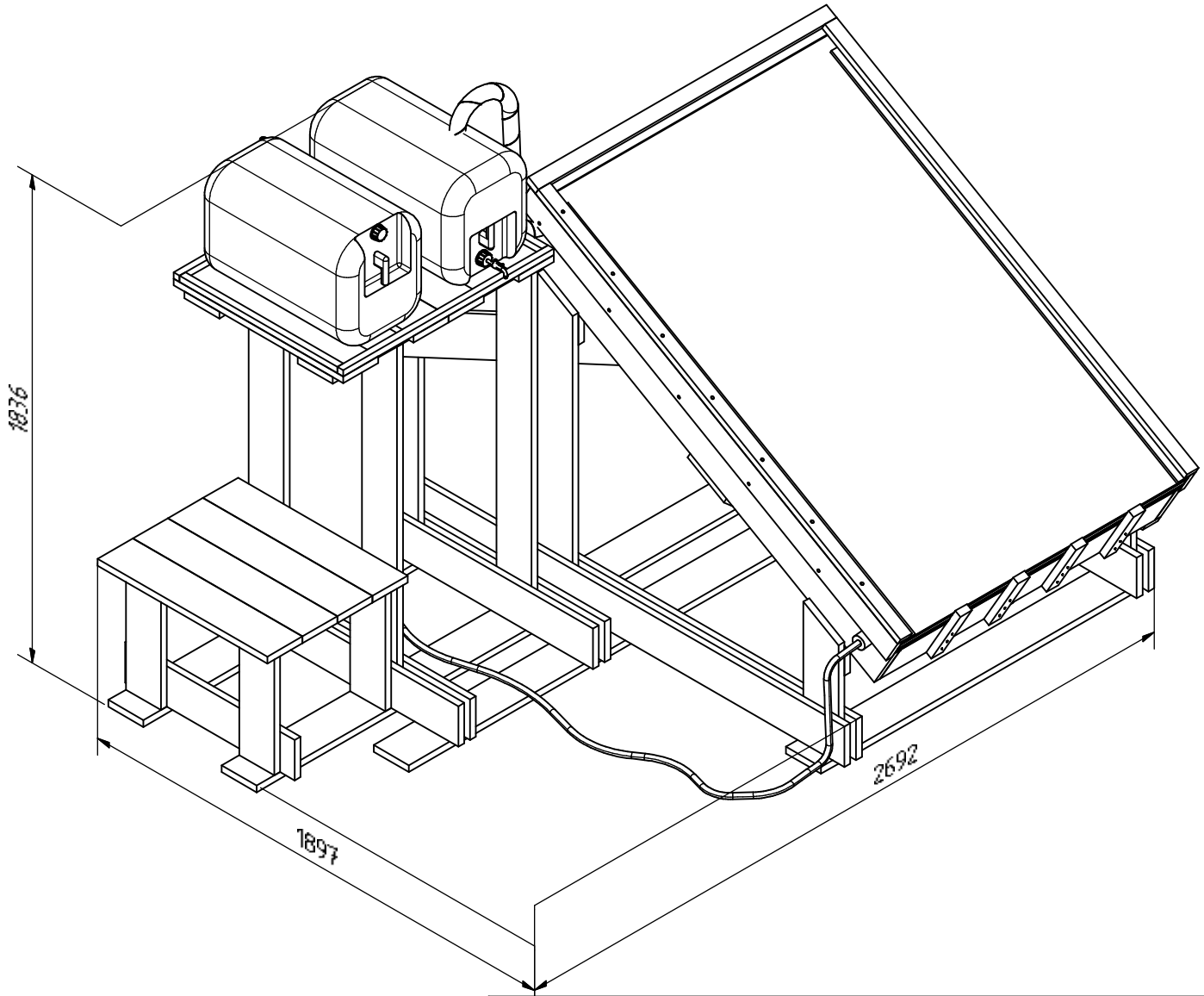
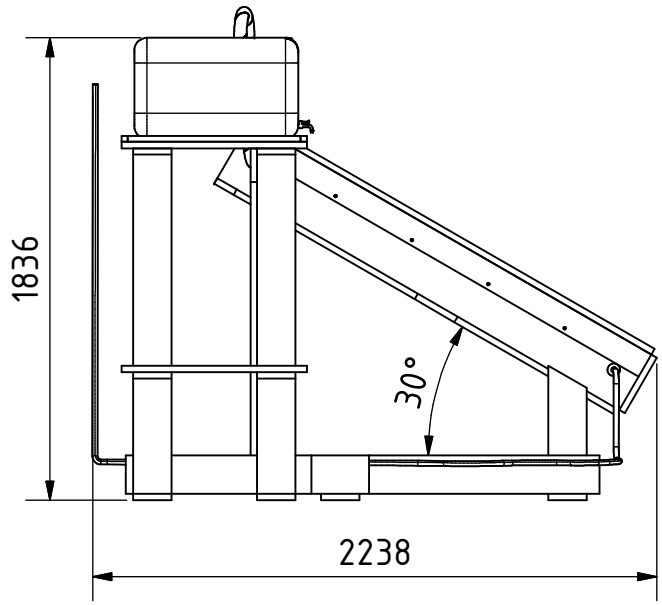
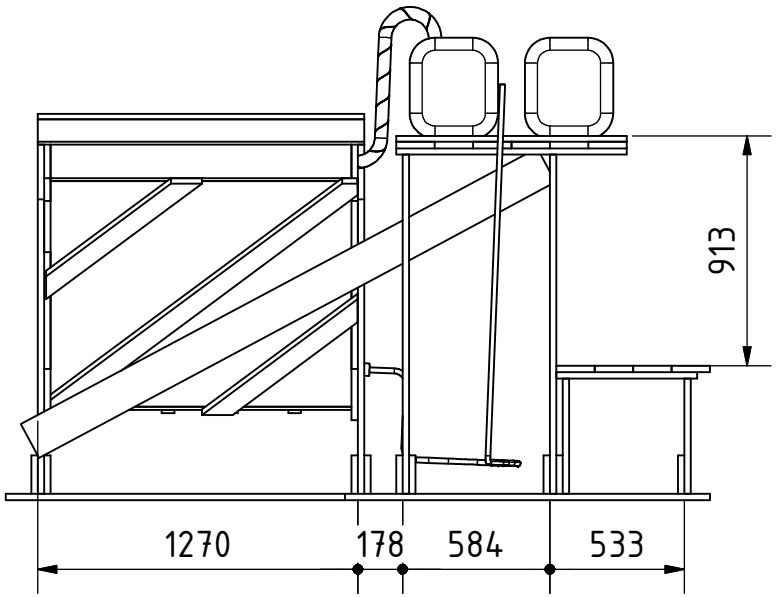
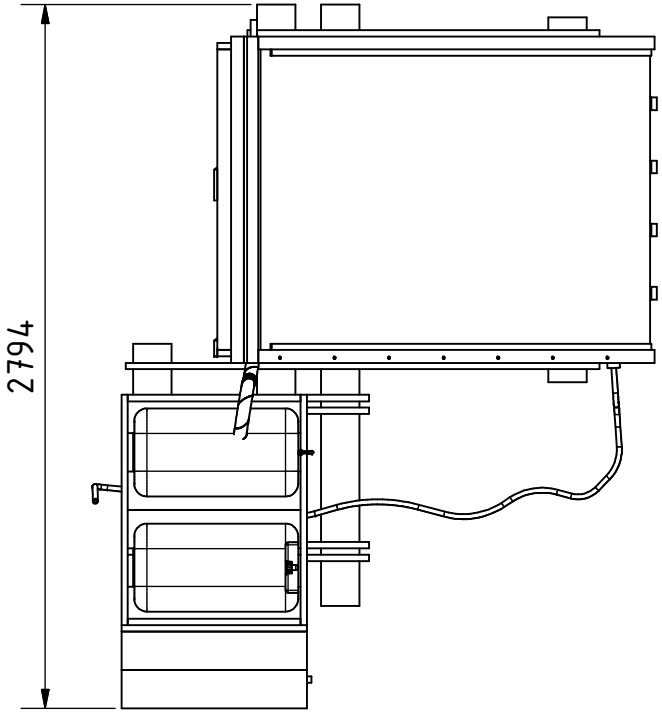


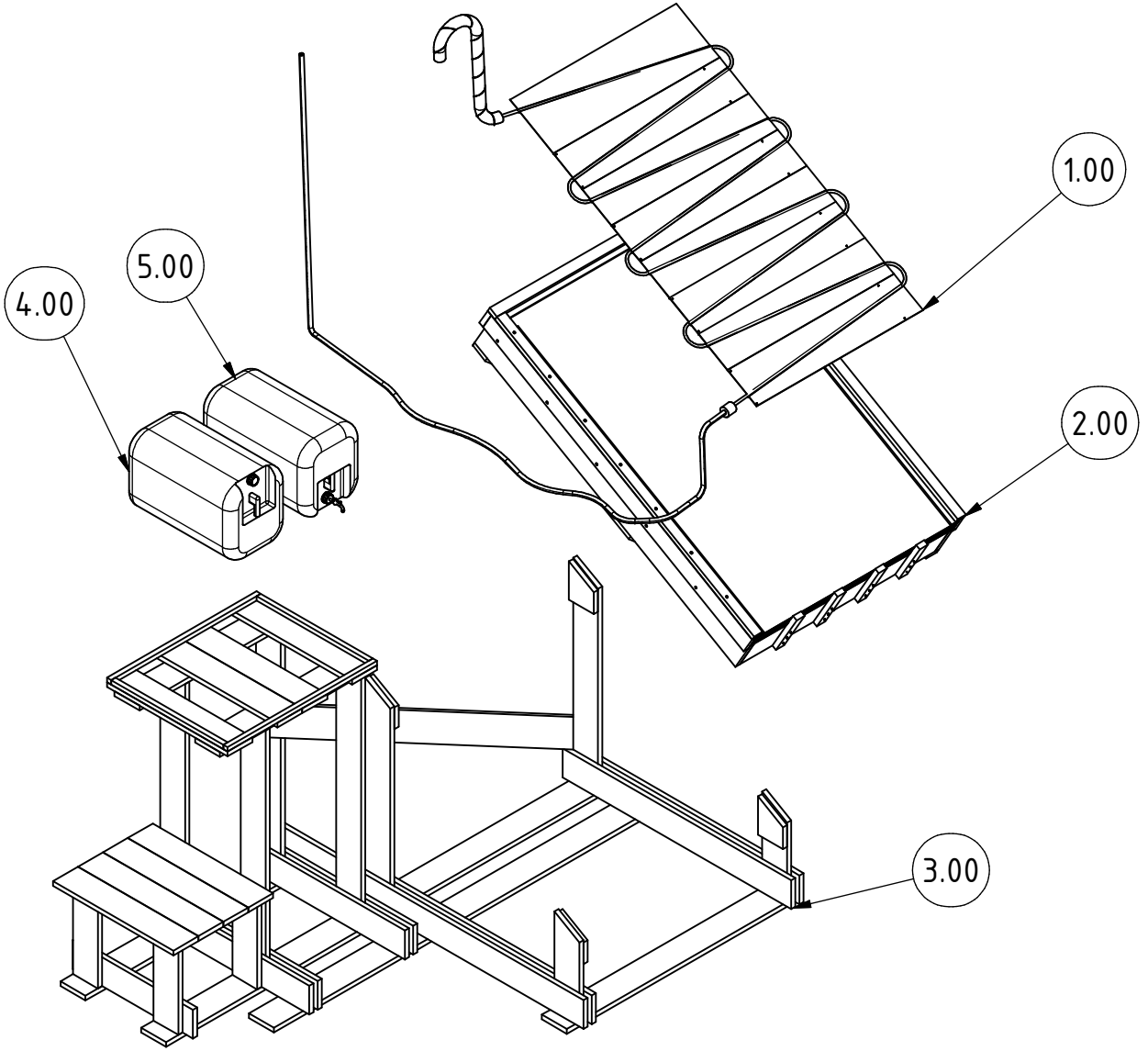
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
3D Views				A1
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	0_Anlage.iam		1
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Assembly / 2 : 35	1 /24







PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
3D Views				A1
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	0_Anlage.iam		1
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Assembly / 1 : 30	2 /24



PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Exploded 3D views				A2
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	0_Anlage.ipn		1
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Assembly / 1 : 30	3 /24

