USES AND APPLICATIONS

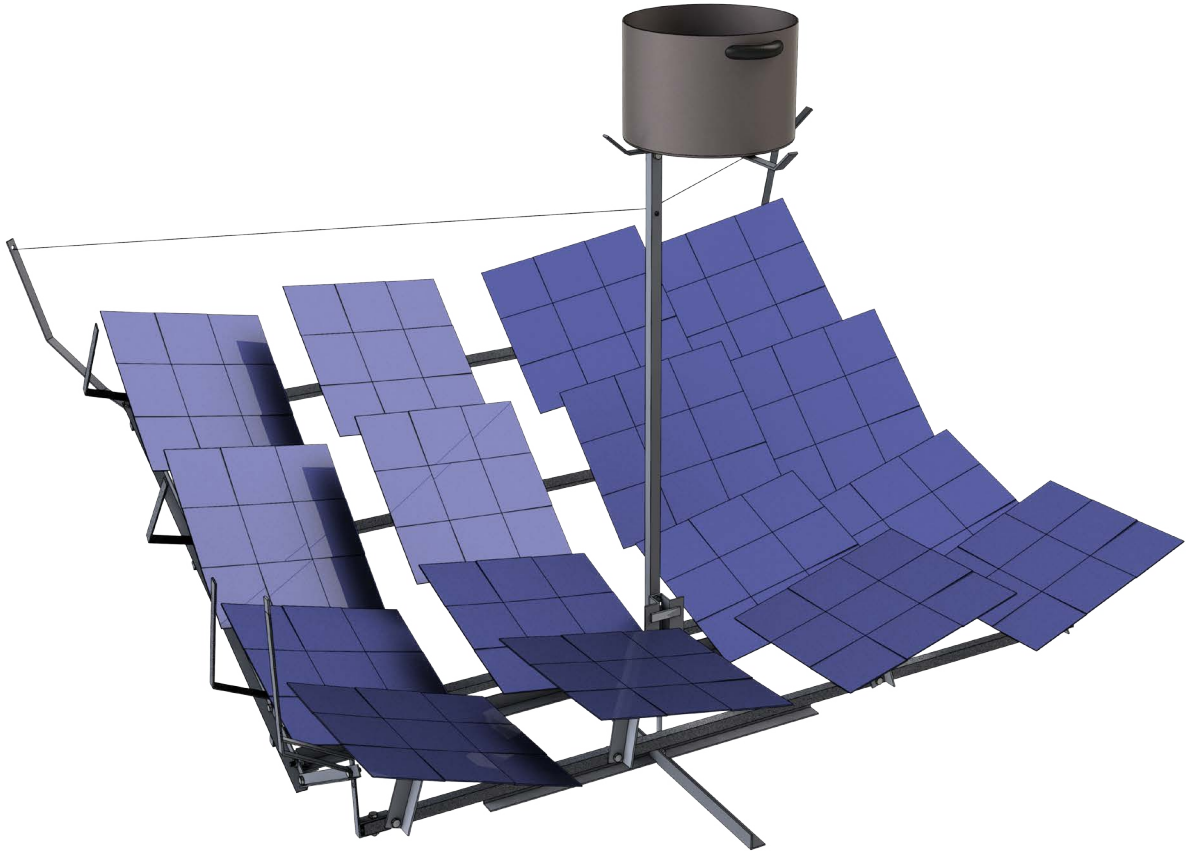
- Cooking
- Frying
- Educational Model
- Demonstrational Unit

TECH SPECS

Power output:	0.5kW
Mirror Surface:	1m^2
Cost:	79 - 145 dollars
Installed size:	1.5m x 1.5m x 1.5m
Build time:	1 week

GoSol.org Construction Guide: Sol1

GUIDE TO BUILDING A SOLAR CONCENTRATOR



Rexel foundation
FOR A BETTER ENERGY FUTURE

This guide has been realised with the support of Rexel Foundation.

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FINAL PRODUCT FOR FRYING

FINAL PRODUCT FOR COOKING

GoSol.org's Sol1 Solar Concentrator

THE SOL1 NAME

Sol or Sól in the Norse mythology stands for the goddess of the sun.

1 is the approximate number of square meters of reflective surface concentrating sunlight.

THE SOL1 DESIGN

The Sol1 configuration was developed such that the machine can be built with the simplest of tools and materials. It delivers heat for cooking and frying activities and is the ideal entry-level technology to experience GoSol.org technologies.

500W of heat at approximately 200°C are delivered to a convenient cooking surface. The Sol1 has a small footprint and can fit nicely into existing spaces.

ABOUT THIS GUIDE

On the following pages you will find everything you need to know to build your first solar concentrator.

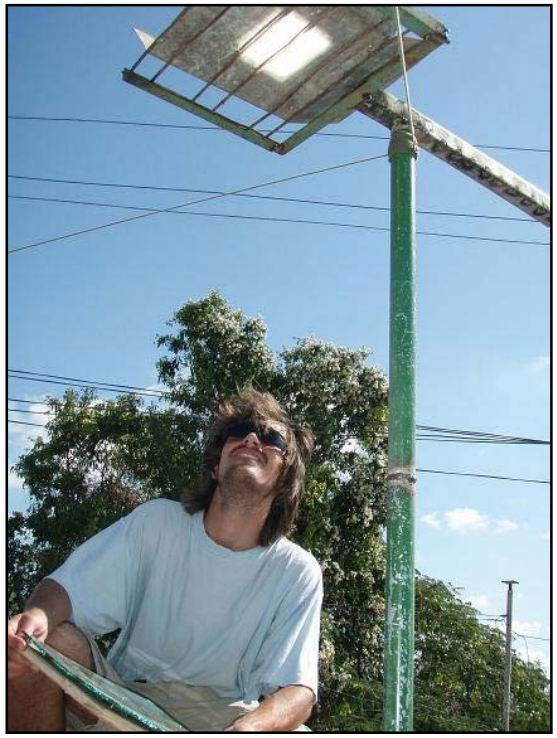
Be sure to visit our GoSol.org platform and contact us any time you face difficulties or need additional clarifications.

Guide based on a first version by Eva & Eerik Wissenz. William Cleaver, Urs Riggenbach and Lorin Symington have made this guide with the support of the backers of the #FreeTheSun campaign and the Rexel Foundation.

BOILING

FRYING

EDUCATION



DEMONSTRATION

GoSol.org

Sol1 Budget & Construction

Construction time varies based on available tool-sets, skills and schedules. With all materials on hand, an experienced fabricator in a well equipped shop can build a Sol1 in two days. A welder + apprentice using a hacksaw on a street corner in Mali would take closer to 1 week.

COUNTRY / MATERIAL	MEXICO	HAITI	USA
METAL	$ 47	$ 55	$ 65
MIRRORS	$ 22	$ 35	$ 63
OTHER MATERIALS BOLTS, CEMENT, ETC.	$ 10	$ 10	$ 17
TOTAL	$ **79**	$ **100**	$ **145**

BARE MINIMUM WORKSHOP

- Hand drill
- Welding machine + welding mask
- Measuring tape
- File
- Hacksaw
- Paint brush
- Adjustable wrench
- Screwdriver
- Bucket

NICE ADDITIONS

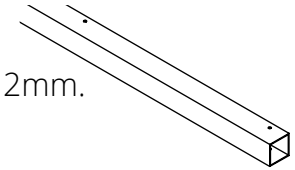
+ Drill press
+ C-clamps (x2)
+ Table vice
+ Grinder (cutting + grinding discs)
+ Welding sawhorses or table
+ Tap & Die set
+ Wrench set
+ Vice grips
+ Bench grinder
+ Metal chop saw

GREAT ADDITIONS

+ Metal cutting band saw
+ Tiller arm welding jig
+ Cement trowel

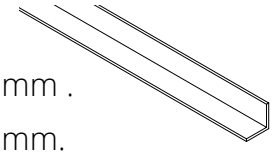
Sol 1 Material List

BOX TUBING:



6.7m of 20x20mm x 2mm.

ANGLE-IRON:

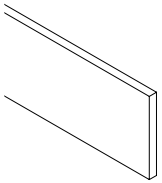


6.5m of 30x30mm x 3mm .

2.6m of 20x20mm x 2mm.

0.5m of 30x30mm x 2mm.

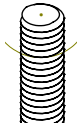
FLAT BAR:



2m of 15x4mm

2.9m of 15x3mm

BOLTS AND NUTS:



1 x 300mm long, 10mm Ø bolt.

2 x 10mm Ø nuts.

32 x 3cm long, 8mm Ø bolts & nuts.

46 x 4cm long, 8mm Ø bolts & nuts.

8 x 3mm Ø wood screws, 2cm long.

24 x 3mm Ø wood screws, 5cm long.

MIRRORS:

160 mirror pieces cut to size 11.6 x 11.6 cm. Mirror thickness can be 2mm or 3mm. These are common „bathroom" glass mirrors available in glass cutting shops.

WOOD:

1.5m of 10x40mm wood.

348 x 348 x 5mm piece of wood.

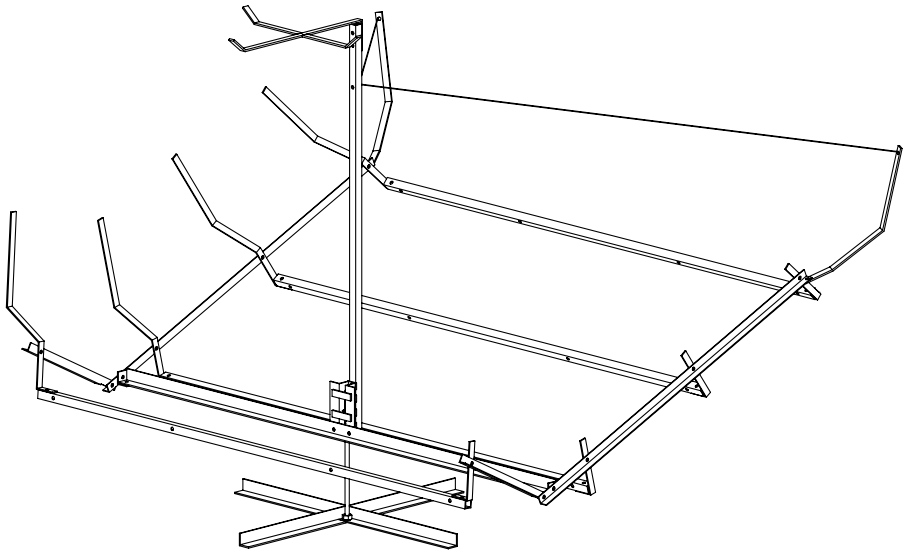
GUY-WIRE:

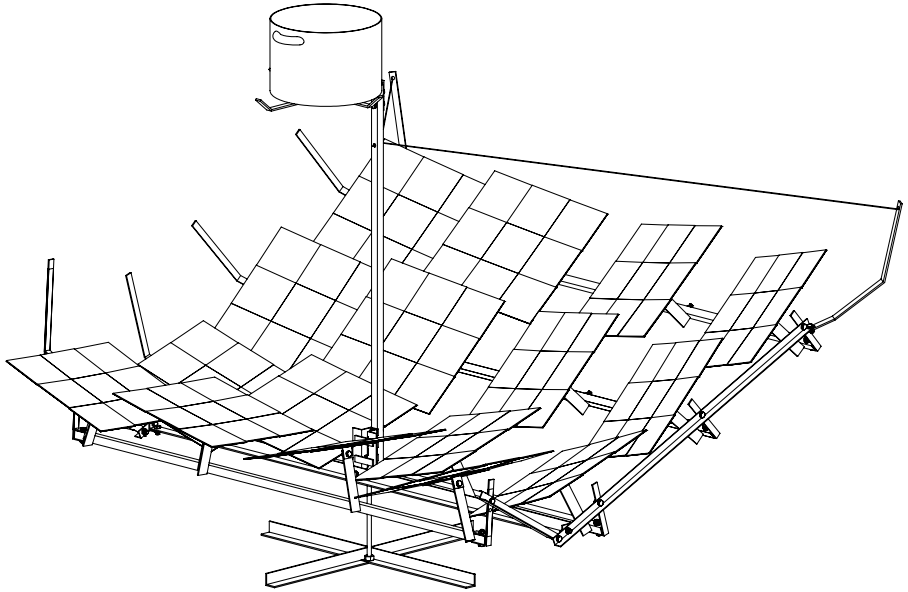
3m of wire (around 3mm thick) regular construction wire or steel aircraft cable.

GLUE AND FIBERGLASS:

250ml epoxy resin and fiberglass for glueing the mirror elements together.

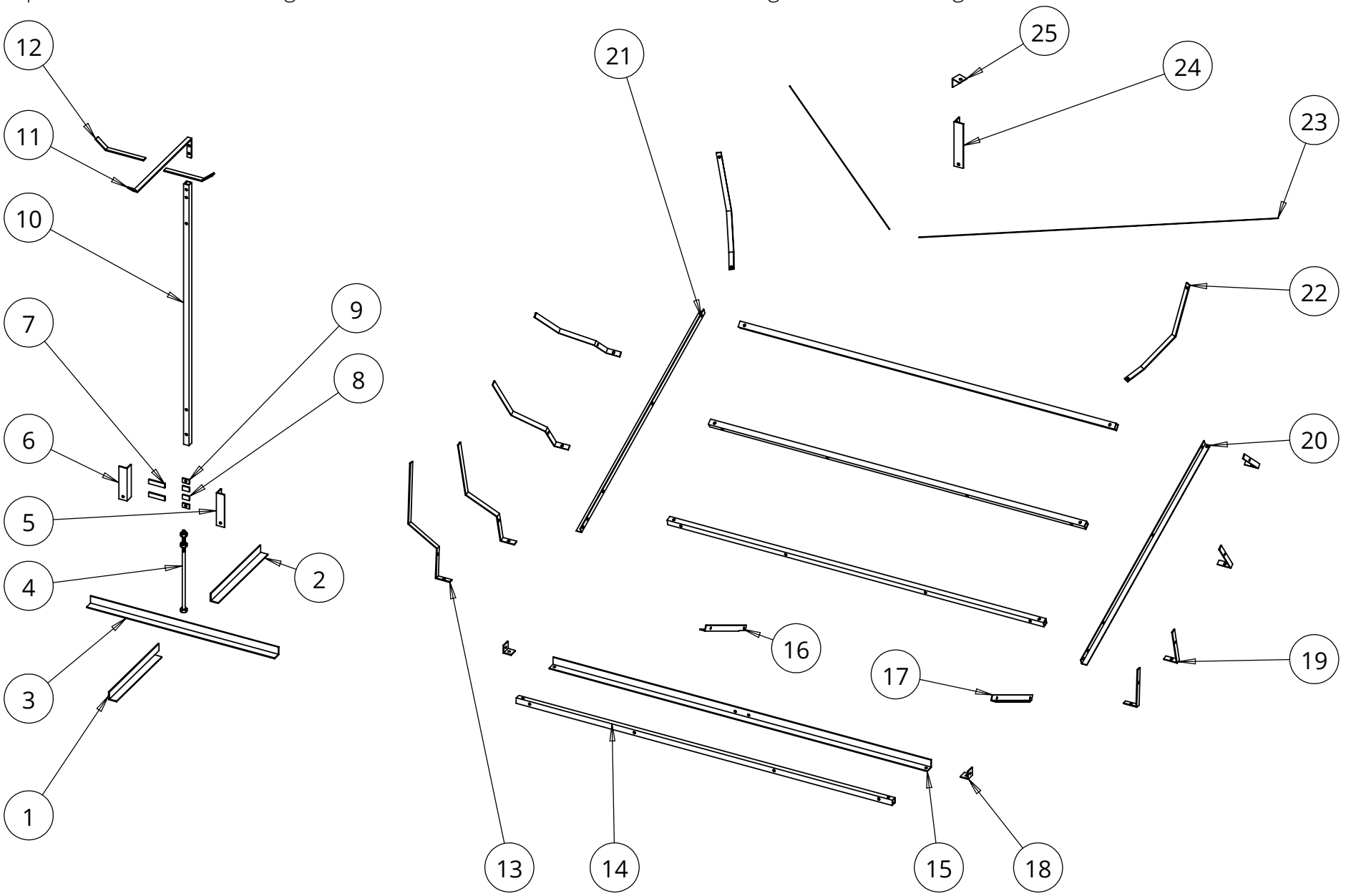
Sol1 Construction Overview





Sol1 Parts Diagram

All pieces referenced in this guide are outlined on the “Construction Drawings” section of this guide.



