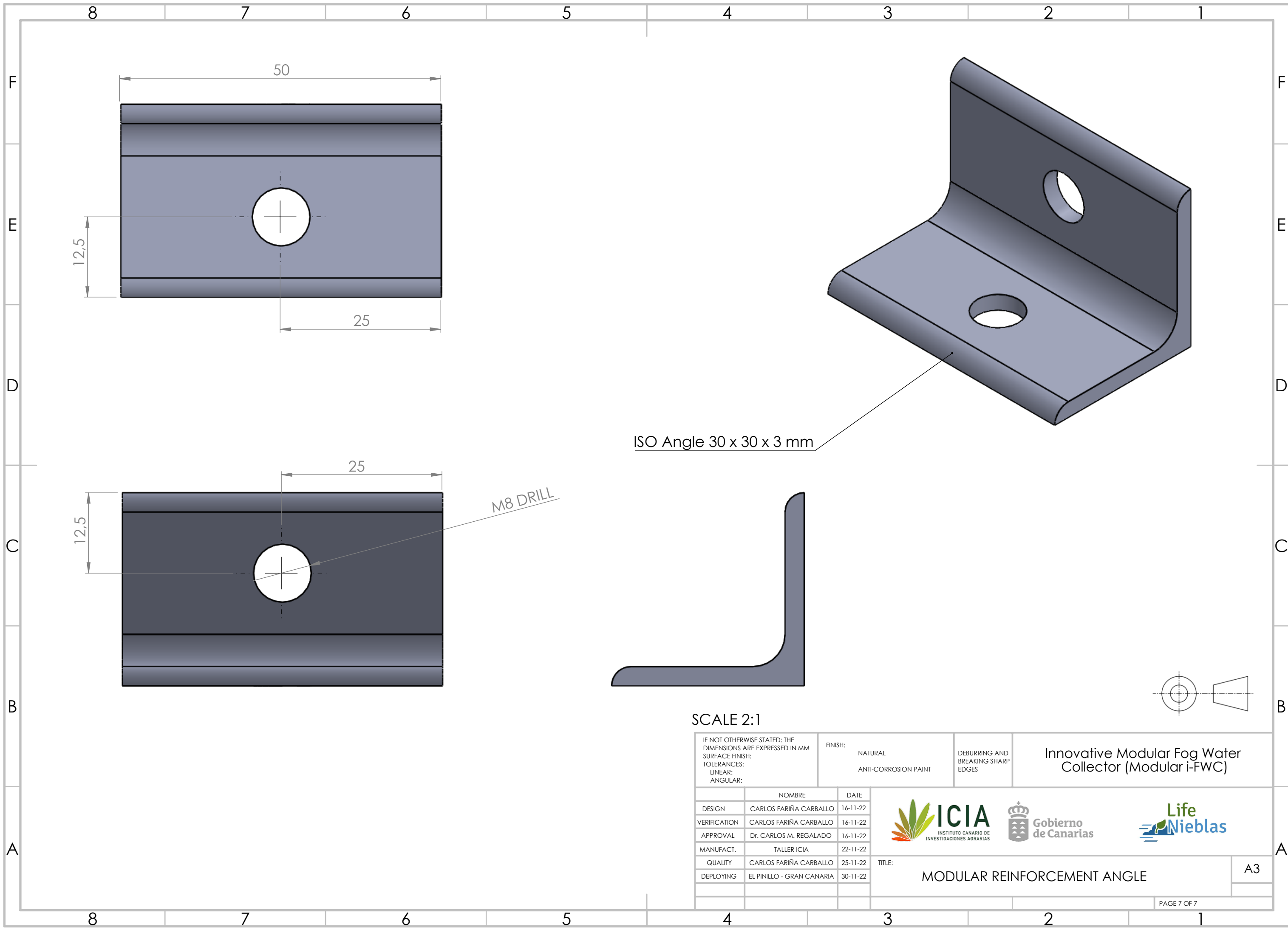


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DEPLOYING	EL PINILLO - GRAN CANARIA	30-11-22							
			TITLE:					A3	
			SSTRUCTURE´S LEGS AND BARS						
								PAGE 5 OF 7	