PARTS LIST

POS	QTY	PART NAME	FINE MANE	PART TYPE	SPECIFICATIONS	SHEET
A1	1	3D Views	0_Anlage.iam			1
A1	1	3D Views				2
A2	1	Exploded 3D views	0_Anlage.ipn			3
B1		Parts list				4
B2		Parts list				5
B3		Parts list				6
C1		Technical notes				7
C2		Technical notes				8
C3		Technical notes				9
1.00	1	Absorber	4.0_Absorber.ipn			10
1.00	1	Absorber				11
1.01	1	Pipe	3.ipt	Production	Pipe, OD 1/2", thickness 1mm, Flexible copper	12
1.02		Technical notes	2.3.ipt			13
1.03	4	Metal sheet2	2.2.ipt	Production	Metal sheet, thickness 0.6-1mm, aluminium/copper, 925x230mm	14
1.04	1	Metal sheet3	2.1.ipt	Production	Metal sheet, thickness 0.6-1mm, aluminium/copper, 980x335mm	15
1.05	1	Hose	7.4.ipt	Buy	Flexible drinking water hose, ID 1/2", L 3-4m	
1.06	1	Riser insulation	6.8.ipt	Buy	Insulation layer, thicknesss 50mm, glass wool or hemp mat, 850x350mm	
1.07	1	Technical notes	6.9.ipt	Buy	Insulation layer, thicknesss 50mm, glass wool or hemp mat, 350x90mm	
2.00	1	Absorber & Wooden box	6.0_Halter.ipn		Joined with 2" and 3" nails and 2" wood screw (pre-drilled)	16
2.00	1	Absorber & Wooden box				17
2.01	1	Glass pane1	6.5.ipt	Buy	Glass, thickness 5mm, 1830x1220mm	
2.02	2	Glass pane2	6.5b.ipt	Buy	Glass, thickness 5mm, 1220x460mm	
2.03	1	Bottom insulation	6.6.ipt	Buy	Insulation layer, thicknesss 10mm, glass wool or hemp mat, 3480x1190mm	
2.04	2	Wooden box board1	Part58.ipt	Production	Timber 178*25*1842mm, hard wood	
2.05	2	Wooden box board2	1.2.ipt	Production	Timber 178*25*1194mm, hard wood	

PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Parts list				B1
DEVELOPED BY	REDESIGNED BY		FILE NAME	QUANTITY
IOG - Engineers Without Borders	OHO e.V.			
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Parts list	4 /24

PARTS LIST

POS	QTY	PART NAME	FINE MANE	PART TYPE	SPECIFICATIONS	SHEET
2.06	4	Wooden box board3	Part66.ipt	Production	Timber 51*25*254mm, hard wood	
2.07	1	Glass cover board1	6.2.ipt	Production	Timber 51*25*1295mm, hard wood	
2.08	2	Glass cover board2	6.19-2.ipt	Production	Timber 51*25*1816mm, hard wood	
2.09	6	Glass damping strip1	6.11-Side.ipt	Buy	Insulation layer, thicknesss 10mm, glass wool or hemp mat, 51*1740mm	
2.10	5	Glass damping strip2	6.11-Top.ipt	Buy	Insulation layer, thicknesss 10mm, glass wool or hemp mat, 51*1245mm	
2.11	2	Glass cover board3	6.4.ipt	Production	Timber 102*25*1842mm, hard wood	
2.12	1	Glass cover board4	6.3.ipt	Production	Timber 102*25*1295mm, hard wood	
2.13	2	Damping frame board1	6.18.ipt	Production	Timber 25*25*1740mm, hard wood	
2.14	2	Damping frame board2	6.1.ipt	Production	Timber 51*25*1245mm, hard wood	
2.15	2	Glass damping strip3	6.10-Top.ipt	Buy	Insulation layer, thicknesss 10mm, glass wool or hemp mat, 25*1195mm	
2.16	2	Glass damping strip4	6.10-Side.ipt	Buy	Insulation layer, thicknesss 10mm, glass wool or hemp mat, 25*1842mm	
2.17	2	Damping frame board3	6.7-Top.ipt	Production	Timber 51*25*1144mm, hard wood	
2.18	2	Damping frame board4	6.7-Side.ipt	Production	Timber 51*25*1791mm, hard wood	
2.19	1	Wooden box board4	1.3-1.ipt	Production	Timber 102*25*1107mm, hard wood	18
2.20	2	Wooden box board5	1.4.ipt	Production		19
3.00	1	Rack	Structure.ipn		Joined with 2" nails	20
3.00	1	Rack				21
3.01	1	Rack board1	5.4.ipt	Production	Timber 152*25*2794mm, hard wood	
3.02	1	Rack board2	5.7.ipt	Production	Timber 152*25*2388mm, hard wood	
3.03	2	Rack board3	5.3-1.ipt	Production	Timber 152*25*1448mm, hard wood	
3.04	1	Rack board4	5.2.ipt	Production	Timber 152*25*1880mm, hard wood	
3.05	2	Rack board5	5.10.ipt	Production	Timber 152*25*1168mm, hard wood	22
3.06	2	Rack board6	5.9.ipt	Production	Timber 152*25*508mm, hard wood	23
3.07	4	Rack board7	5.8-4.ipt	Production	Timber 152*25*203mm, hard wood	24
3.08	1	Rack board8	5.17.ipt	Production	Timber 152*25*2322mm, hard wood	
3.09	4	Rack board9	5.5-4.ipt	Production	Timber 152*25*965mm, hard wood	
3.10	4	Rack board10	5.11-1.ipt	Production	Timber 152*25*1346mm, hard wood	

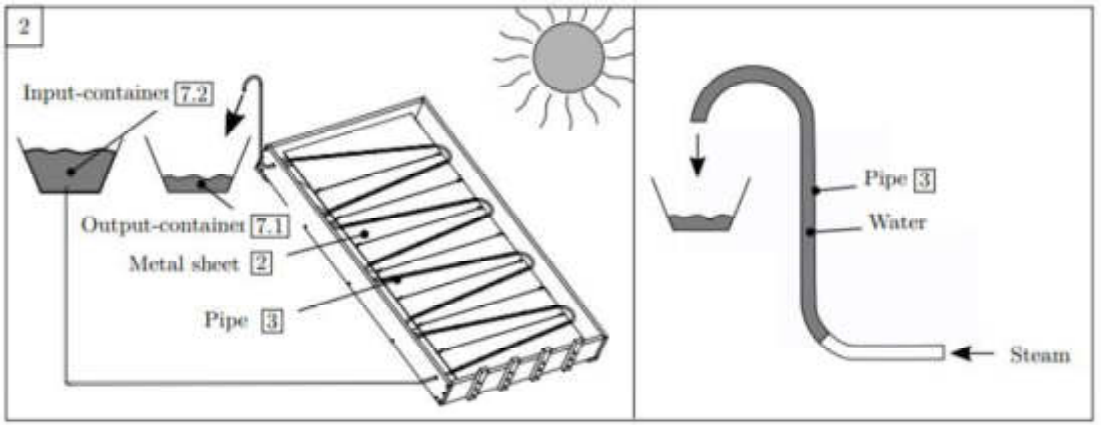
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Parts list				B2
DEVELOPED BY	REDESIGNED BY		FILE NAME	QUANTITY
IOG - Engineers Without Borders	OHO e.V.			
		LICENSE	DOC. TYPE	SCALE / SHEET
		CC-BY-SA 4.0	Parts list	5 /24

PARTS LIST

POS	QTY	PART NAME	FINE MANE	PART TYPE	SPECIFICATIONS	SHEET
3.11	2	Rack board11	5.14-2.ipt	Production	Timber 152*25*914mm, hard wood	
3.12	9	Rack board12	5.6-6.ipt	Production	Timber 152*25*737mm, hard wood	
3.13	2	Rack rail1	5.15-1.ipt	Production	Timber 24*25*914mm, hard wood	
3.14	2	Rack rail2	5.16-2.ipt	Production	Timber 24*25*686mm, hard wood	
3.15	4	Rack board13	5.12-3.ipt	Production	Timber 152*25*457mm, hard wood	
3.16	2	Rack board14	5.13-2.ipt	Production	Timber 152*25*559mm, hard wood	
4.00	1	Output container	7.2.ipt	Buy	Plastic vessel, capacity 60L, square section, with lid	
5.00	1	Input container	7.1.ipt	Buy	Plastic vessel, capacity 60L, square section, with lid, include a 1/2" valve embeeded on the lid	

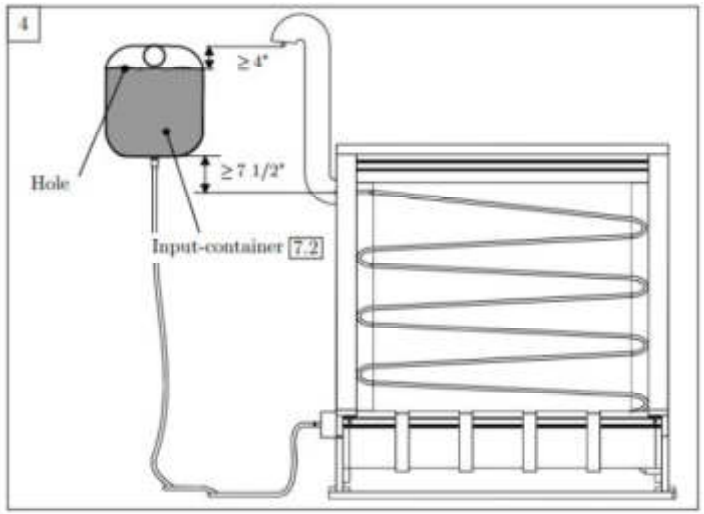
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Parts list				B3
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.			
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Parts list	6 /24

TECHNICL NOTES

NOTES	CONTENT
How the system works	- The water flows from the input-container 7.2 into the pipe 3 . The sun heats up the metal sheets 2 and the water in the pipe. When the water is hot enough, it starts boiling and pathogens are killed. To isolate the front-side, two glass panes are placed on top of the pipe (this is not shown in the picture). - When water boils, steam is produced. The steam needs much more room than the liquid water. Thus, the steam pushes some of the heated water out of the pipe into the output-container. Afterwards the boiled water flows out of the outlet and is collected in the output-container 7.1 - After enough water has flown out of the system cold, untreated water from inside of the input-container can pour in and the process restarts. 
Considerations	- The pipe has to stick tight on the metal sheets. - Glass panes on top of the absorber: - There must be two glass panes. -Do not replace glass with foil or acrylic glass! - Wooden box has to be well insulated. - No water and only a bit of air should get inside

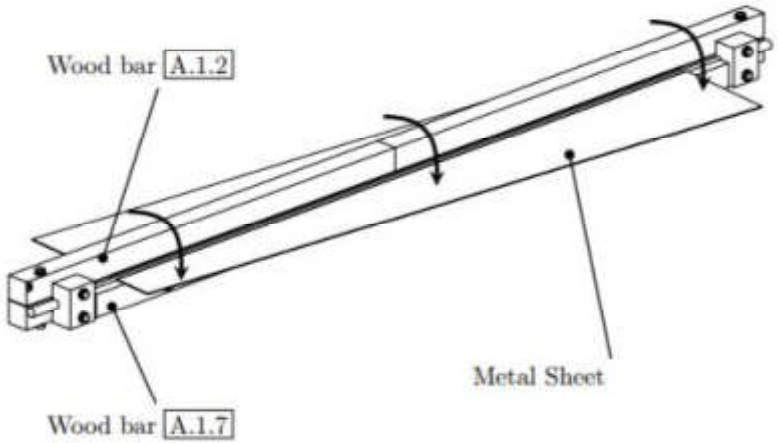
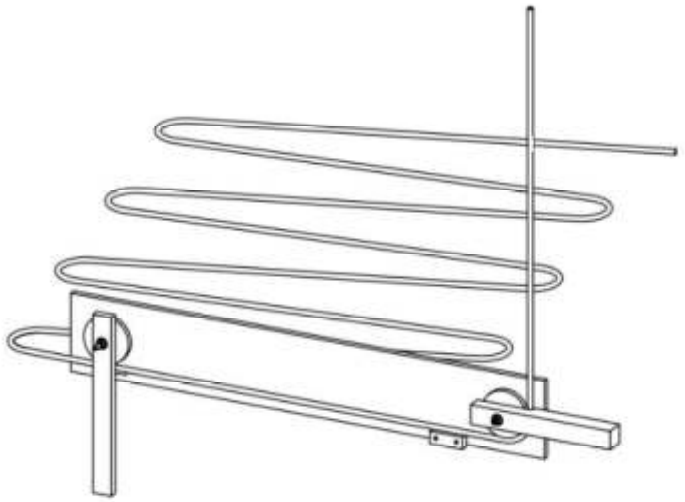
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Technical notes				C1
DEVELOPED BY	REDESIGNED BY		FILE NAME	QUANTITY
IOG - Engineers Without Borders	OHO e.V.			
		LICENSE: CC-BY-SA 4.0	DOC. TYPE: Technical notes	SCALE	SHEET: 7 /24