Tools & Actions Chart

Read Construction Notes (Pg. 16)

Welding

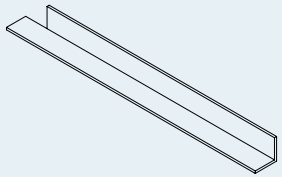
Glueing

Tightening

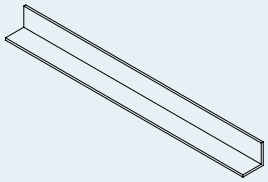
Cementing

Taping

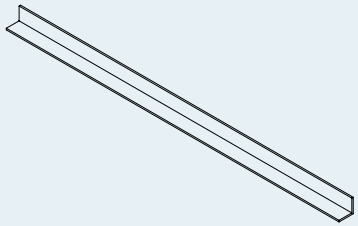
P1 - NOTCHED BASE ANGLE ARM



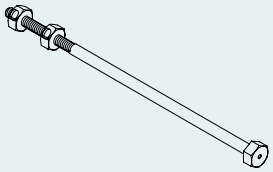
P2 - BASE ANGLE ARM



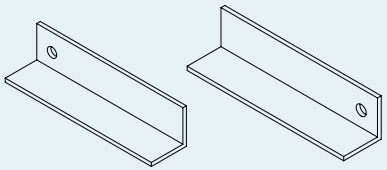
P3 - MAIN BASE ANGLE



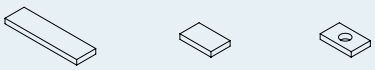
P4 - CENTRAL PIVOT

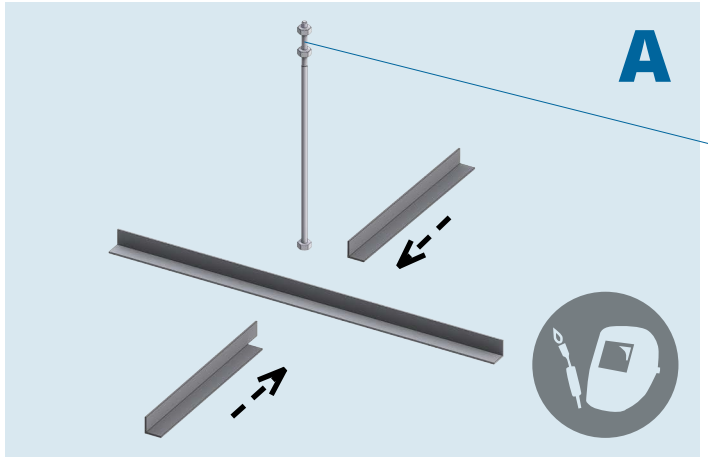


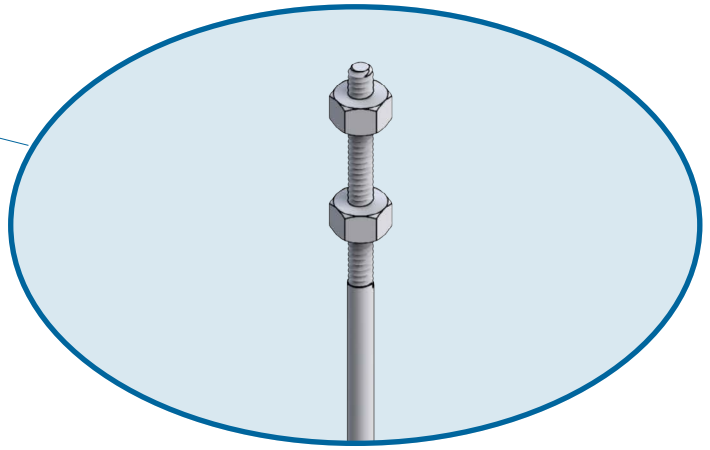
P5-6 - COLLAR ANGLES

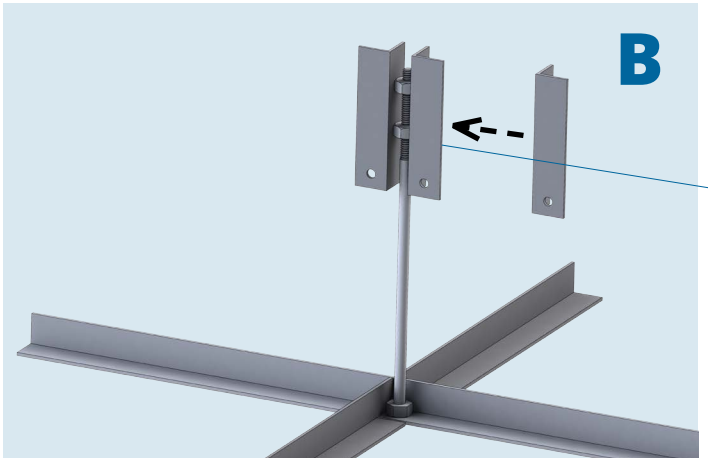


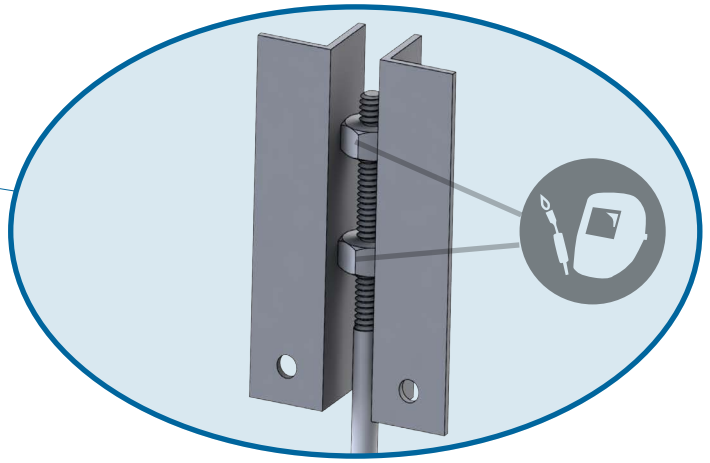
P7-9 COLLAR SPANNERS

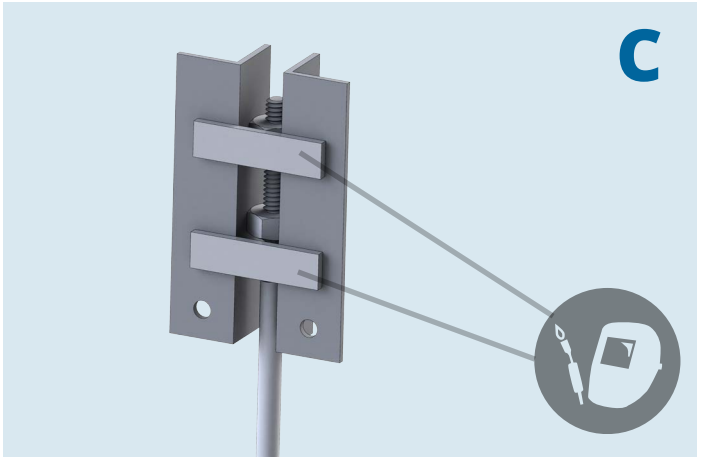


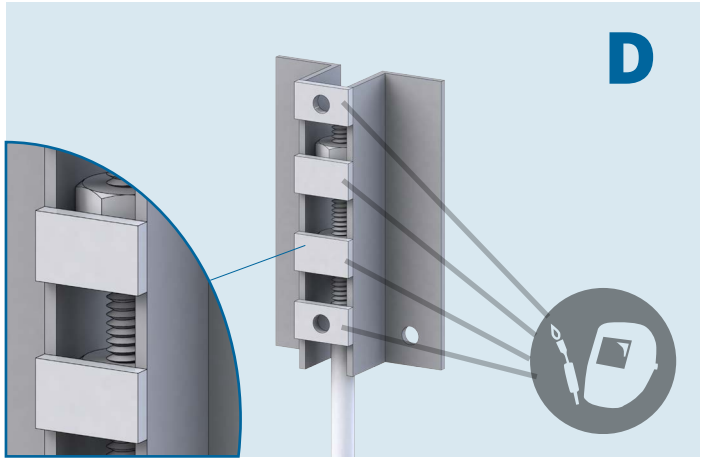






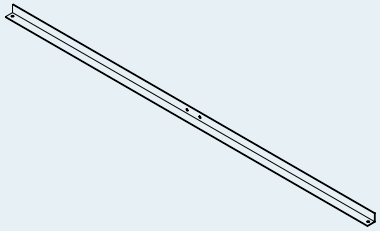




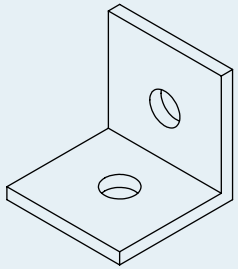


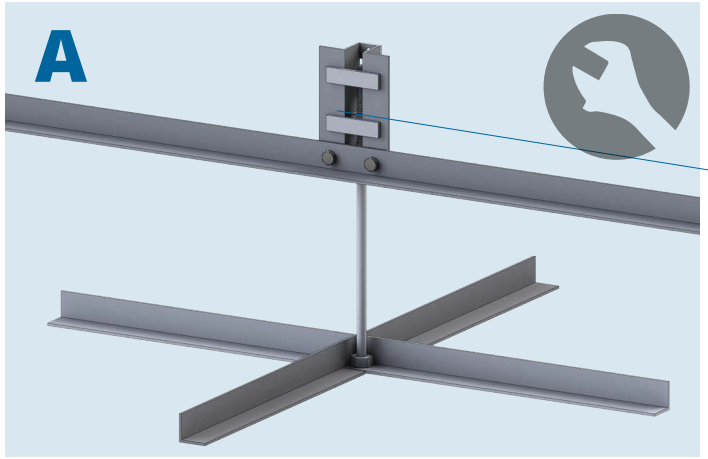
P10 - CENTRAL MAST

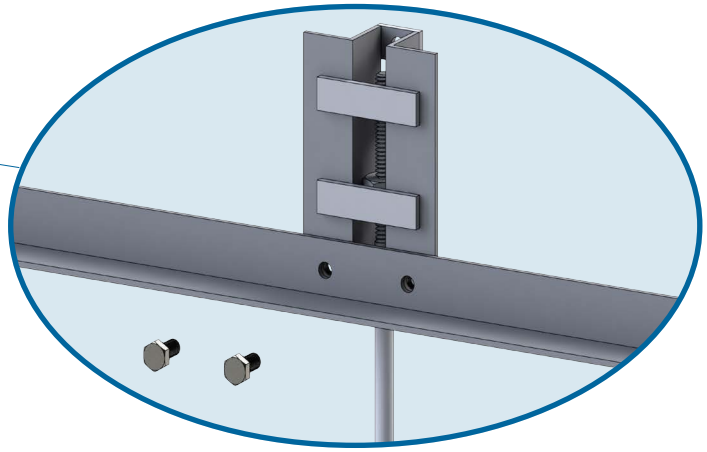
P15 - MIRROR SUPPORT FRAME BOTTOM ANGLE

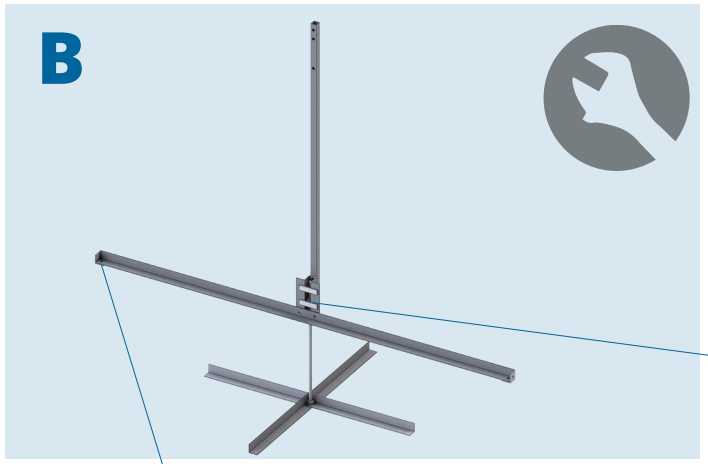


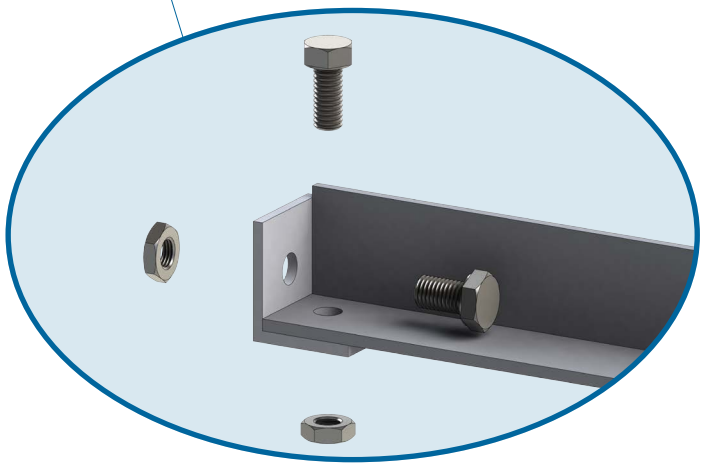
P18 - MIRROR SUPPORT FRAME BOTTOM ANGLE BOX END (2X)