SCALE 1:10

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DEPLOYING		EL PINILLO - GRAN CANARIA		30-11-22			
		TITLE:				A3	
		WATER COLLECTION PLATE					
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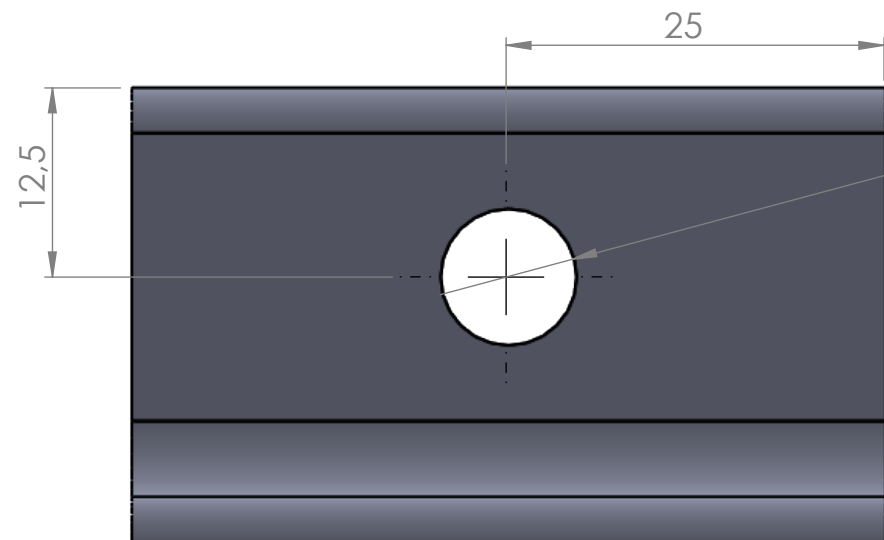
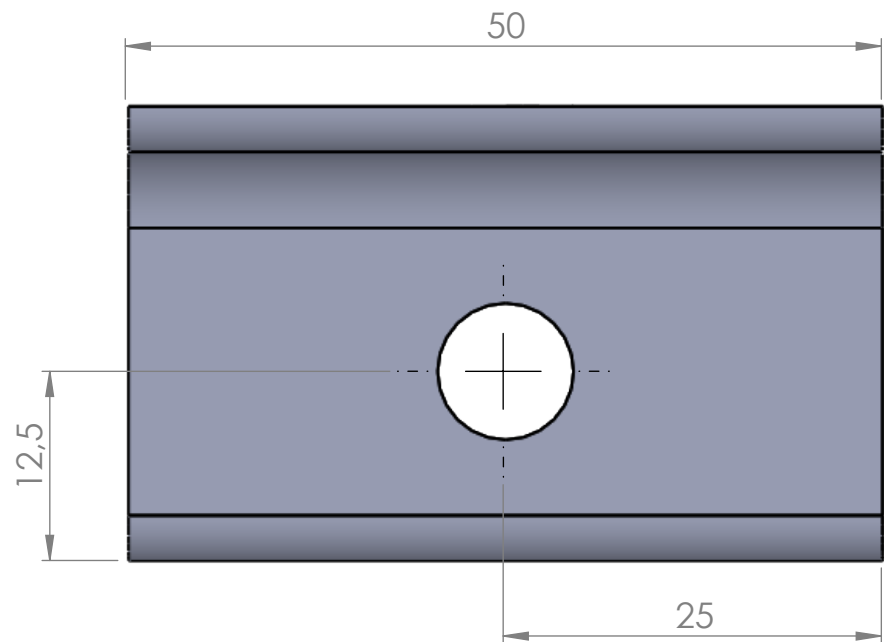
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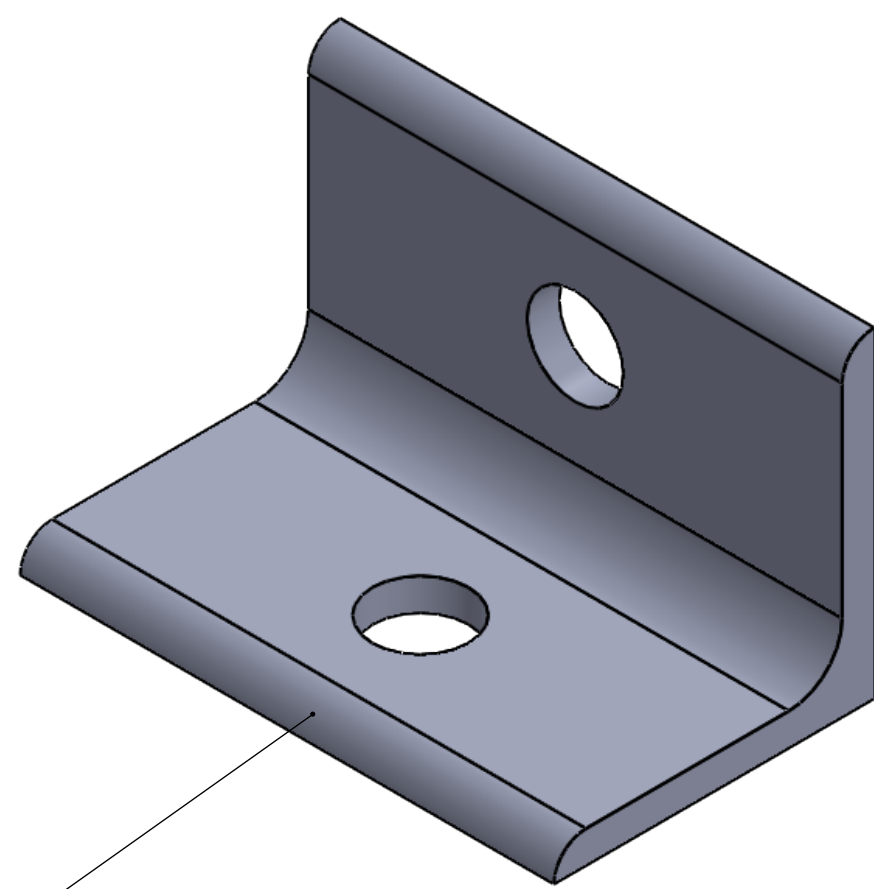
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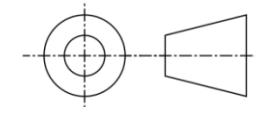
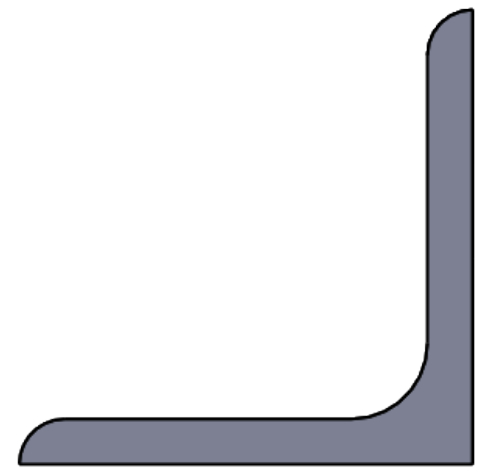
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M8 DRILL



ISO Angle 30 x 30 x 3 mm



SCALE 2:1

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TITLE:						MODULAR REINFORCEMENT ANGLE			A3	
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