TECHNICL NOTES

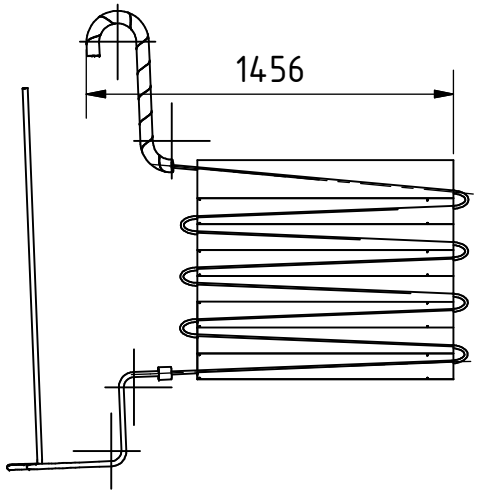
NOTES	CONTENT
Installation heights	- The input-container 7.2 has to be on the correct height (see picture below) - At least 4" between water-level (input-container) and the outlet - < 4" : Untreated water will leave the system. Make sure to drill a hole into the input-container at that height! - Much more than 4" : The system will produce less water. - The difference in height of the bottom of the input-container and the point where the pipe leaves the wooden box has to be 7 1/2". This difference also may not be changed, otherwise the system will not work well either. Please note that the water-level in the input-container 7.2 will fall while the system is running. In order to keep this variation low, the input-container should have a large floor area. 
Insulation	- Insulation material which is resistant up to at least 140◦C. For example glass wool or hemp mat. - Each part can be made out of several smaller parts. - Strips in contact with glass are attached to these in order to absorb shocks and to prevent it from breaking. The material needs to be very soft. If it is soft enough, you can use the insulation material

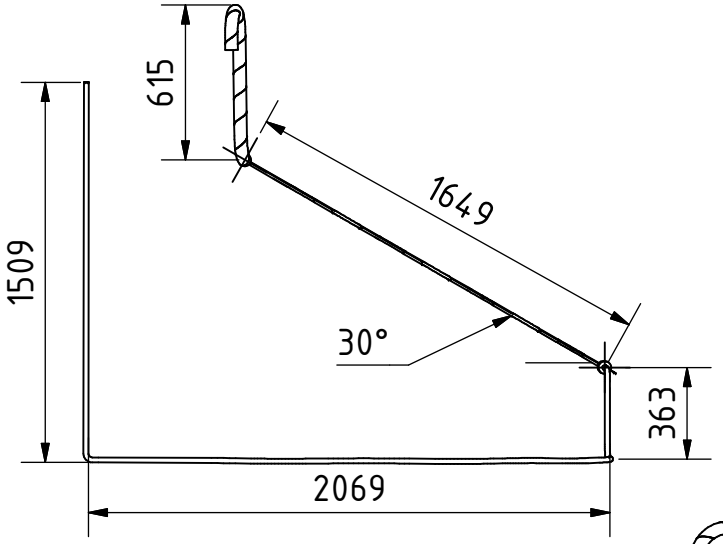
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Technical notes				C2
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	LICENSE: CC-BY-SA 4.0	DOC. TYPE: Technical notes / SCALE	SHEET: 8 /24

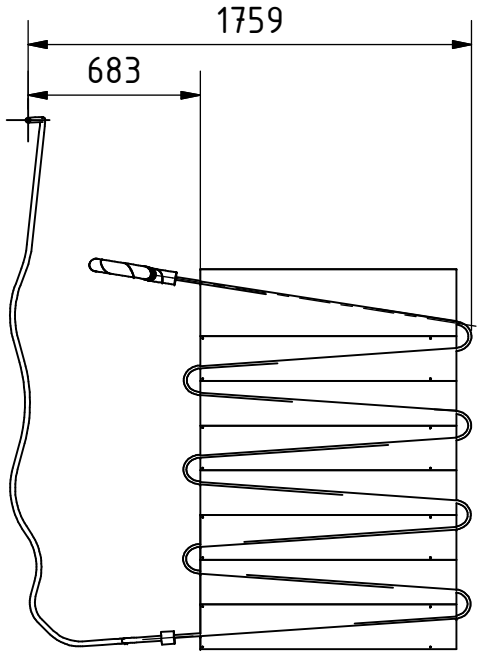
TECHNICL NOTES

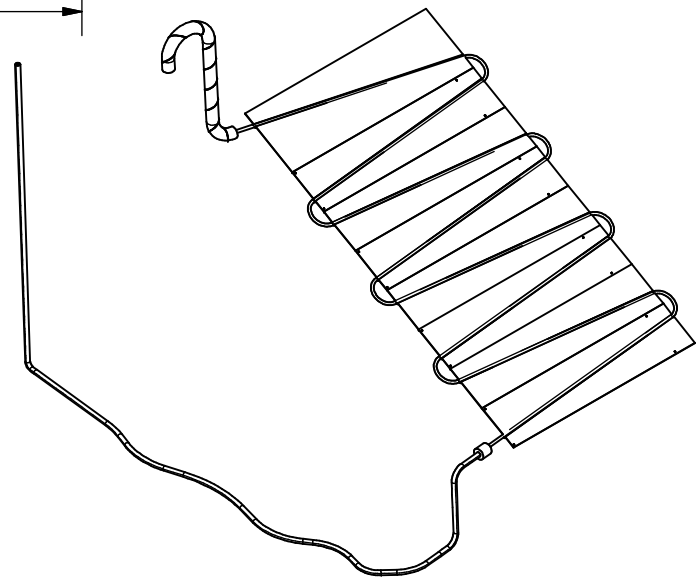
NOTES	CONTENT
Metal Bending Tools	Instructions can be found in the documentation on building a Metal Sheet Bending Tool and a Pipe-Bending Tool. In case you do not have the tools for metal bending.  
Building the rack	- You will need at least two people and an area of at least 53.82 ft2. - The rack has to stand on even ground. If you do not have even ground, use bricks or wood to level the rack. - The rack is designed for two 60 liter containers with the dimensions 65 cm x 35 cm x 40 cm. If you use other containers, you might need to change the design. - All boards and rails are made of wood. You do not have to smooth or sand it. - After every step, check that the angles and distances of the boards have not changed. - You will only need nails. Screws are not necessary. The nails have to be three times as long as the thickness of the material to be nailed down

PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Technical notes				C3
DEVELOPED BY	REDESIGNED BY		FILE NAME	QUANTITY
IOG - Engineers Without Borders	OHO e.V.			
		LICENSE: CC-BY-SA 4.0	DOC. TYPE: Technical notes	SCALE	SHEET: 9 /24