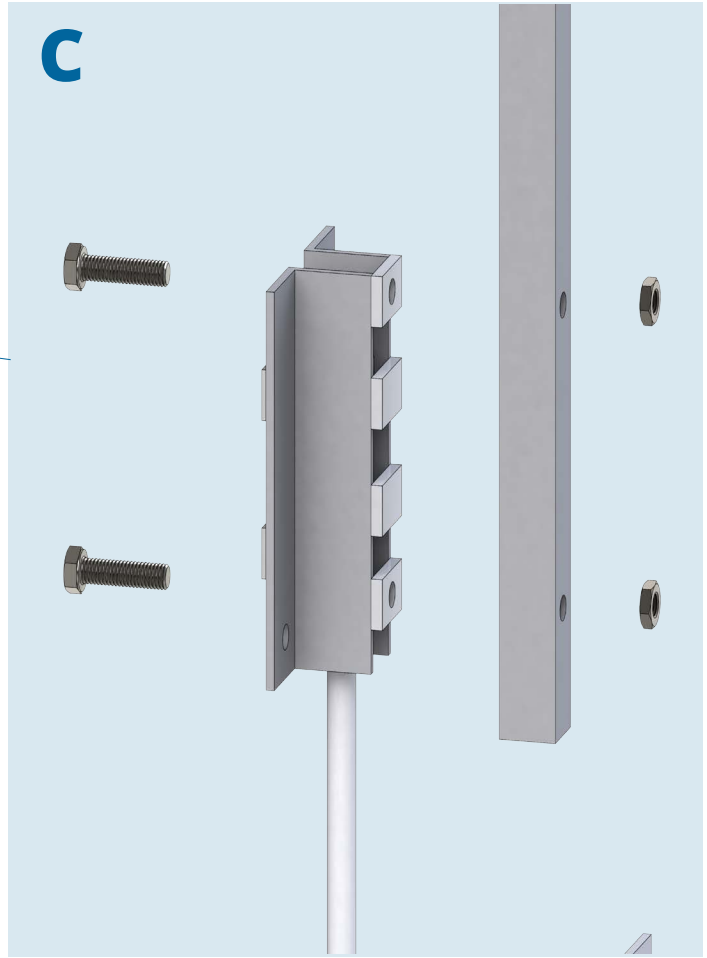




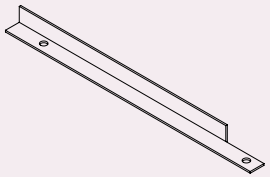




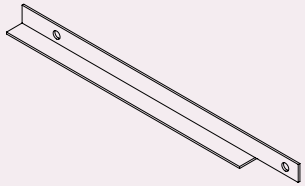




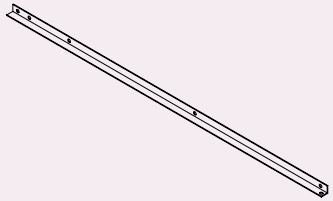
P16 - MIRROR SUPPORT DIAGONAL KICKER A



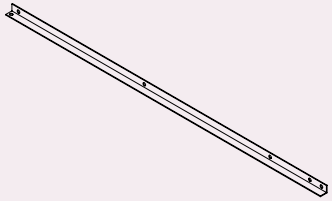
P17 - MIRROR SUPPORT DIAGONAL KICKER B



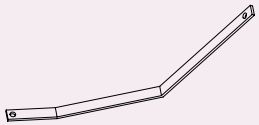
P20 - MIRROR SUPPORT DIAGONAL A

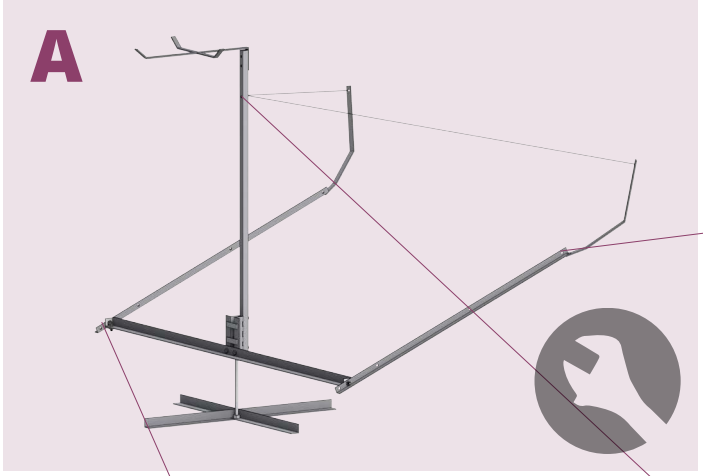


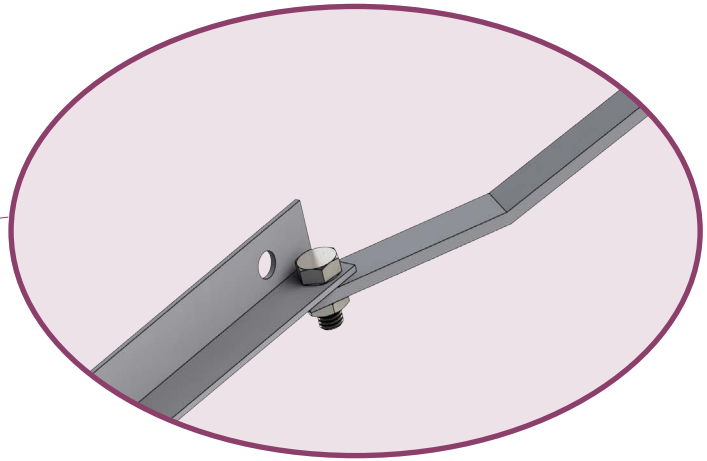
P21 - MIRROR SUPPORT DIAGONAL B

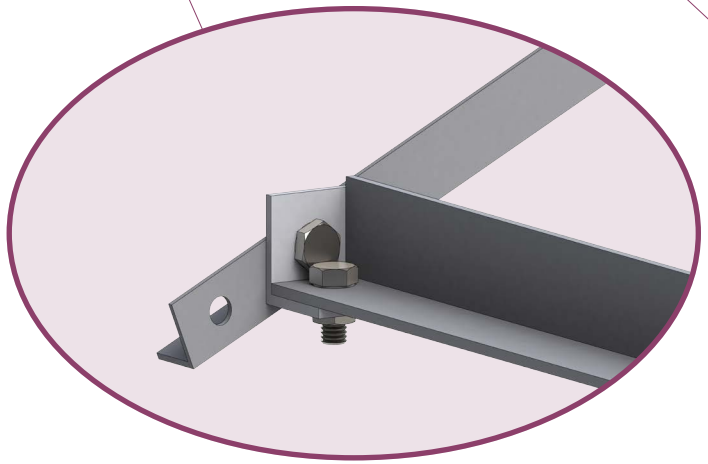


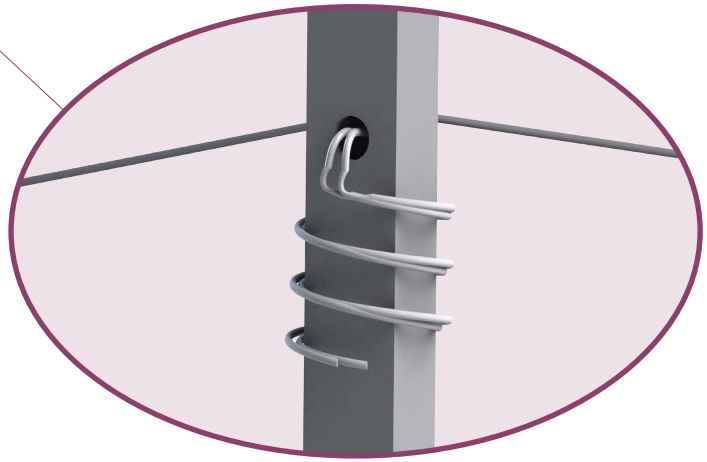
P22 - GUY-WIRE ATTACHMENT ANTENNAS (2X)

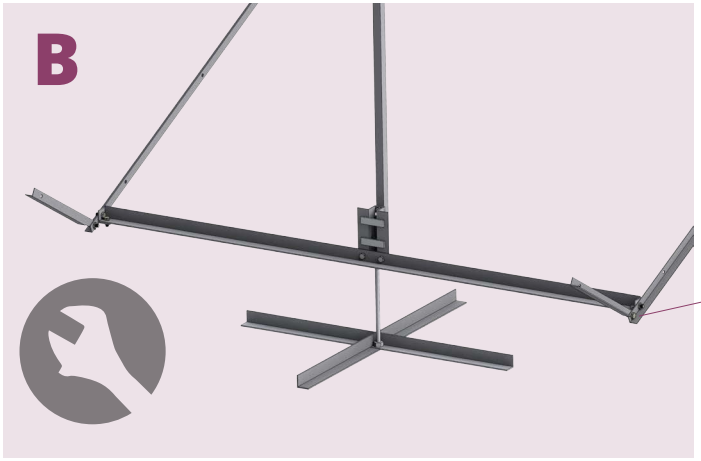


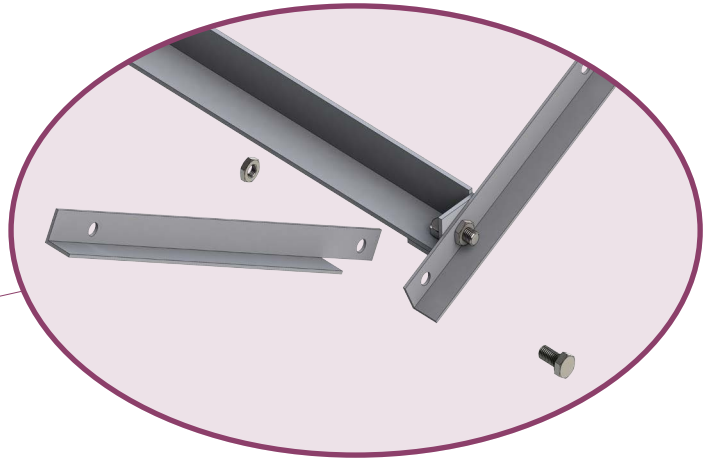




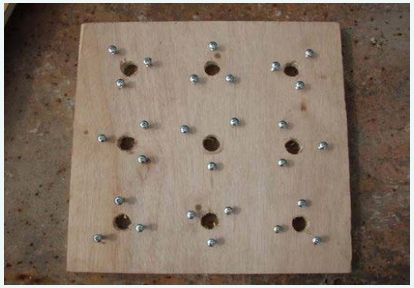




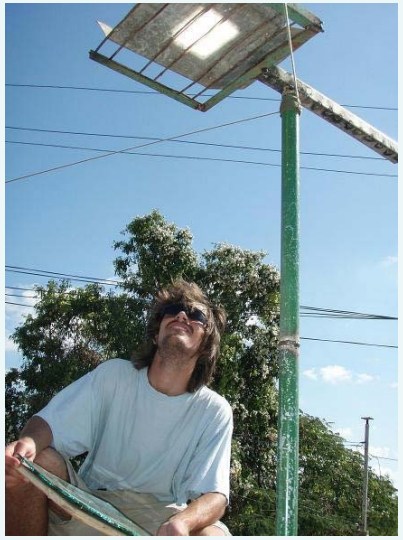




PLYWOOD CUT TO SIZE WITH WOOD SCREWS



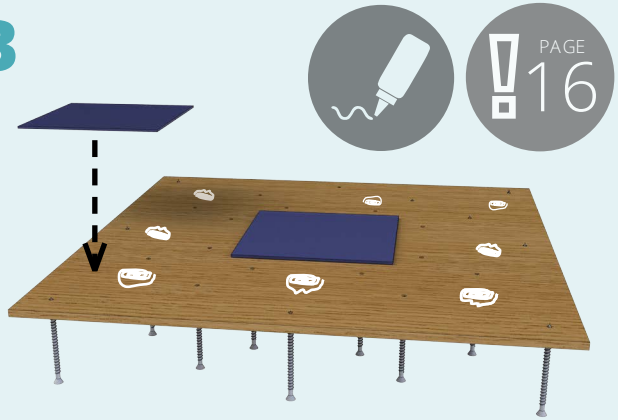
COOKING SUPPORT OR MAKESHIFT FOCAL POINT.



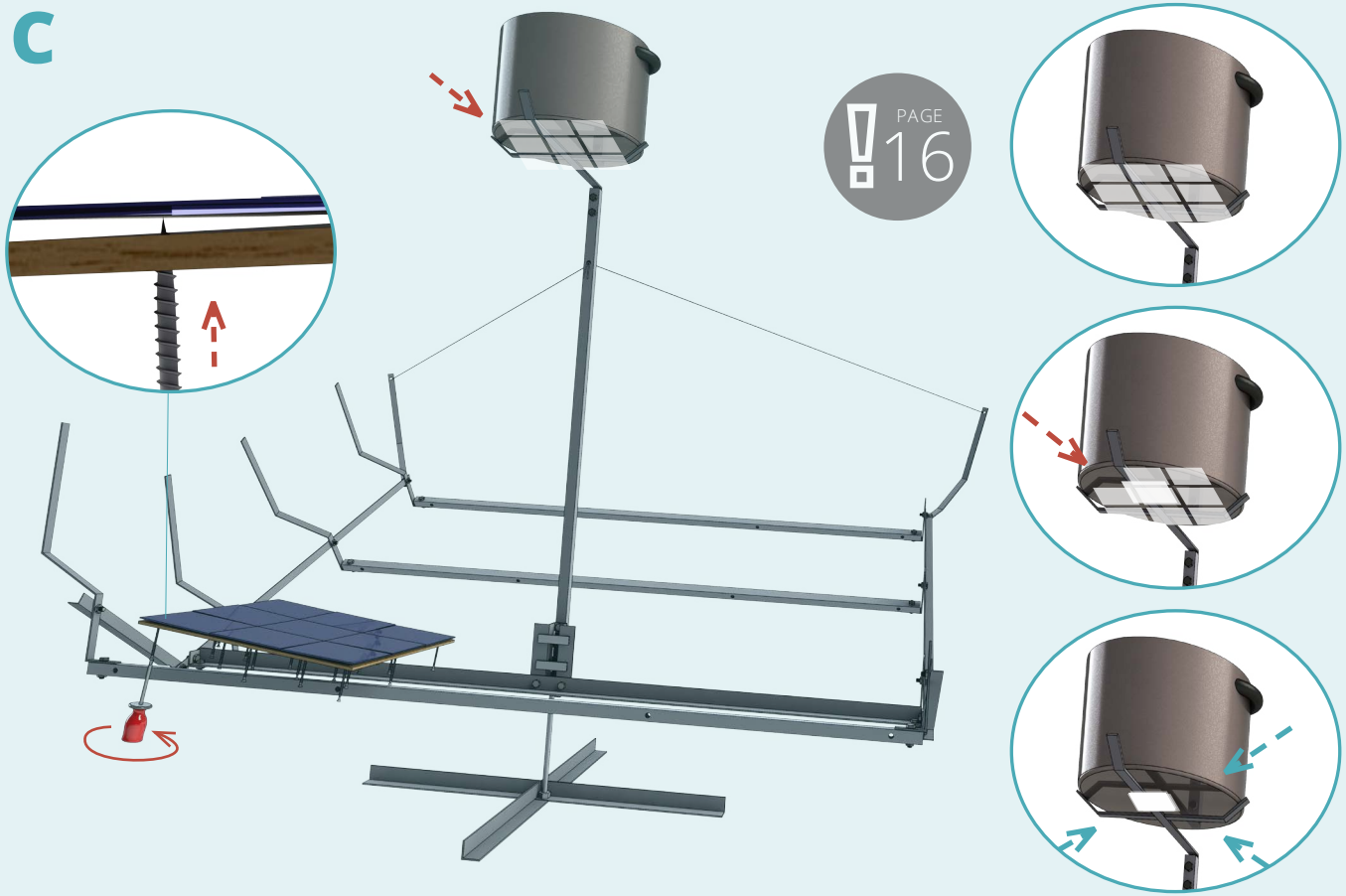
CALLIBRATING THE SCREWS

A

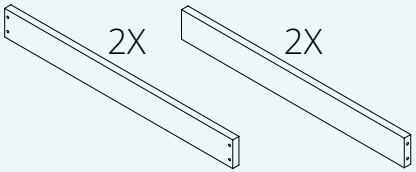
B



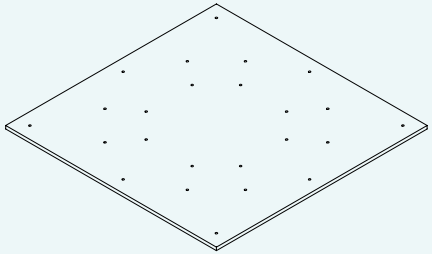
C



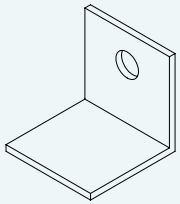
P26 - 27: WOOD FRAMES



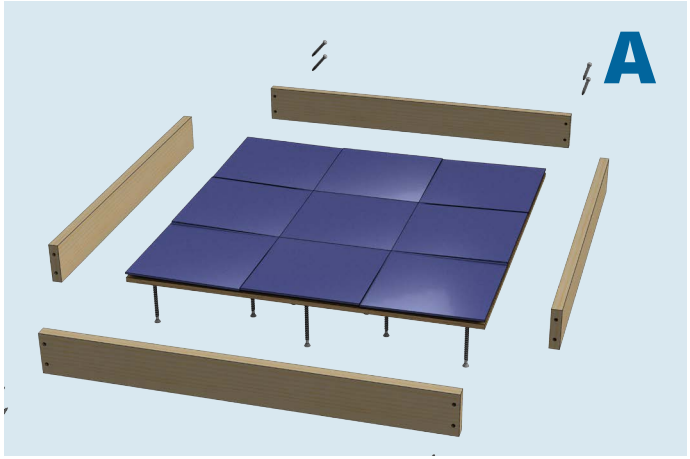
P28: WOOD SQUARE

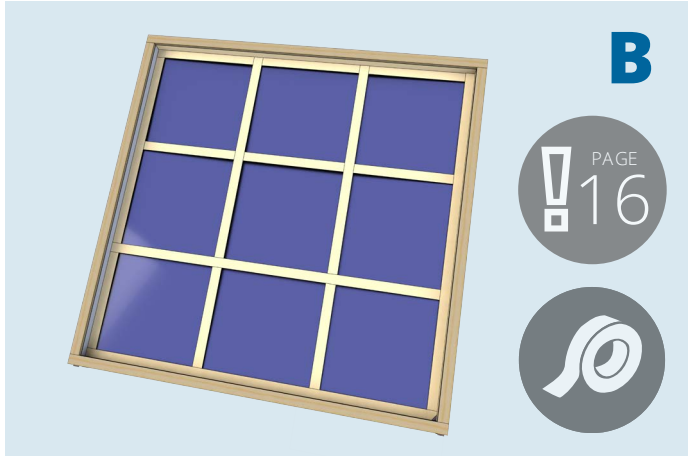


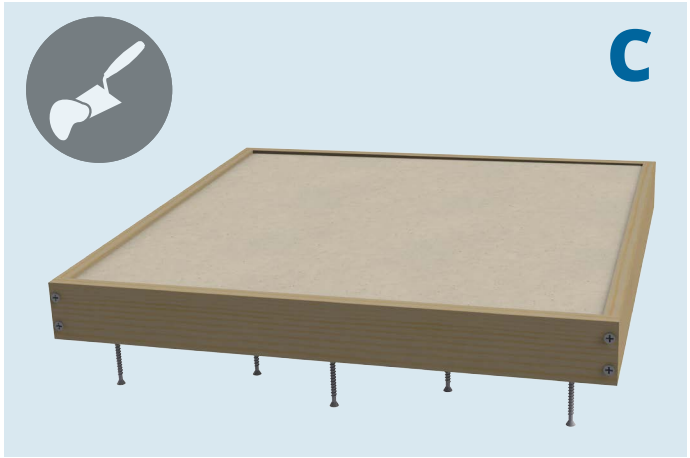
P25 - MIRROR BACKING TAB (16X)

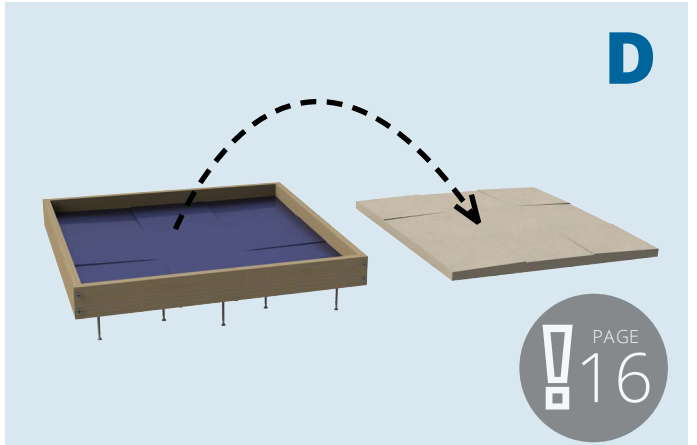


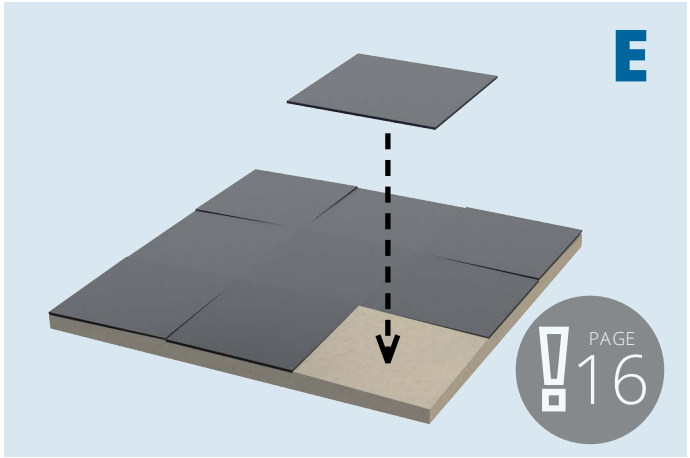
F: ADDING EPOXY RESIN AND FIBERGLAS

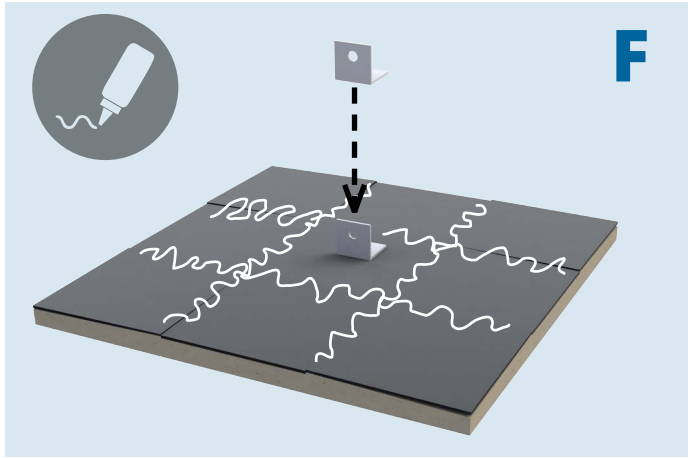




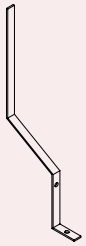




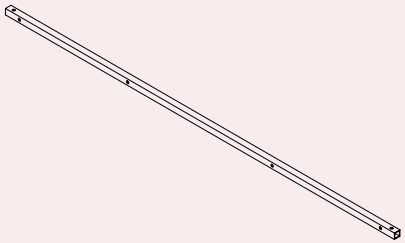




P13 - ROW CONTROL LEVER (4X)

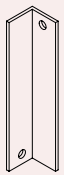


P14 - MIRROR ROW (4X)

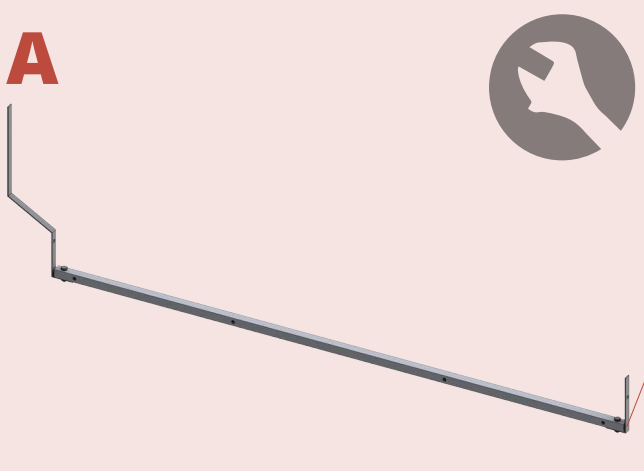


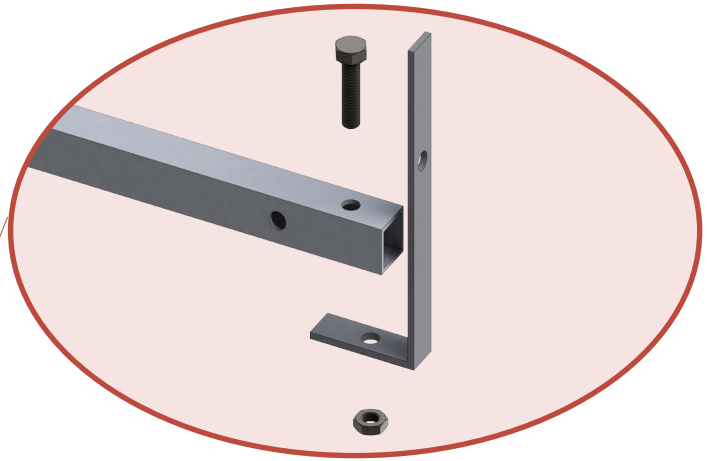
P19 - MIRROR ROW BALANCE OFFSET

P24 - ROW TO MIRROR ANGLE IRON (16X)

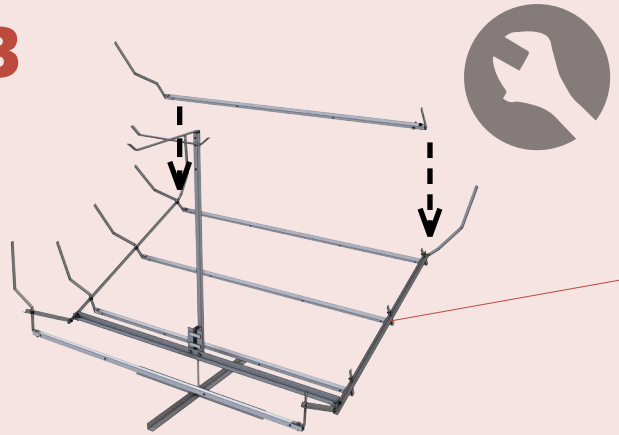


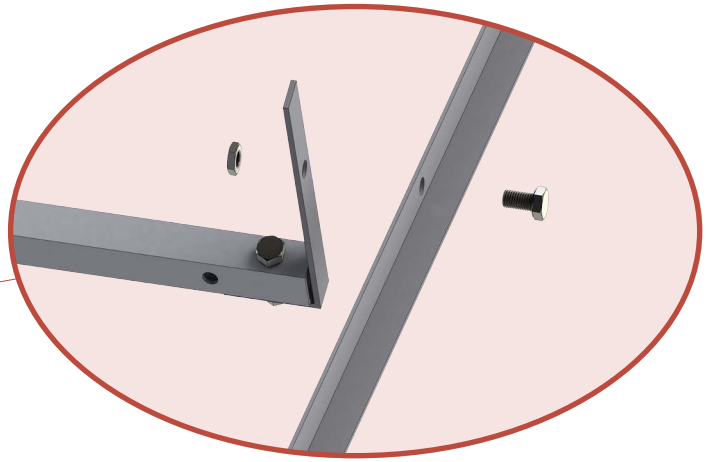
A





B





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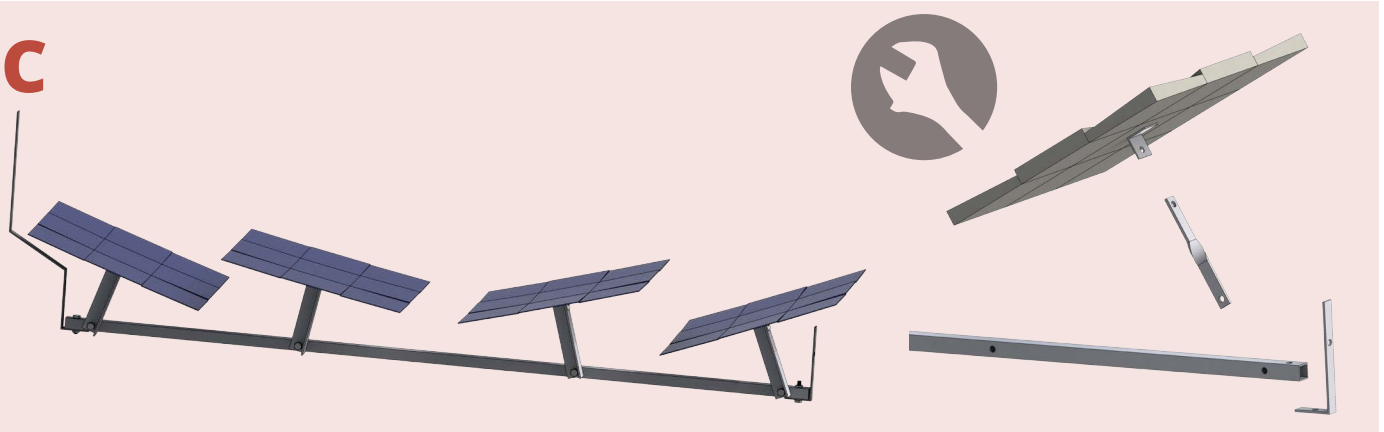
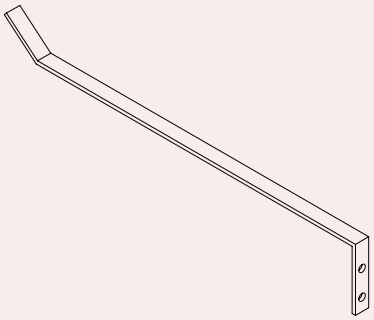
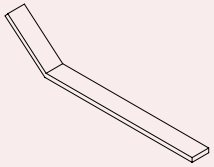