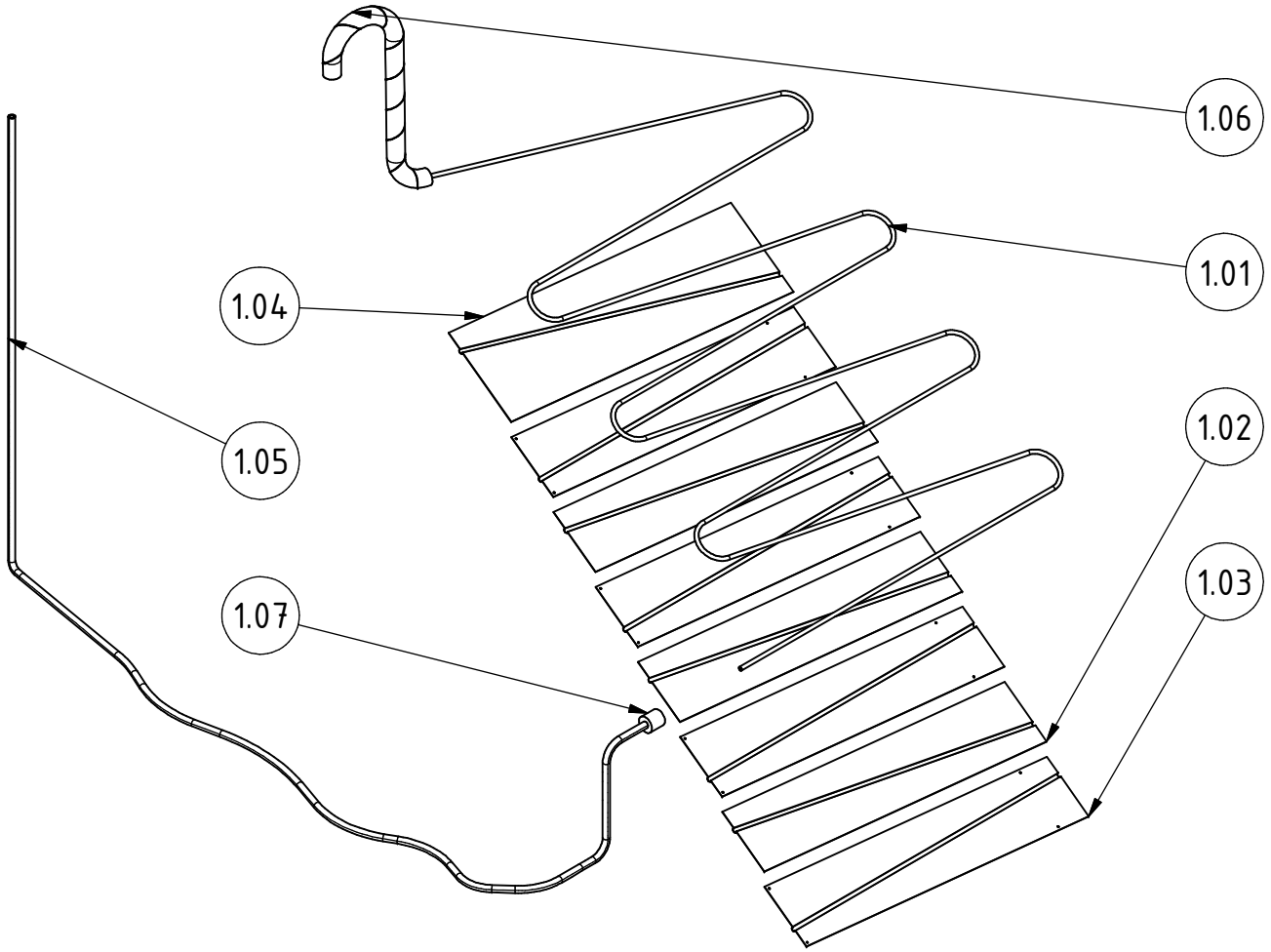




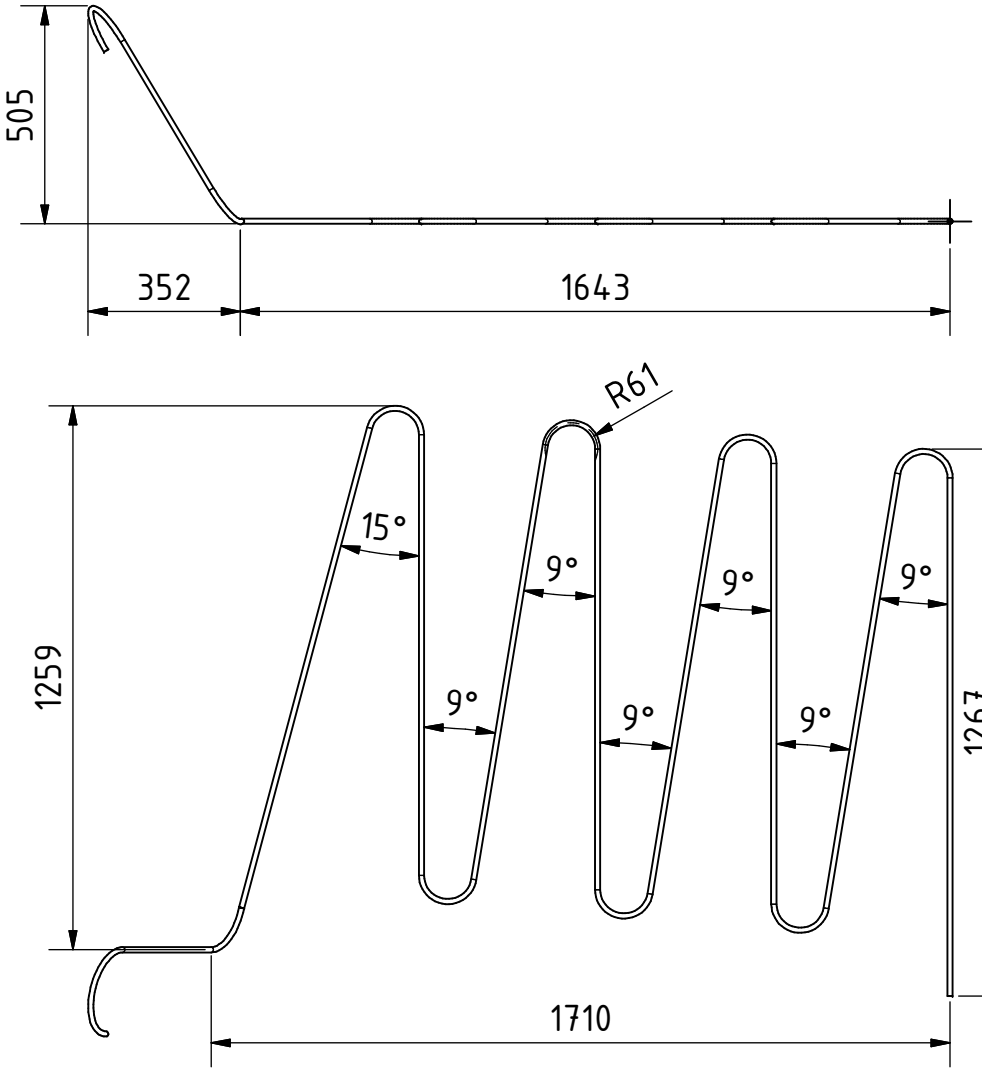


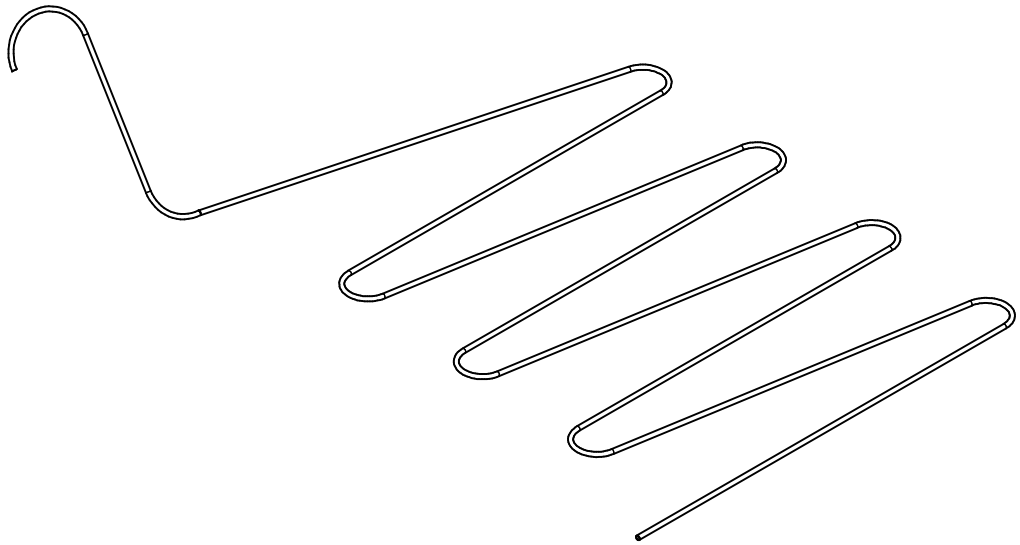


PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Absorber				1.00
DEVELOPED BY	REDESIGNED BY		FILE NAME	QUANTITY
IOG - Engineers Without Borders	OHO e.V.		4.0_Absorber.iam	1
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Assembly / 1 : 30	10 /24

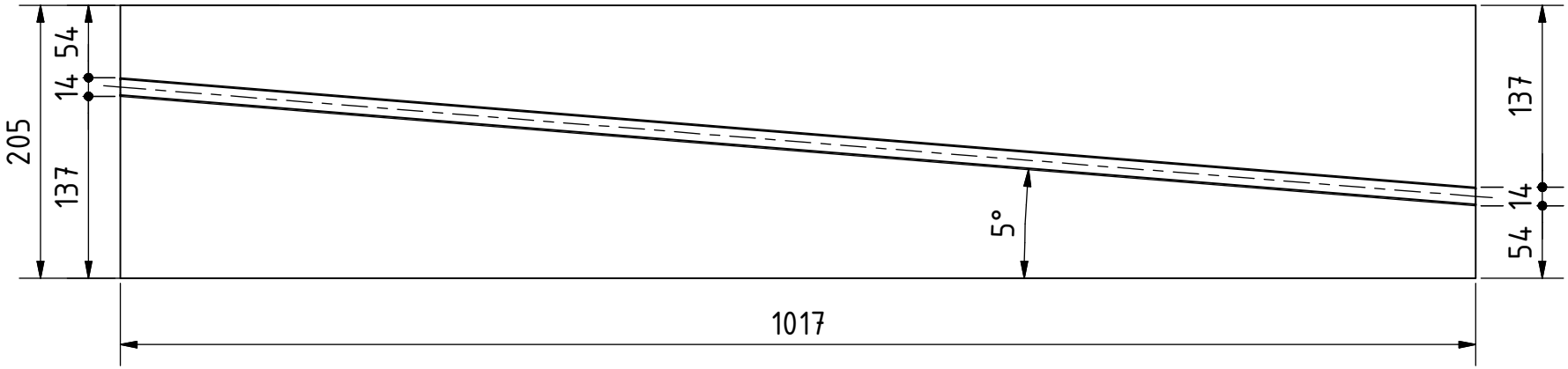


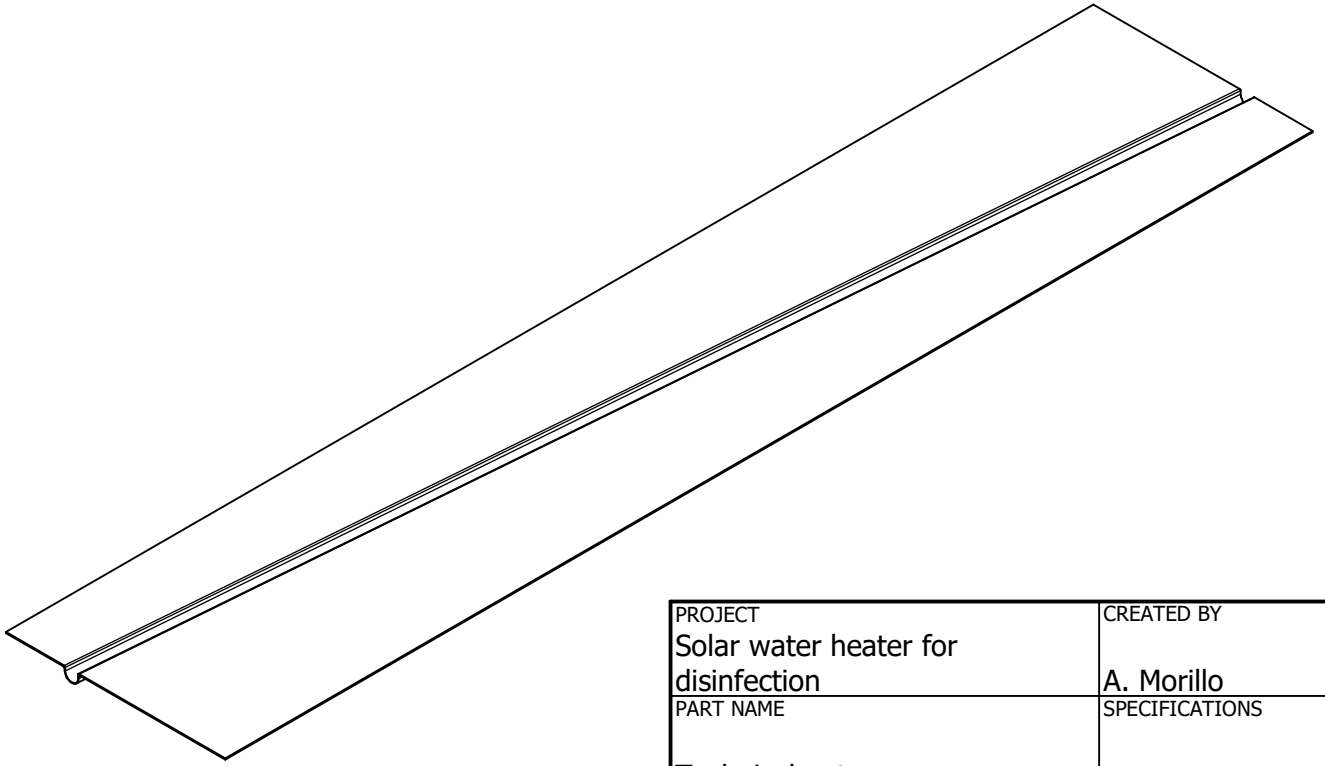
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Absorber				1.00
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	4.0_Absorber.ipn		1
		LICENSE / DOC. TYPE / SCALE		SHEET
		CC-BY-SA 4.0 / Assembly / 1 : 20		11 /24

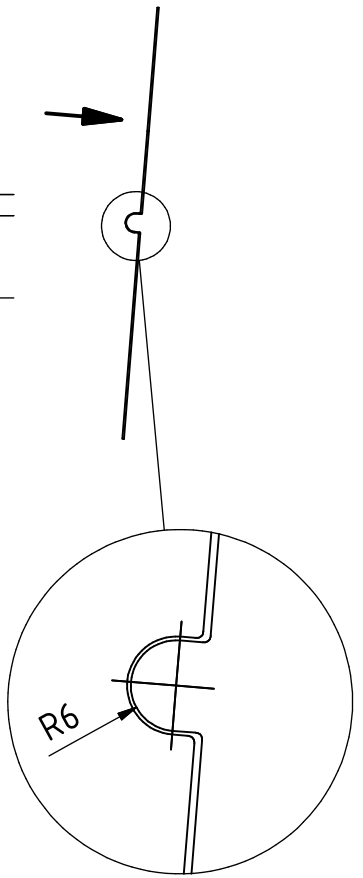




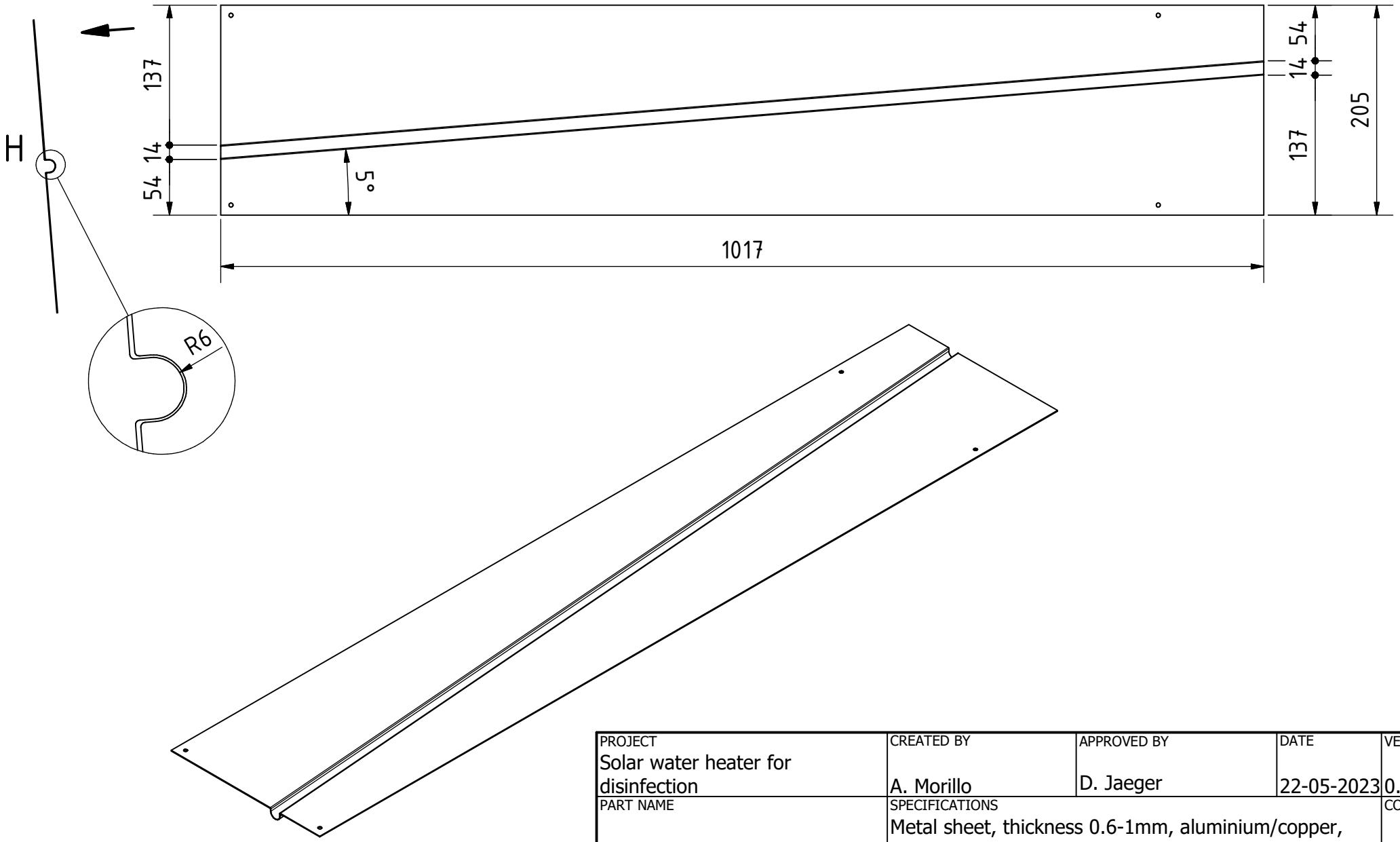
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Pipe	Pipe, OD 1/2", thickness 1mm, Flexible copper			1.01
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	3.ipt		1
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Part / 2 : 35	12 /24