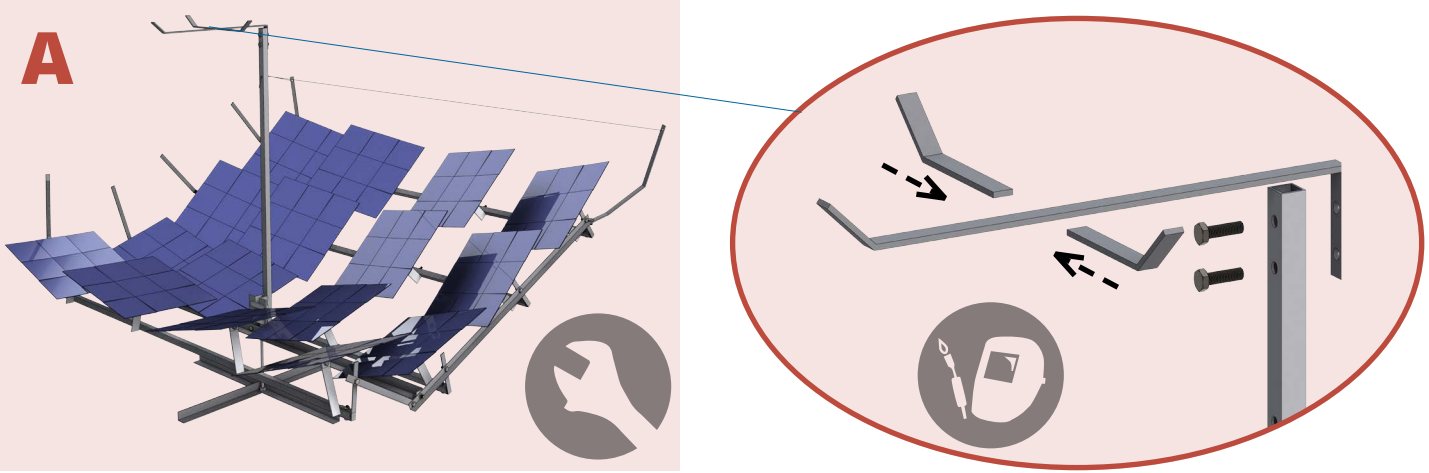
P11 - CENTRAL COOKING SUPPORT



P12 - COOKING SUPPORT ARMS



A



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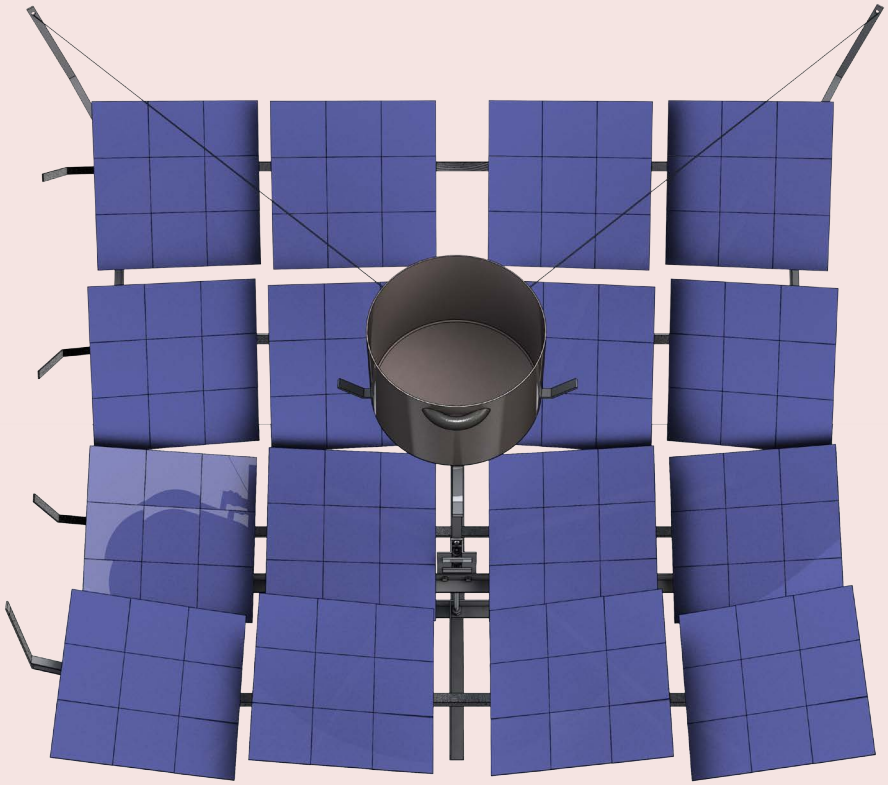


Construction Tips and Notes

MIRRORS

Order mirrors cut to size from a glass shop or mirror supplier. These are common “bathroom” glass mirrors.

MIRROR CALLIBRATION

A. Divide the plywood into 9 squares. Drill 3 wood screws into every square, so they almost come out the other side. No screws on the center square.

B. Add a little bit of regular glue (not epoxy) and glue on the 9 mirrors.

C. Hold the mirrors into the frame at the position shown. Use a screwdriver and adjust screws in or out, to focus all 8 outter mirrors onto the center mirror.

MIRROR MOLD

A. Build a wooden frame around the calibrated mirror.

B. Seal the gaps between the mirrors, and between the mirrors and the wood with masking tape. Use a towel and rub the mirrors and wood sidings with oil or grease.

C. Now fill in the cement.

D. Wait for the cement to dry by respecting your specific cement’s dry time. If the mirror mold does not come out of the wood box easily remove the wood sidings.

E. Place the mirrors reflective side down on the mold.

F. Apply epoxy resin and fiberglass matting to the back of the mirrors to fix them in place. Once dry remove from mold and glue the Mirror Backing Tab to the center mirror (use epoxy glue or regular construction glue for this).

Tipp: Add tape over the cement mold to prevent mirrors sticking to cement in case epoxy leaks down between mirrors.

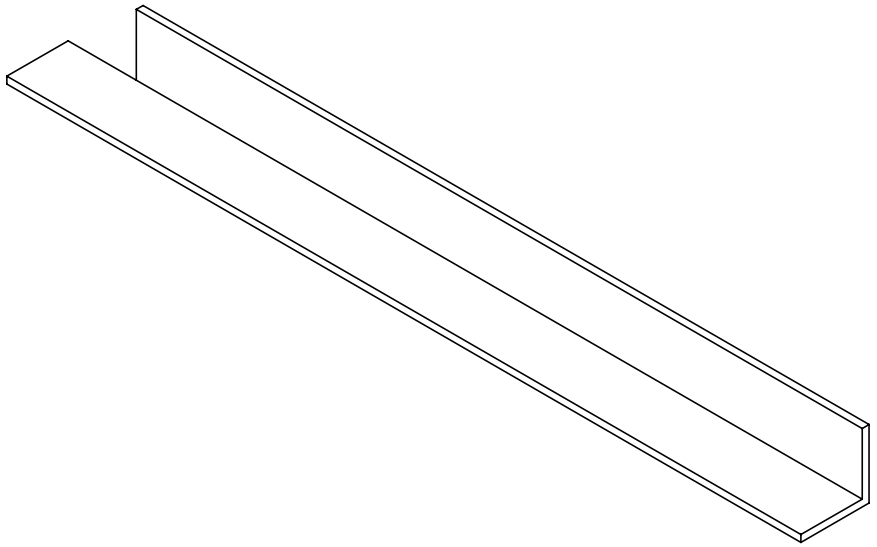
GUY-LINES/WIRES

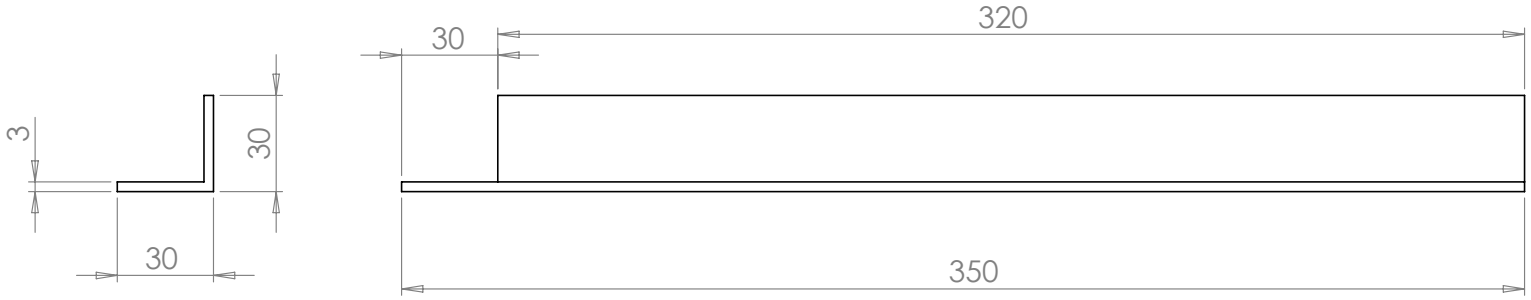
Use construction wire or steel aircraft cable and fix ends by twisting the wire or use cable clamps.

PAINTING

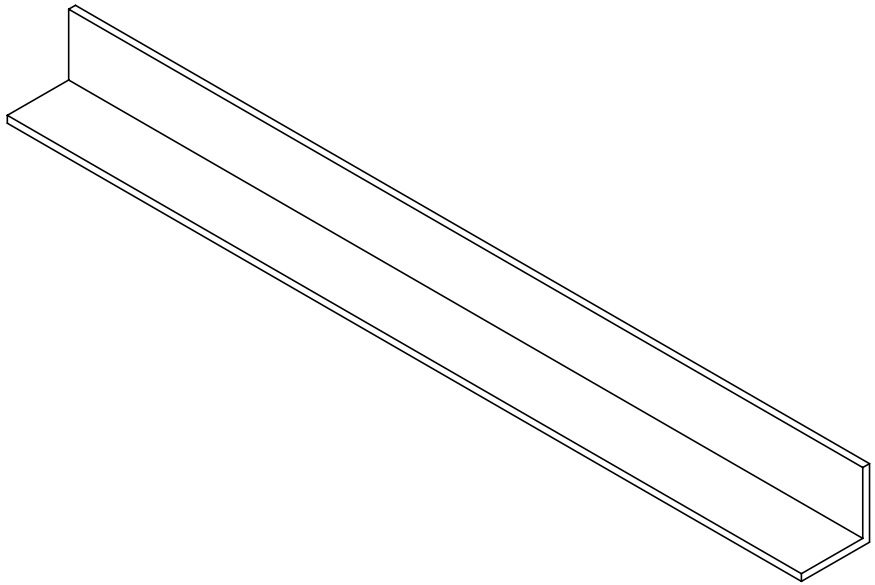
After successful construction the machine needs to be disassebled and all metal pieces need to be painted to avoid corrosion.