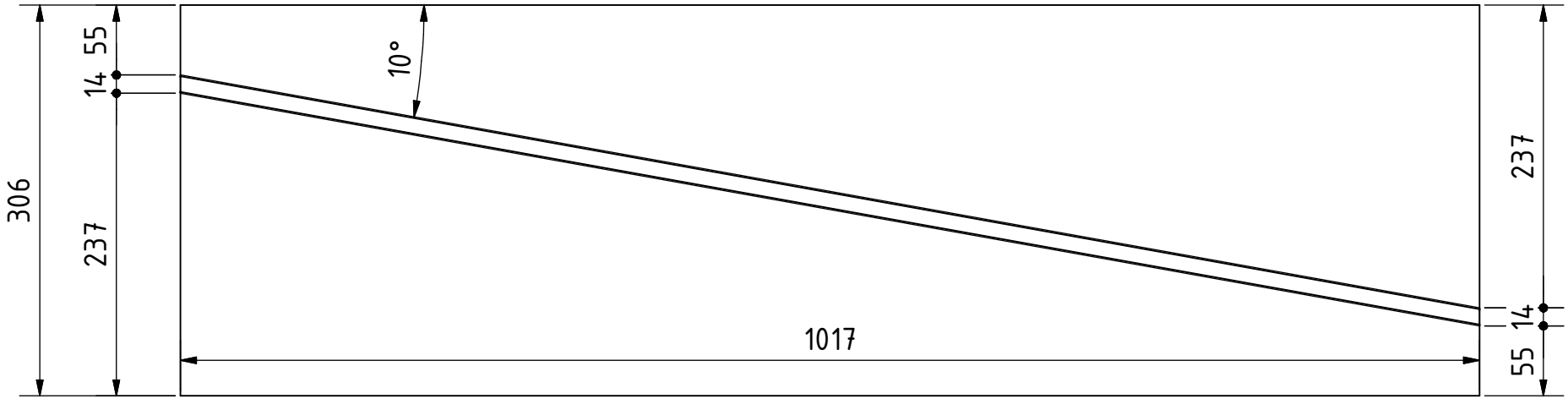


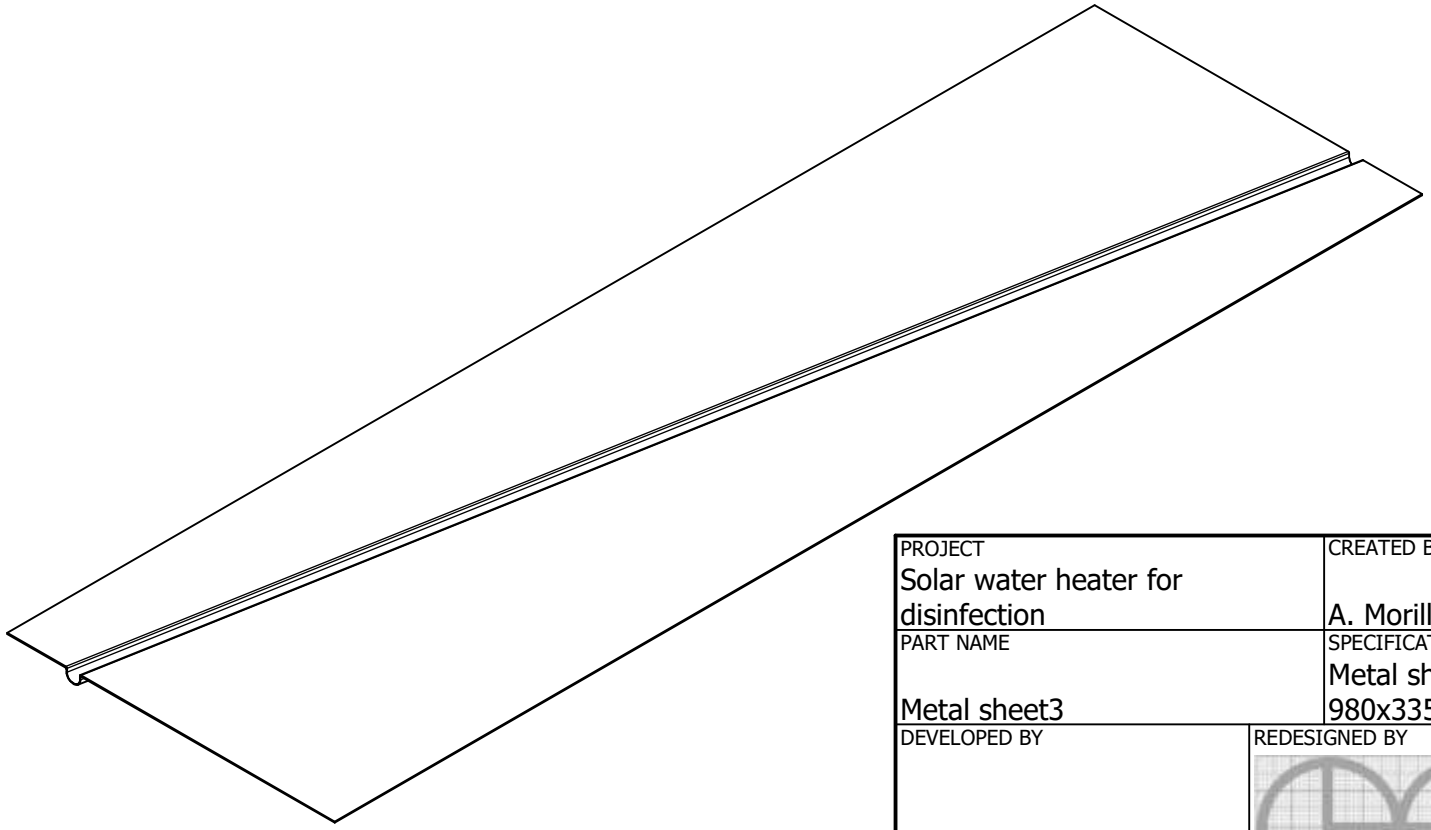


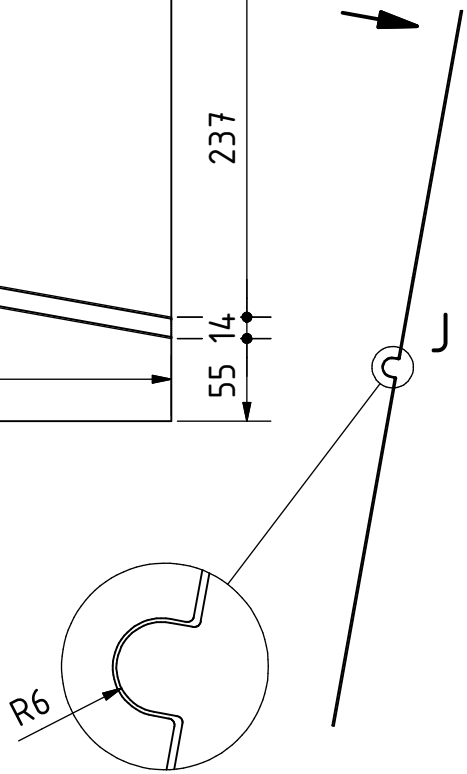
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Technical notes				1.02
DEVELOPED BY	REDESIGNED BY		FILE NAME	QUANTITY
IOG - Engineers Without Borders	OHO e.V.		2.3.ipt	
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Technical notes	13 /24



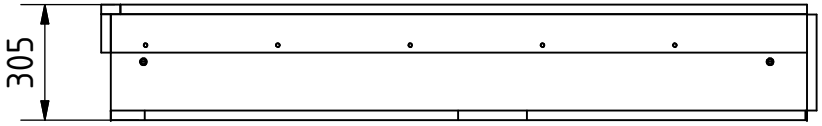
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Metal sheet2	Metal sheet, thickness 0.6-1mm, aluminium/copper, 925x230mm			1.03
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	2.2.ipt		4
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Part / 1 : 5	14 /24

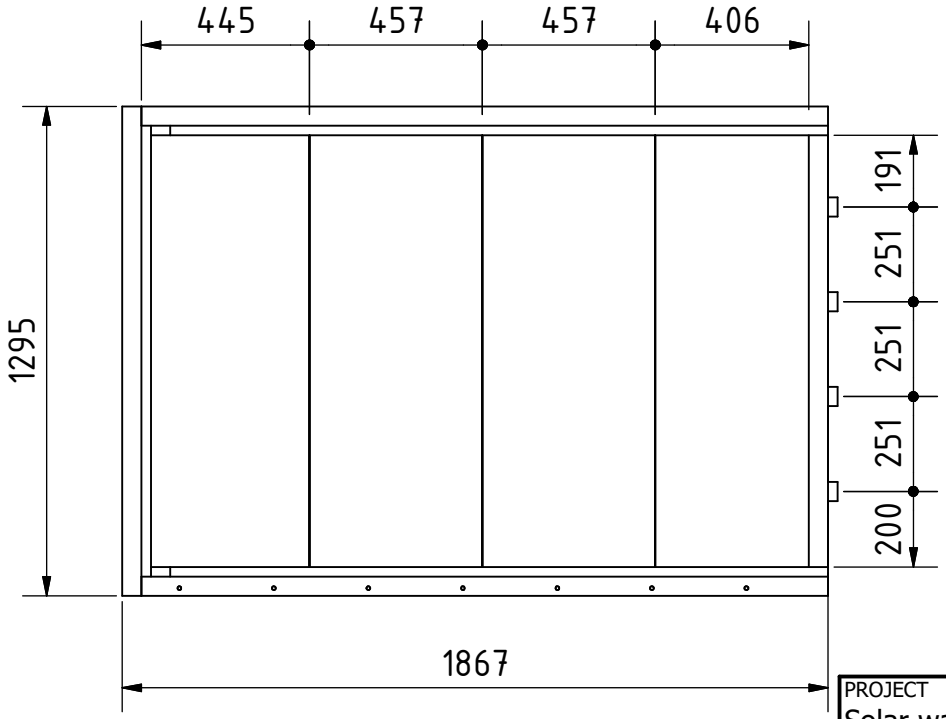


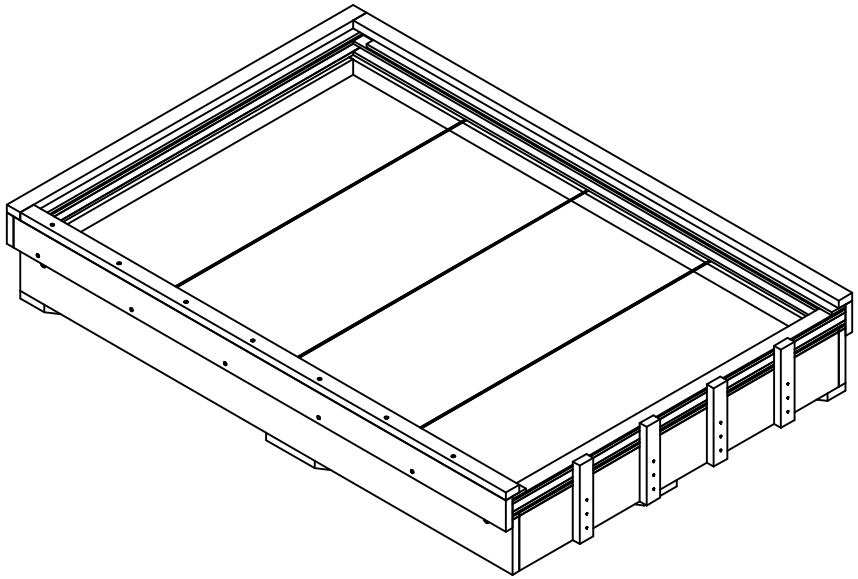




PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Metal sheet3	Metal sheet, thickness 0.6-1mm, aluminium/copper, 980x335mm			1.04
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	2.1.ipt		1
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Part / 1 : 5	15 /24