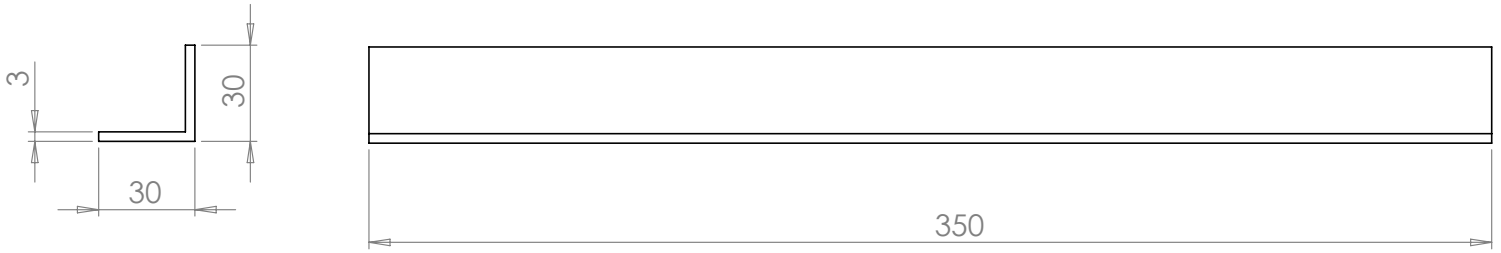
P1 - Notched base angle arm



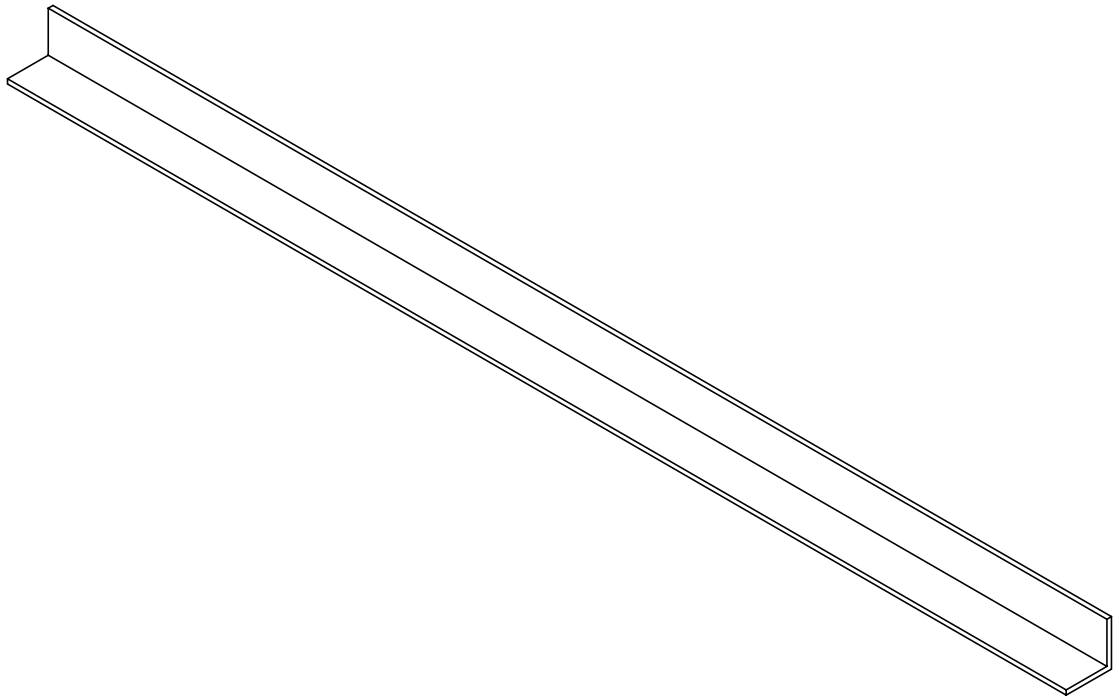


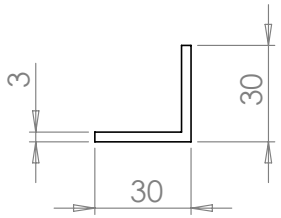
P2 - Base angle arm



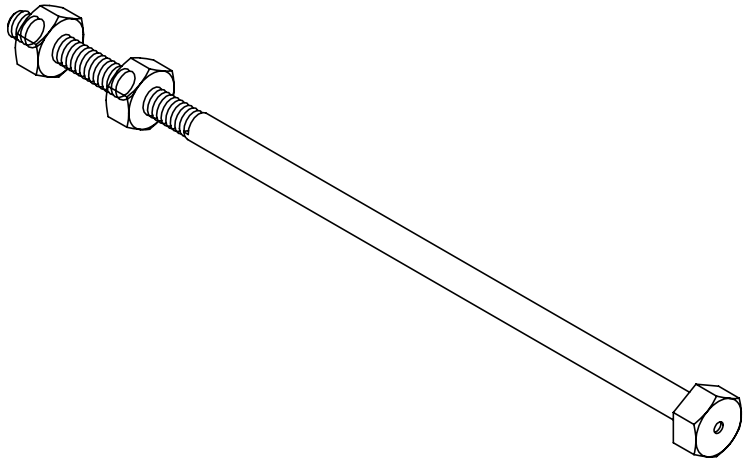


P3 - Main base angle

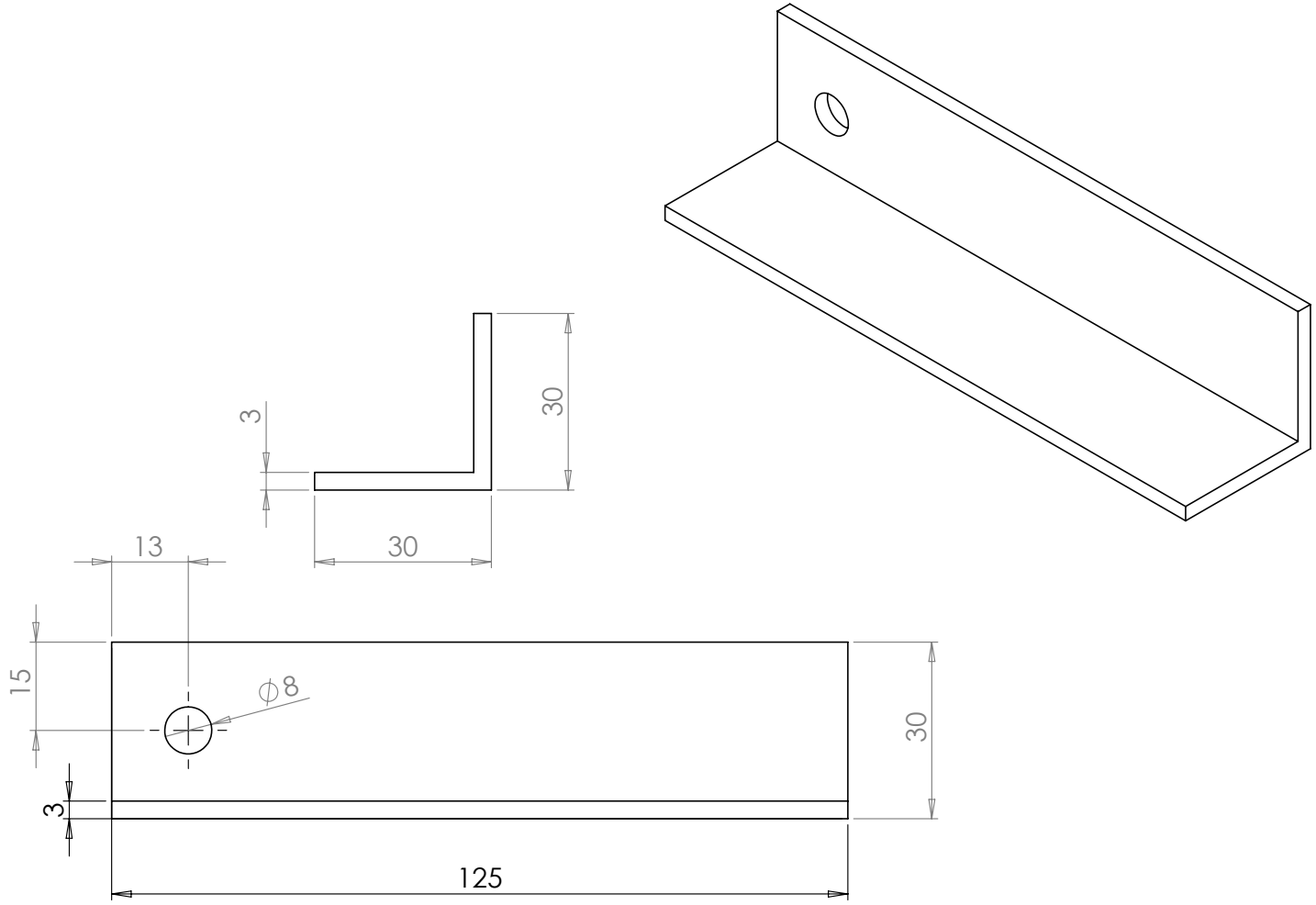




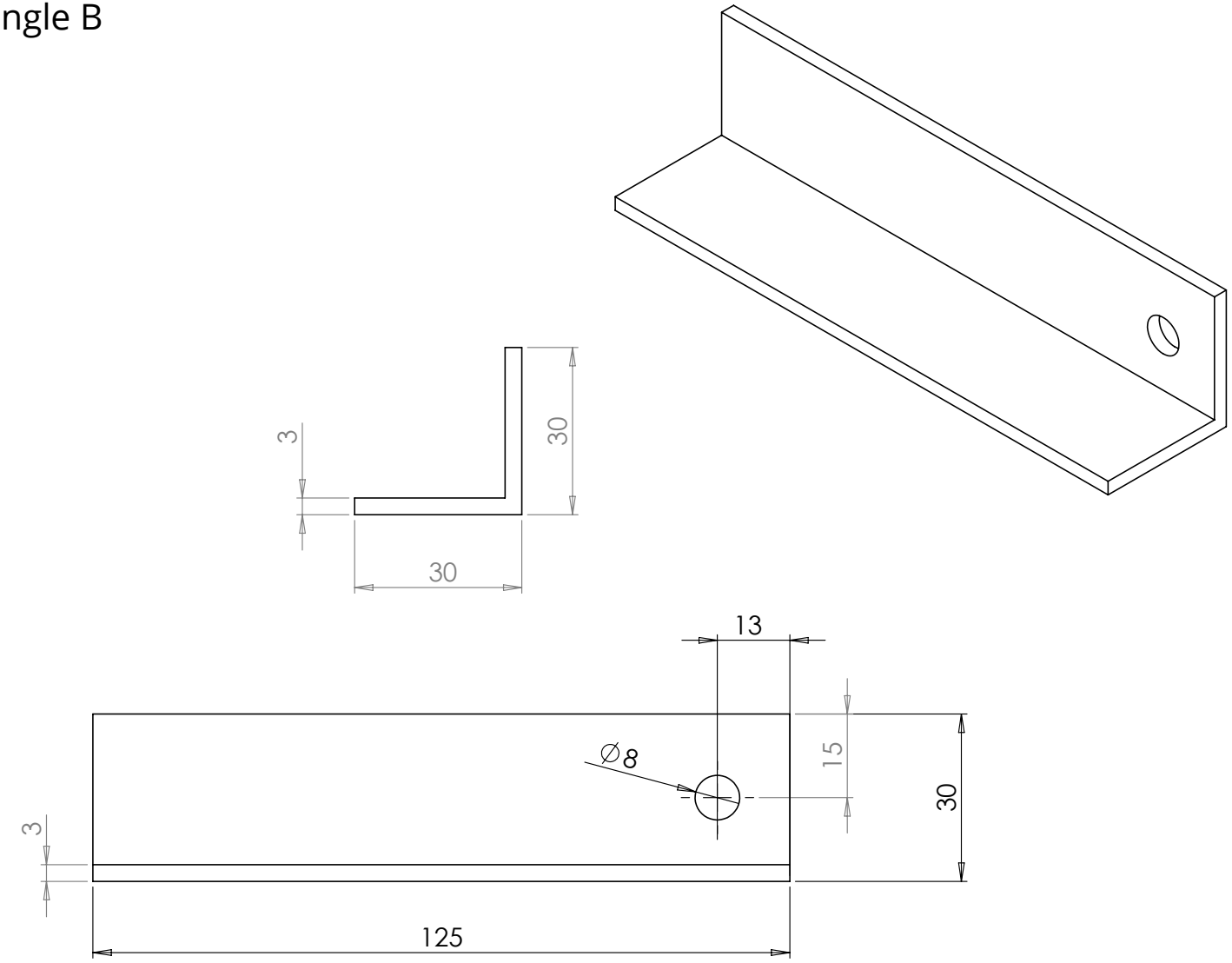
P4 - Central Bolt



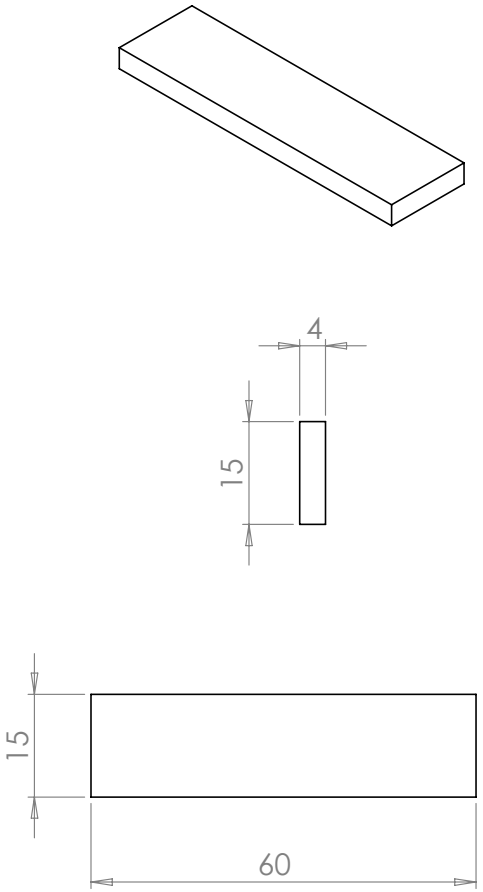
P5 - Collar angle A



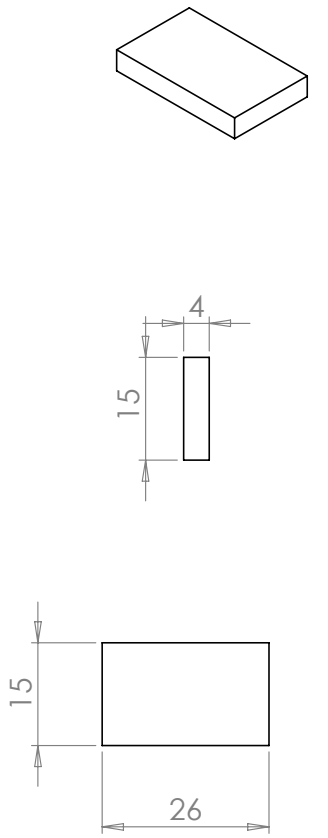
P6 - Collar angle B



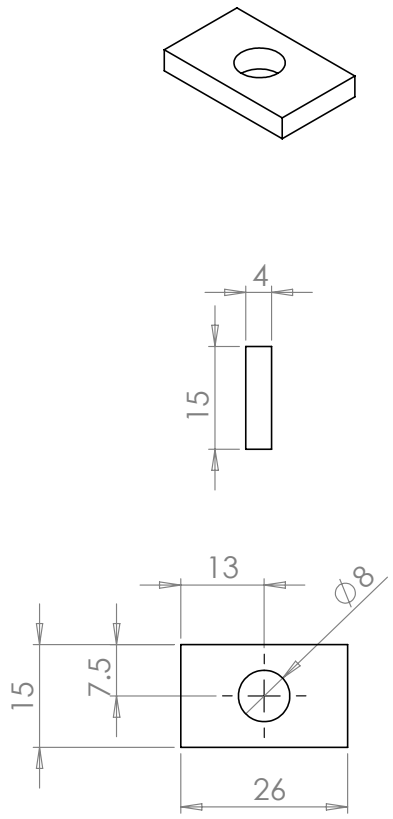
P7 - L Collar spanners - x2



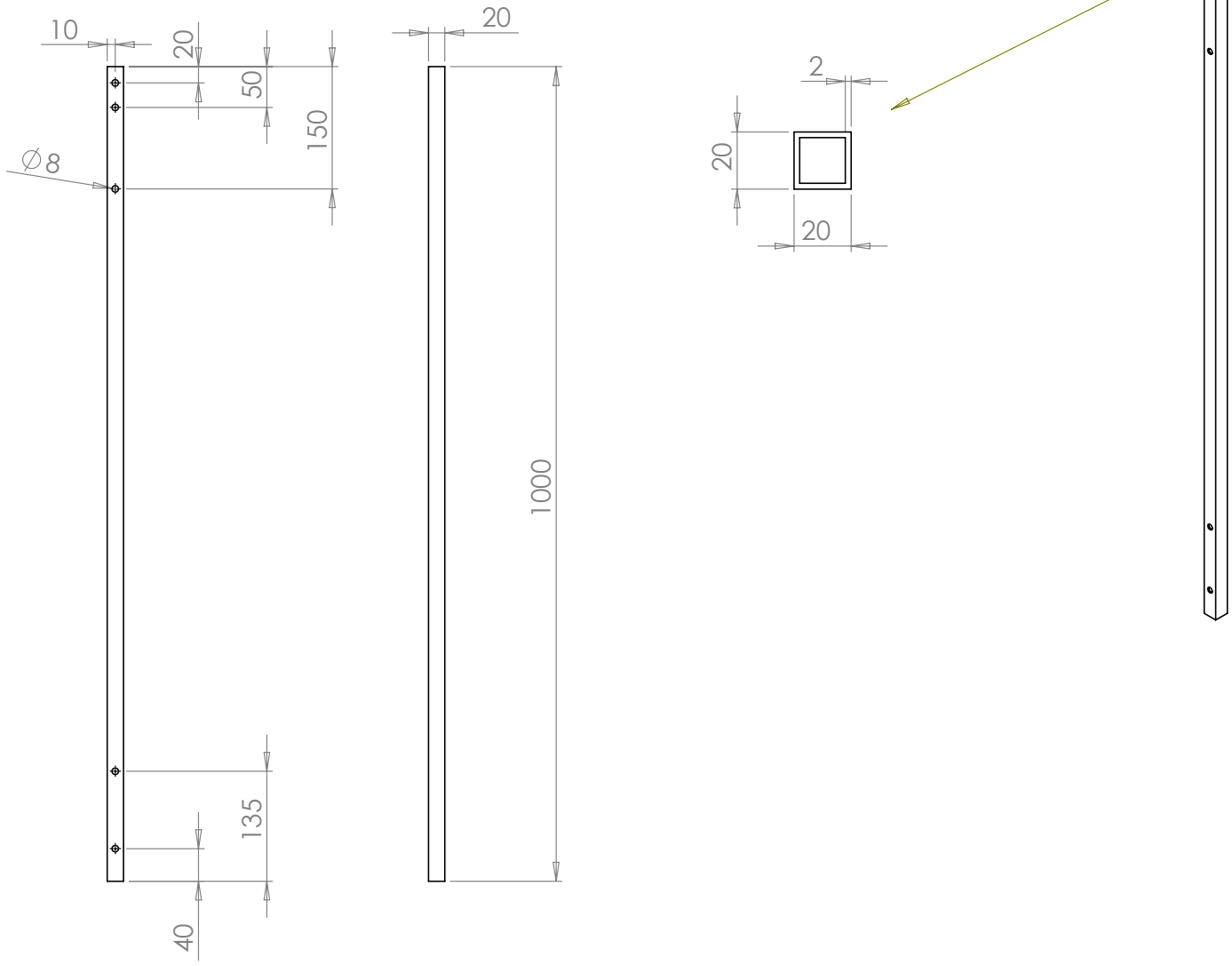
P8 - S Collar spanners - x2



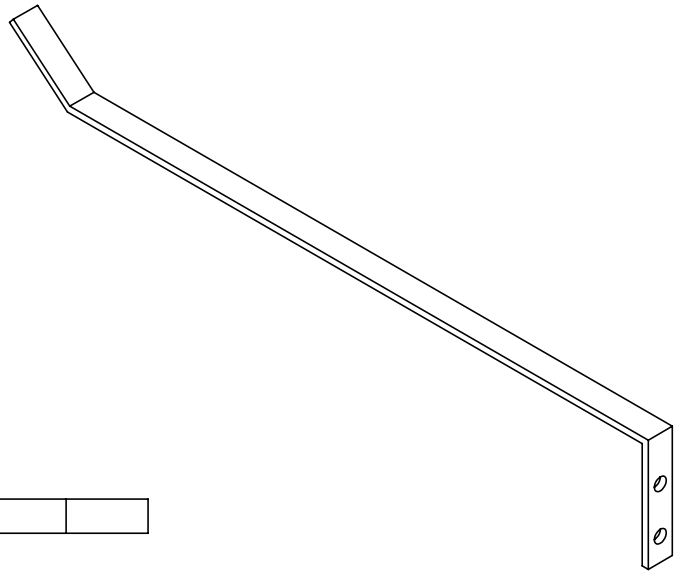