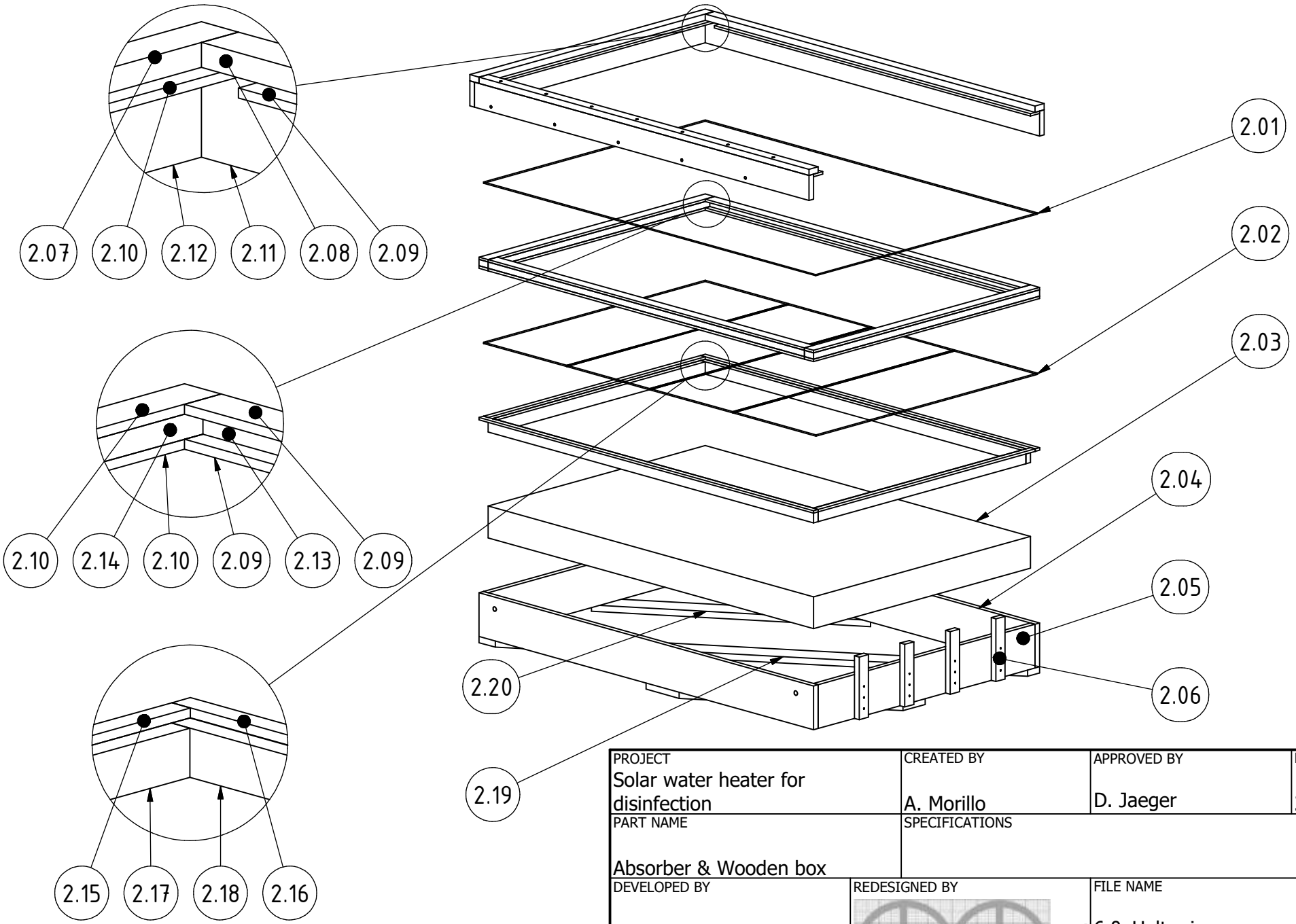




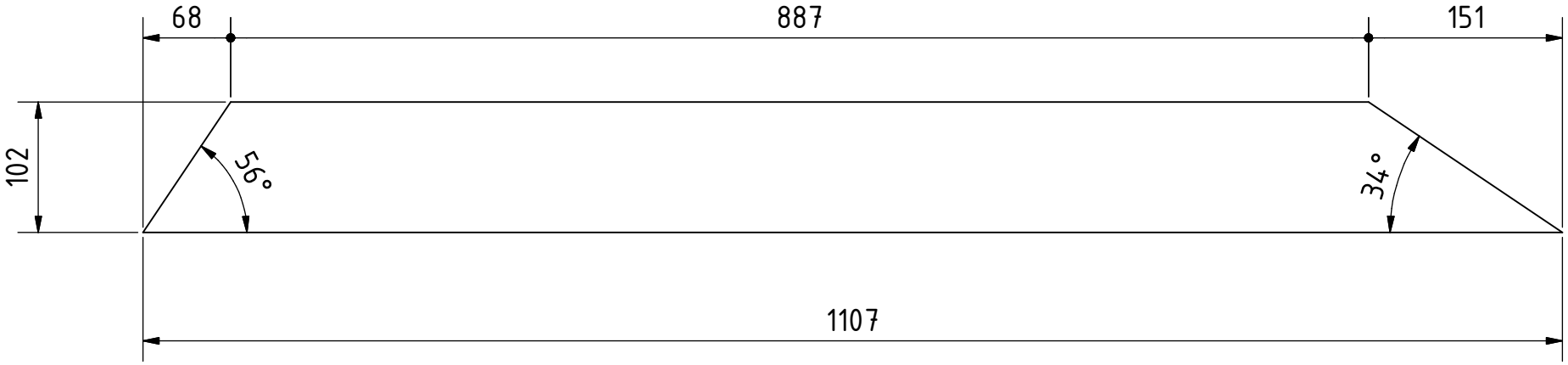


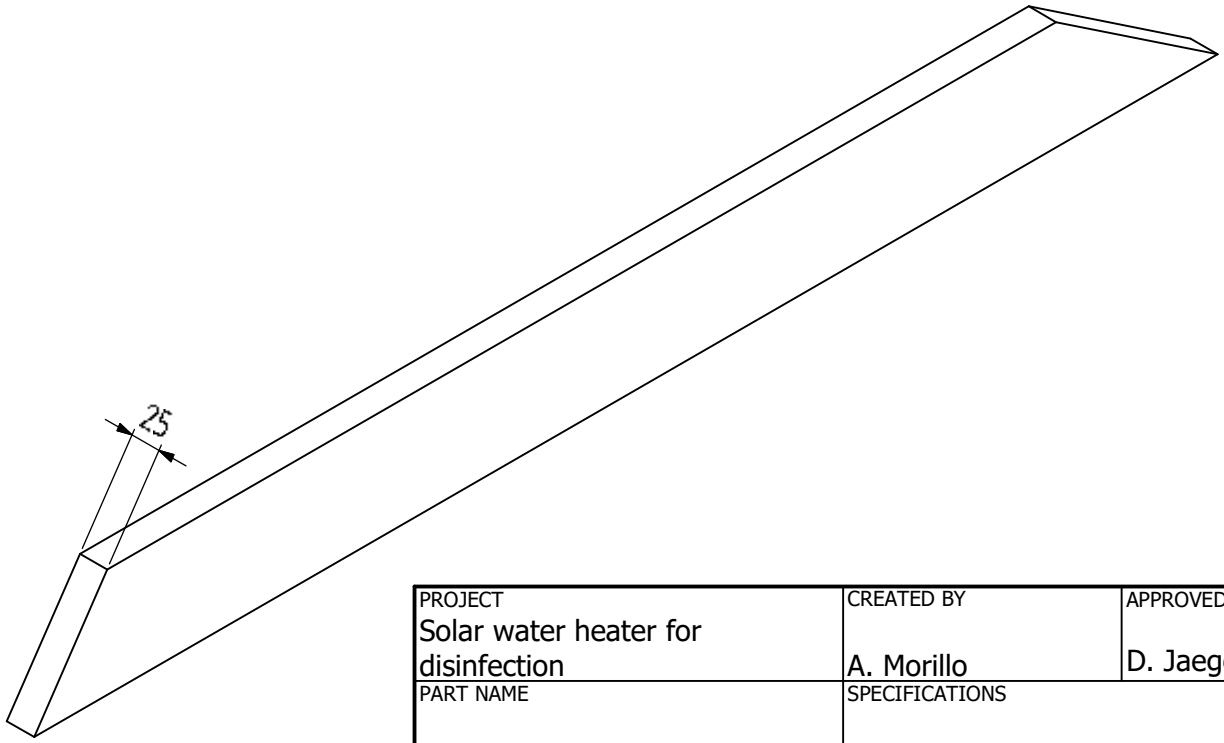
Joined with 2" and 3" nails and 2" wood screw (pre-drilled)

PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Absorber & Wooden box				2.00
DEVELOPED BY	REDESIGNED BY		FILE NAME	QUANTITY
IOG - Engineers Without Borders	OHO e.V.		6.0_Halter.iam	1
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Assembly	16 /24

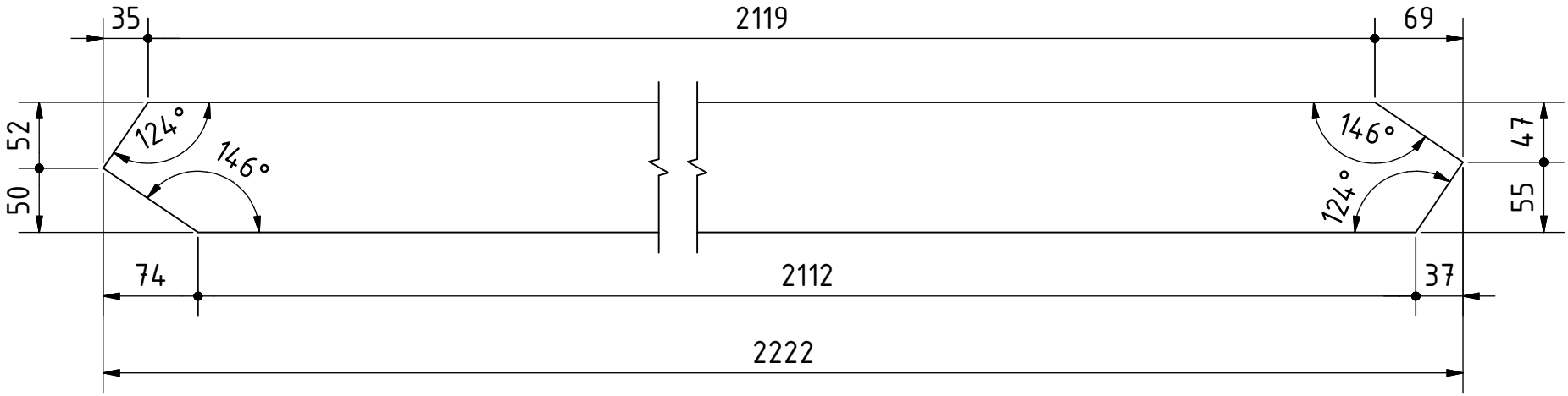


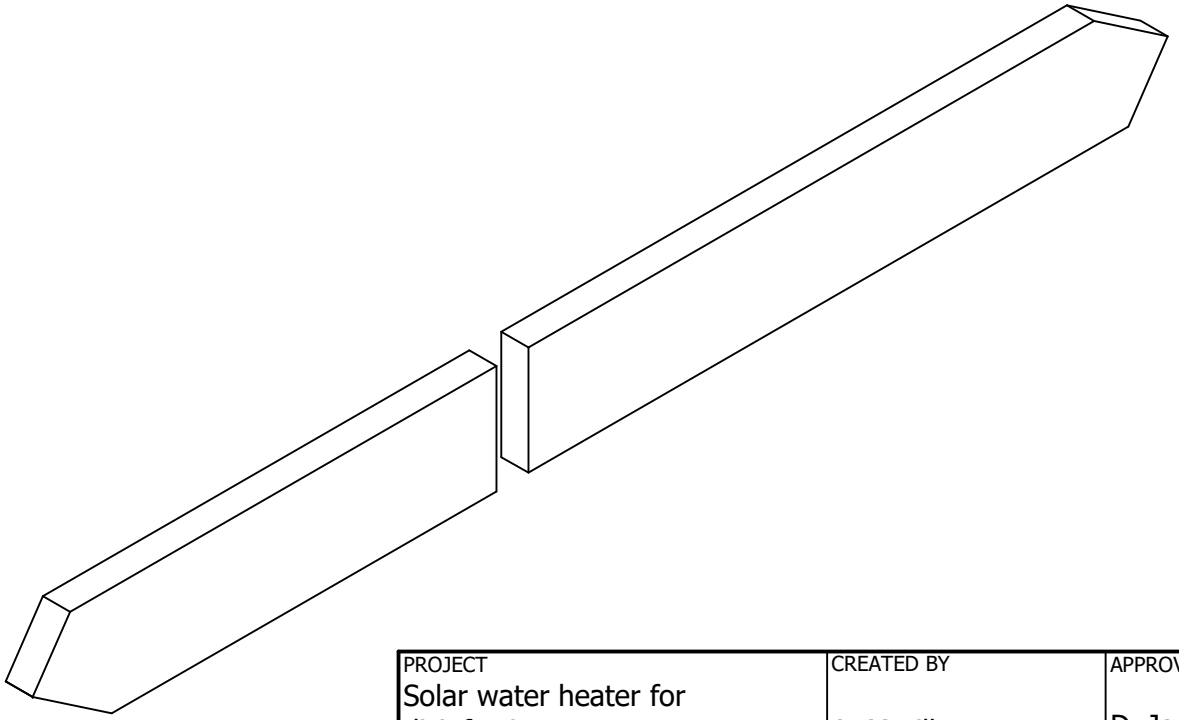
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Absorber & Wooden box				2.00
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	6.0_Halter.ipn		1
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Assembly / 1 : 20	17 /24





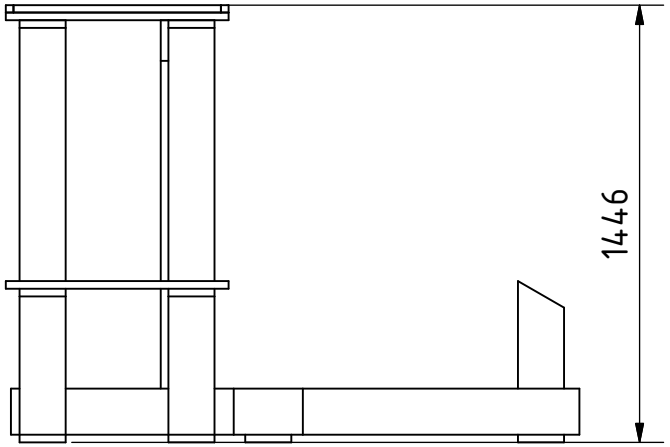
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Wooden box board4	Timber 102*25*1107mm, hard wood			2.19
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	1.3-1.ipt		1
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Part / 1 : 5	18 /24

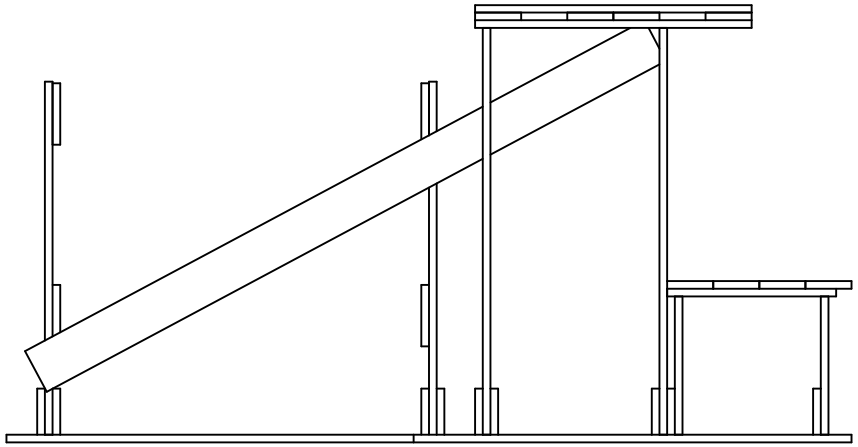


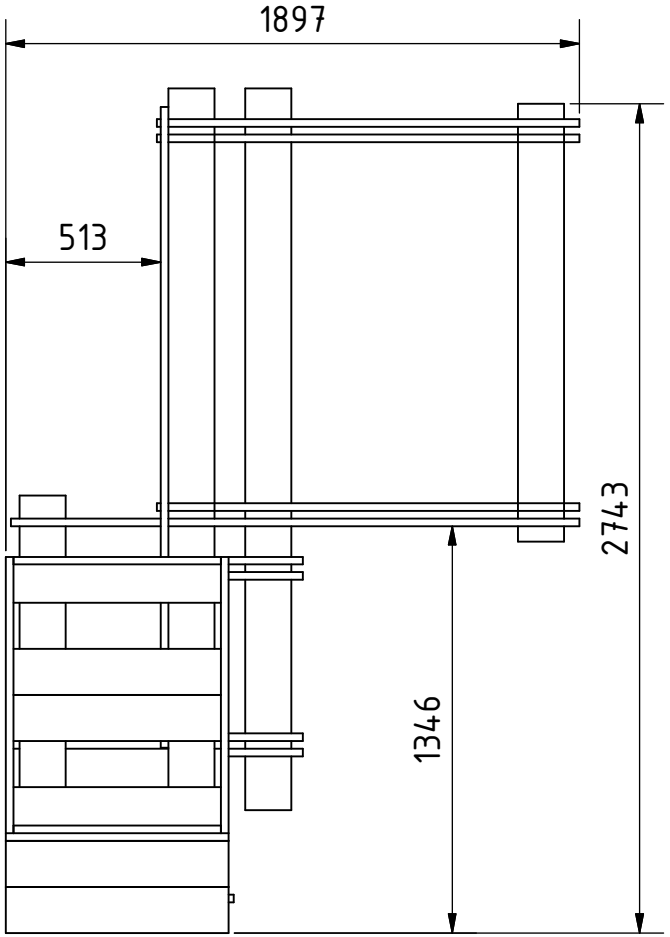


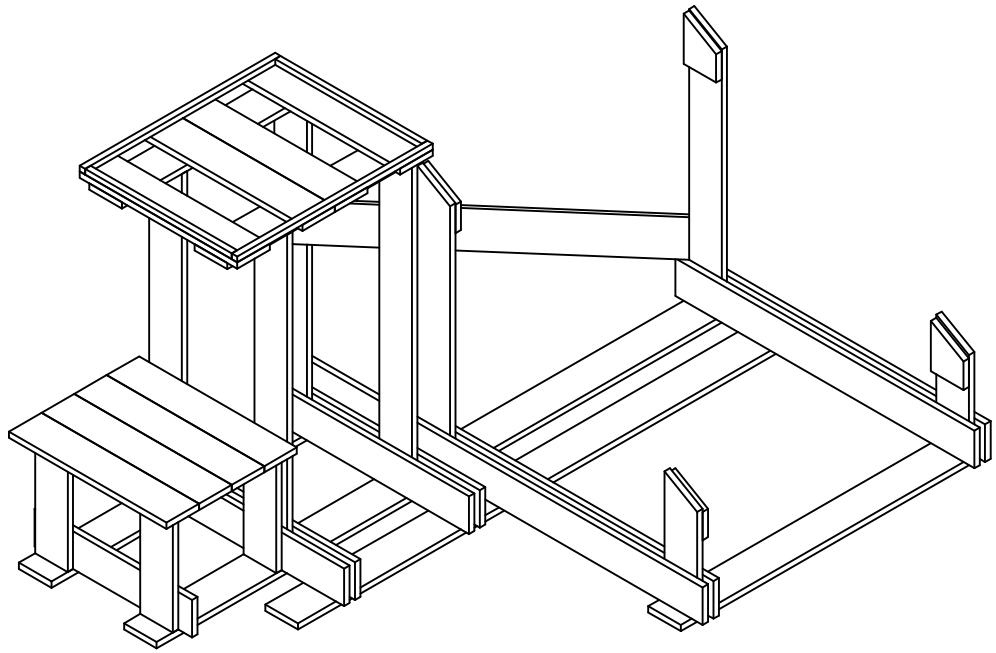
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Wooden box board5				2.20
DEVELOPED BY	REDESIGNED BY		FILE NAME	QUANTITY
IOG - Engineers Without Borders	OHO e.V.		1.4.ipt	2
		LICENSE	DOC. TYPE	SCALE / SHEET
		CC-BY-SA 4.0	Part	1 : 5 / 19 /24