P9 - SH Collar spanners - x2

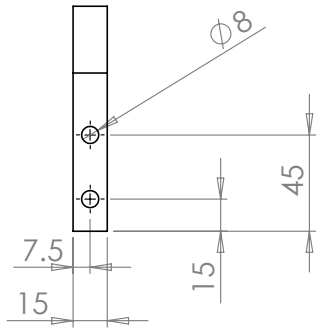


P10 - Central Mast

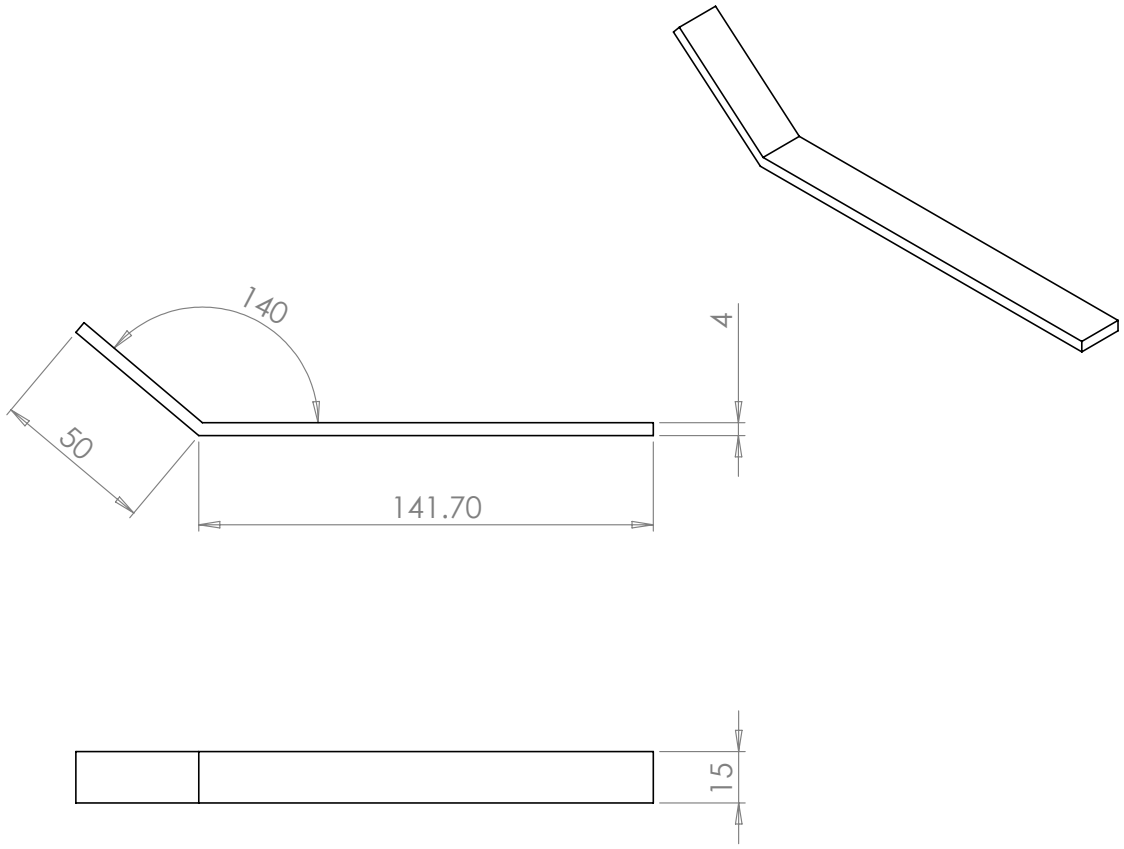


P11 - Central Cooking Support

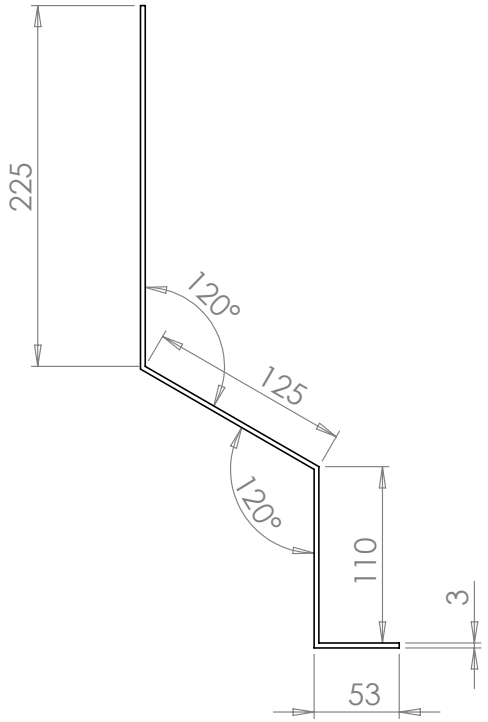


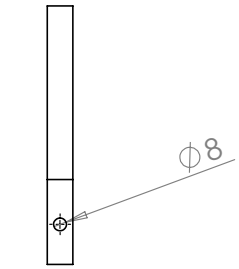


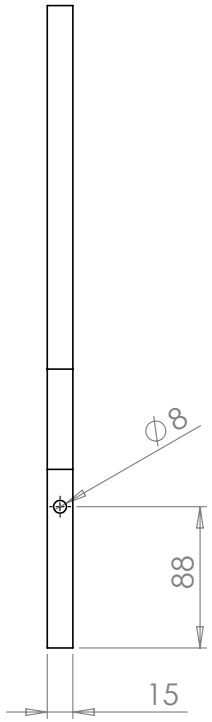
P12 -Cooking Support Arms - x2

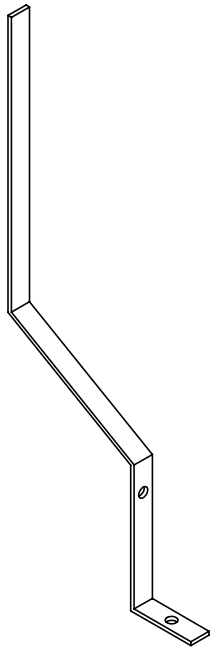


P13 - Row Control Lever - x4

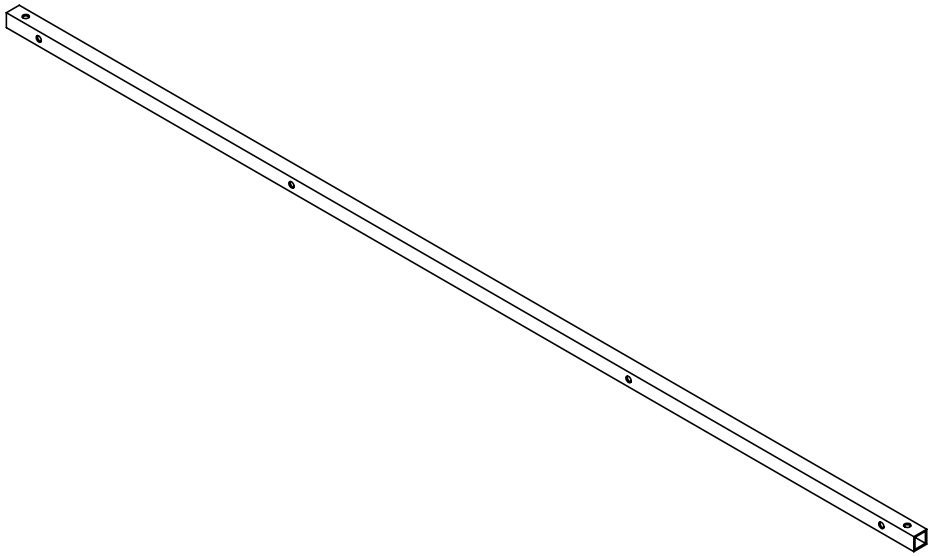


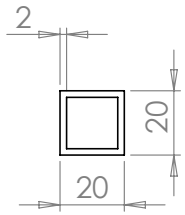


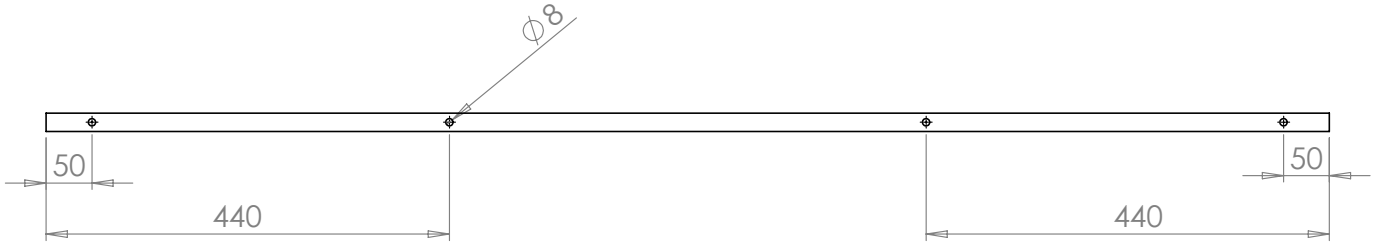




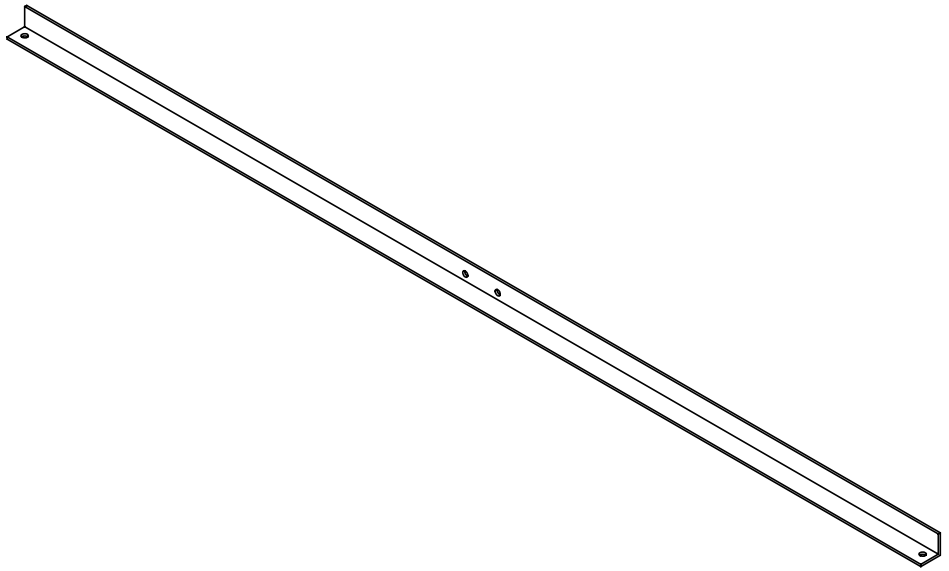
P14 - Mirror Row - x4

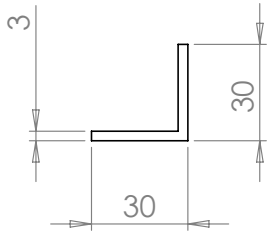


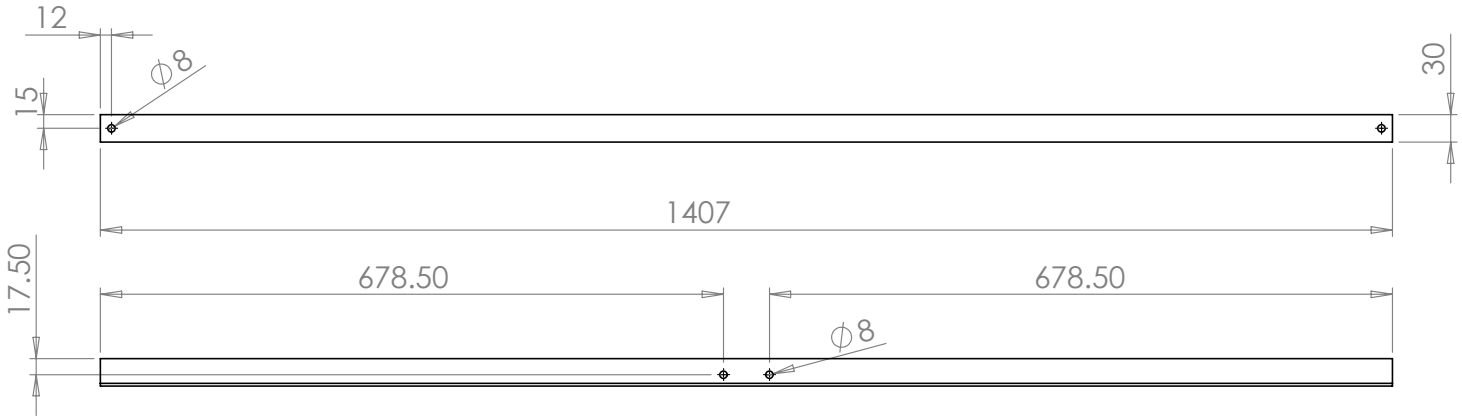