Joined with 2" nails

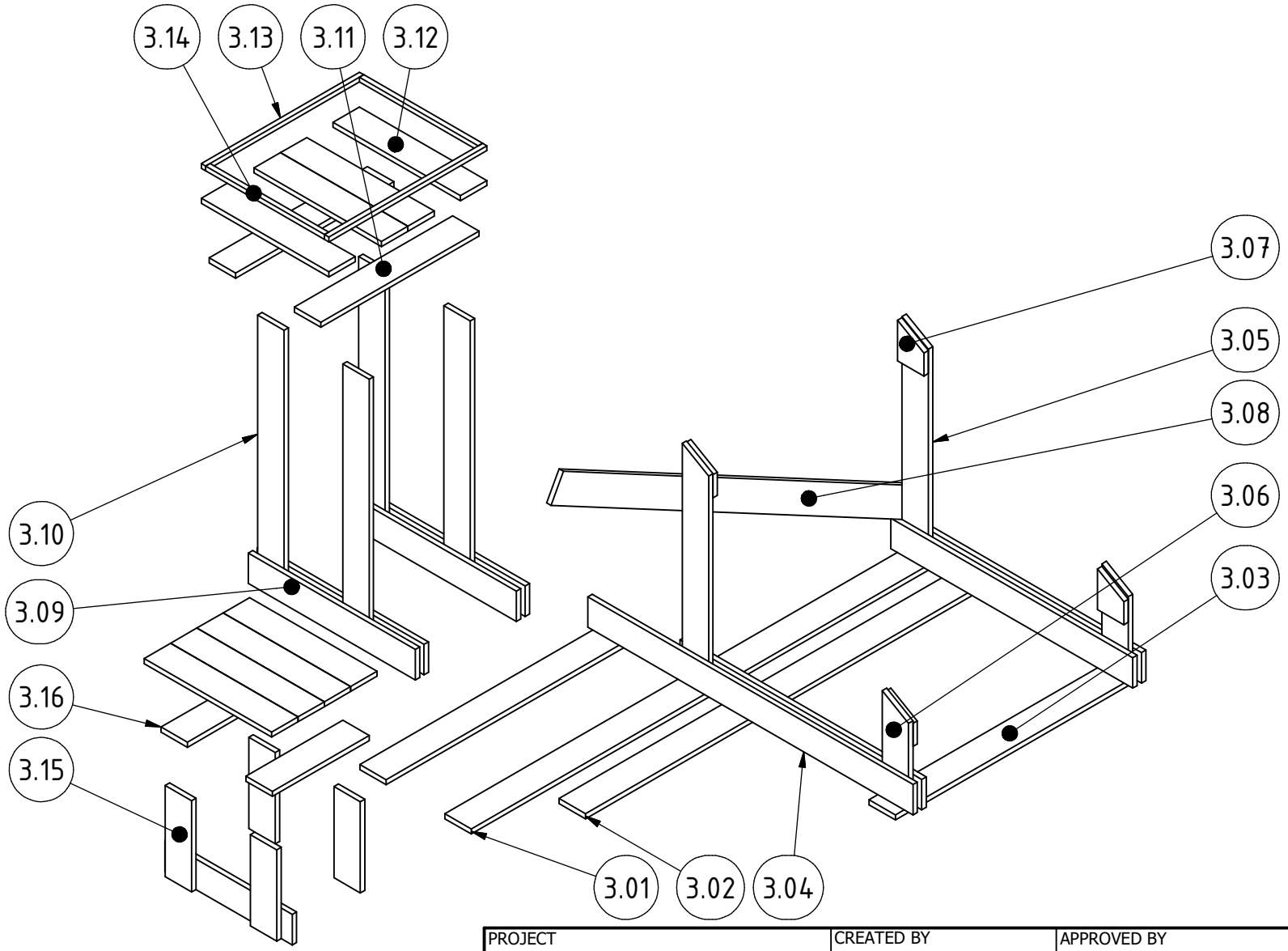




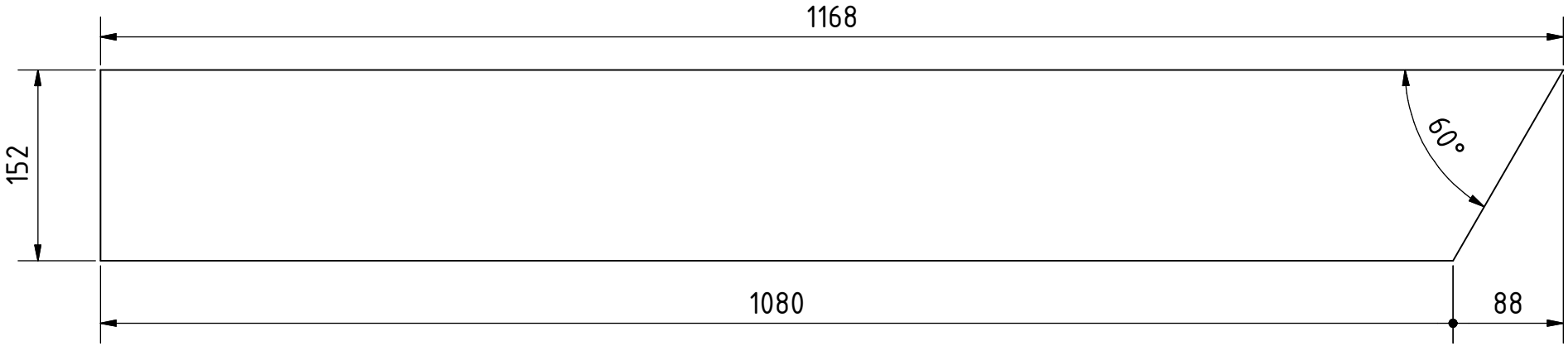


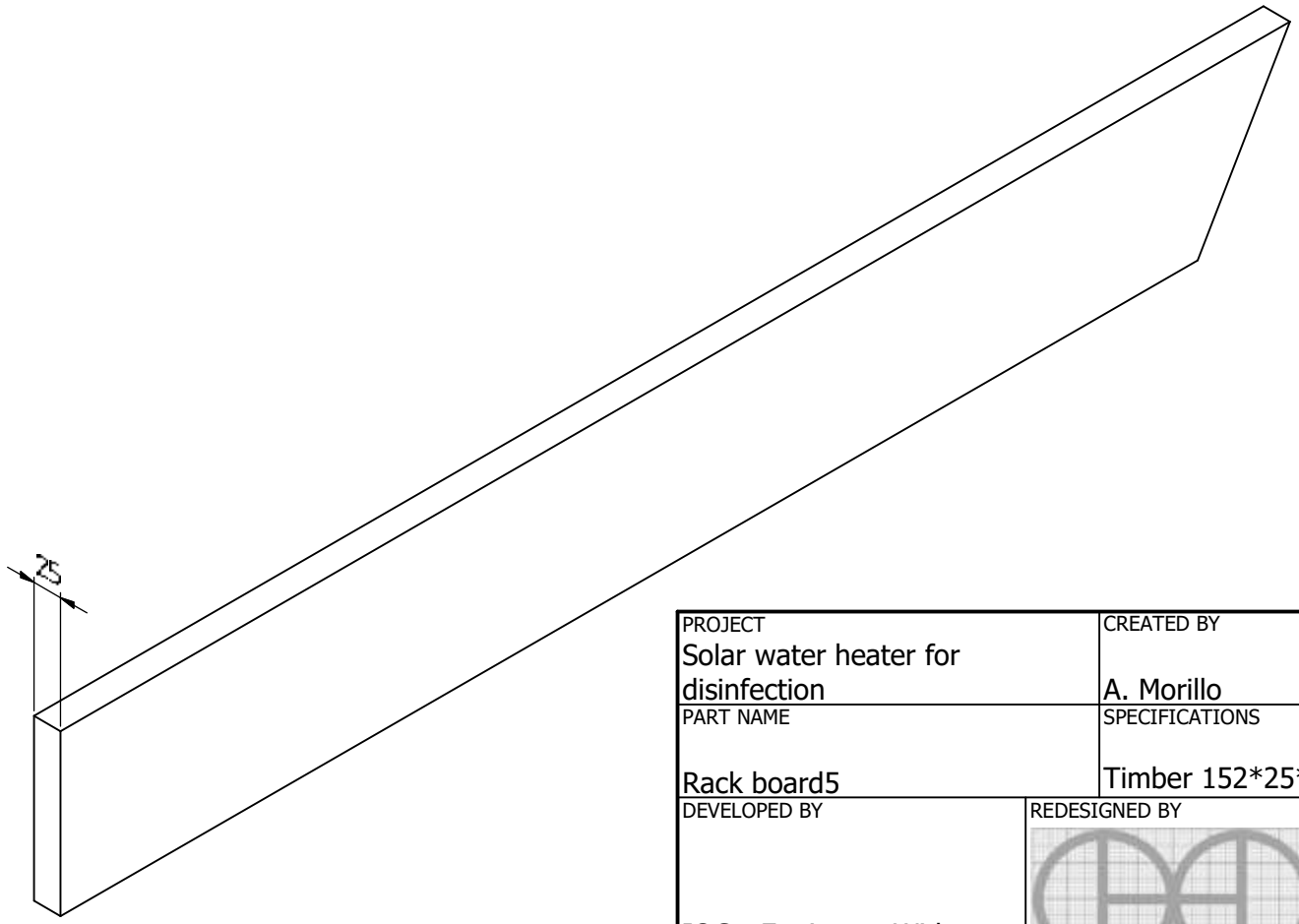


PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Rack				3.00
DEVELOPED BY	REDESIGNED BY		FILE NAME	QUANTITY
IOG - Engineers Without Borders	OHO e.V.		Structure.iam	1
		LICENSE	DOC. TYPE	SCALE / SHEET
		CC-BY-SA 4.0	Assembly	20 /24

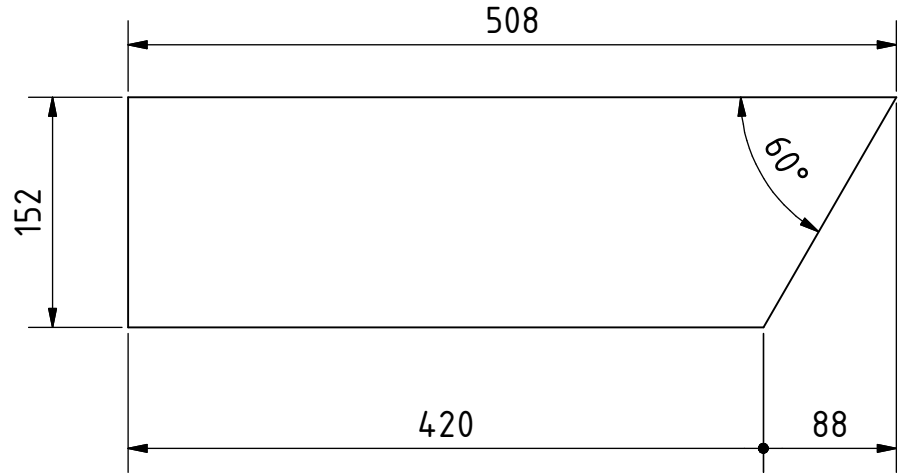


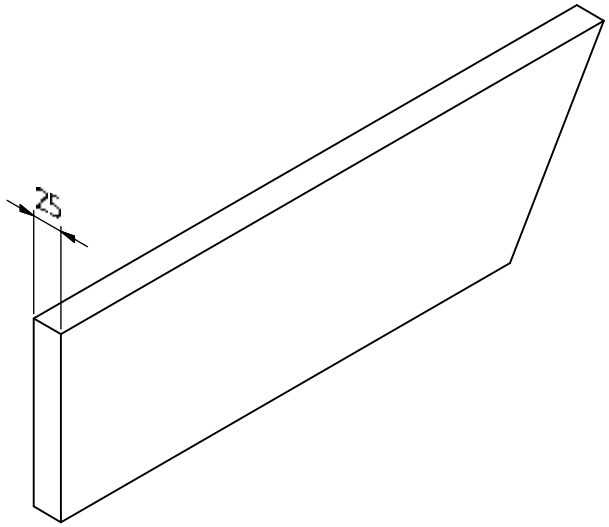
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Rack				3.00
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	Structure.ipn		1
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Assembly / 1 : 25	21 /24



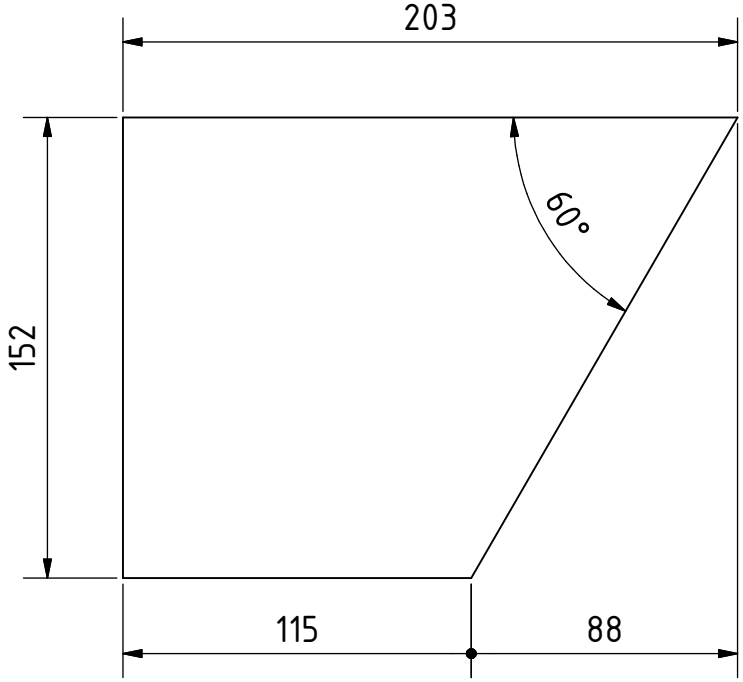


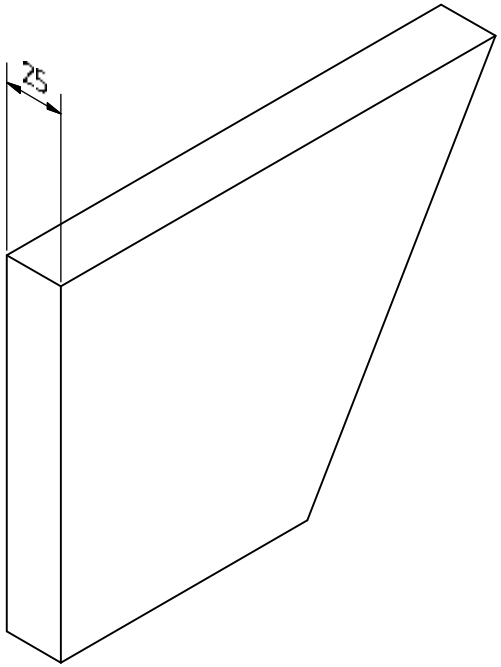
PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Rack board5	Timber 152*25*1168mm, hard wood			3.05
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	5.10.ipt		2
		LICENSE / DOC. TYPE / SCALE		SHEET
		CC-BY-SA 4.0 / Part / 1 : 5		22 /24





PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Rack board6	Timber 152*25*508mm, hard wood			3.06
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	5.9.ipt		2
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Part / 1 : 5	23 /24





PROJECT	CREATED BY	APPROVED BY	DATE	VERSION
Solar water heater for disinfection	A. Morillo	D. Jaeger	22-05-2023	0.01
PART NAME	SPECIFICATIONS			CODE
Rack board7	Timber 152*25*203mm, hard wood			3.07
DEVELOPED BY	REDESIGNED BY	FILE NAME		QUANTITY
IOG - Engineers Without Borders	OHO e.V.	5.8-4.ipt		4
		LICENSE	DOC. TYPE / SCALE	SHEET
		CC-BY-SA 4.0	Part / 2 : 5	24 /24