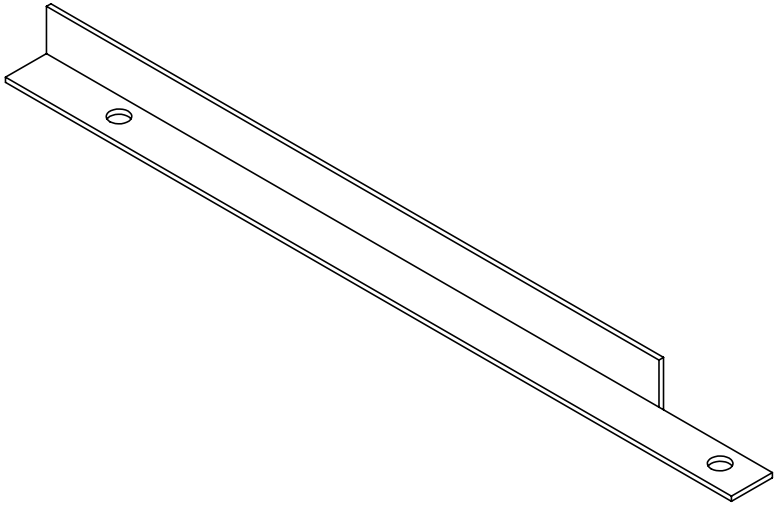
P15 - Mirror Support Frame Bottom Angle

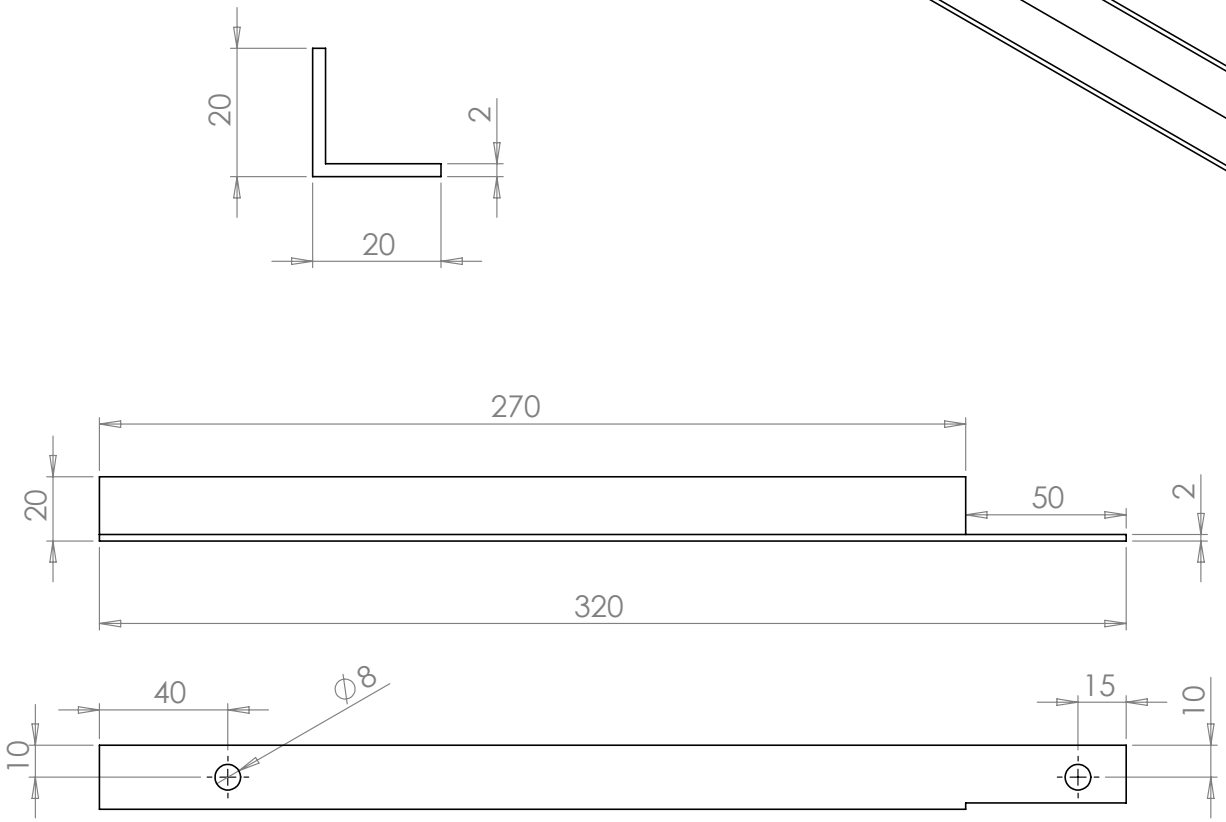




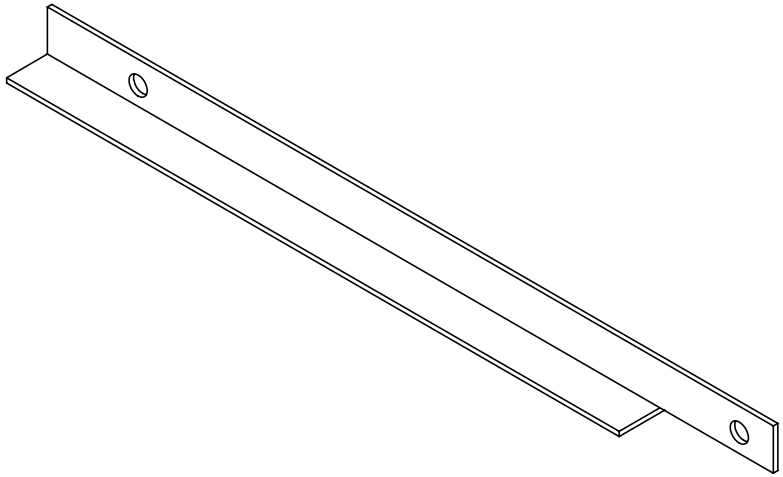


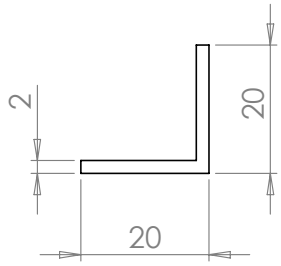
P16 - Mirror Support Diagonal Kicker A

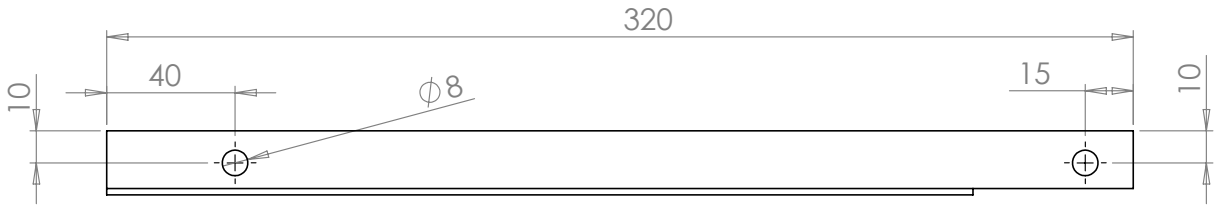


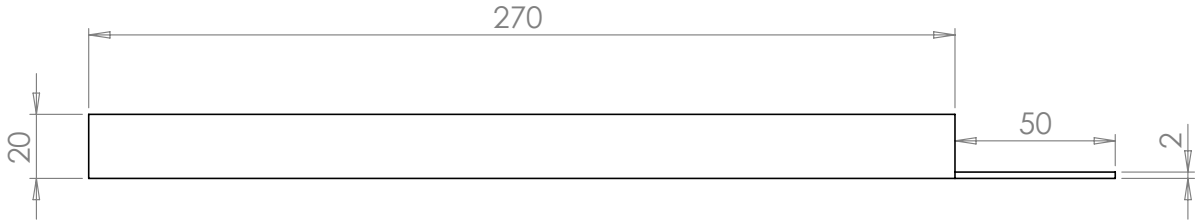


P17 - Mirror Support Diagonal Kicker B

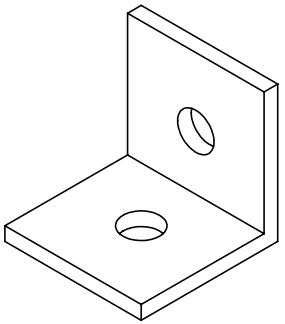


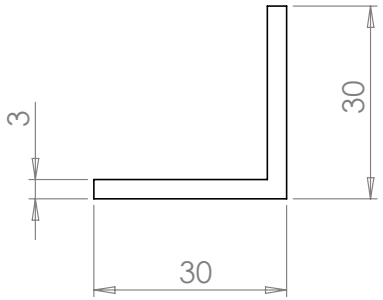


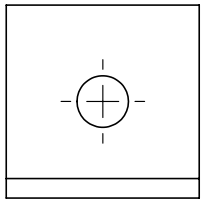


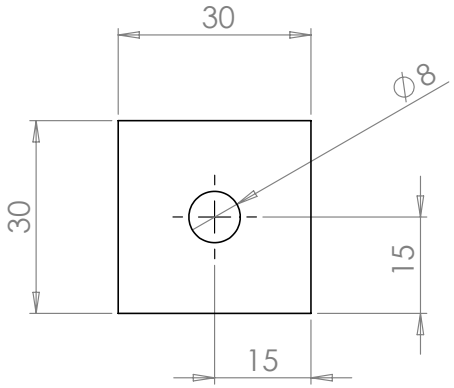


P18 - Mirror Support Frame Bottom Angle Box End - x2

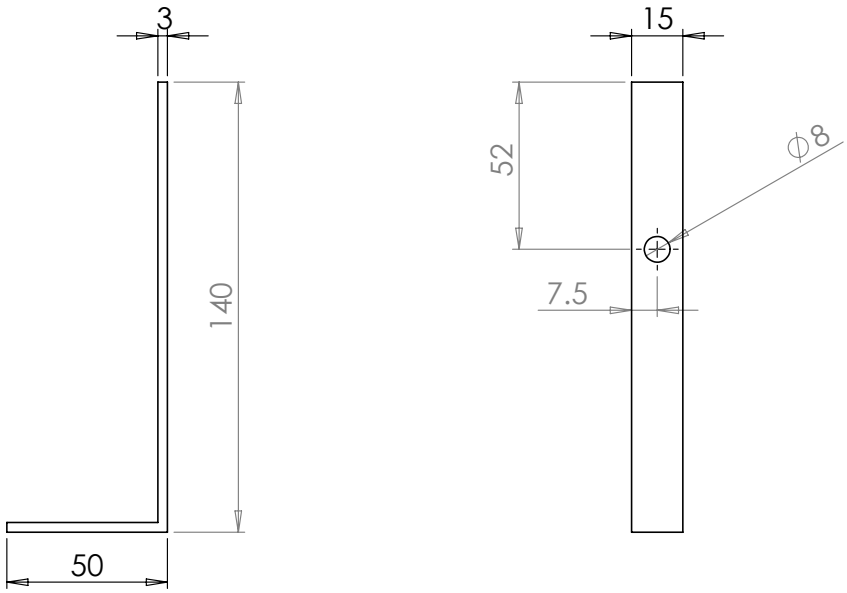


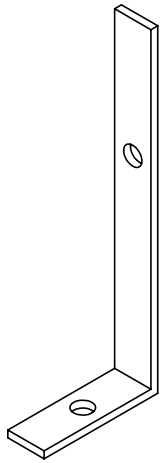




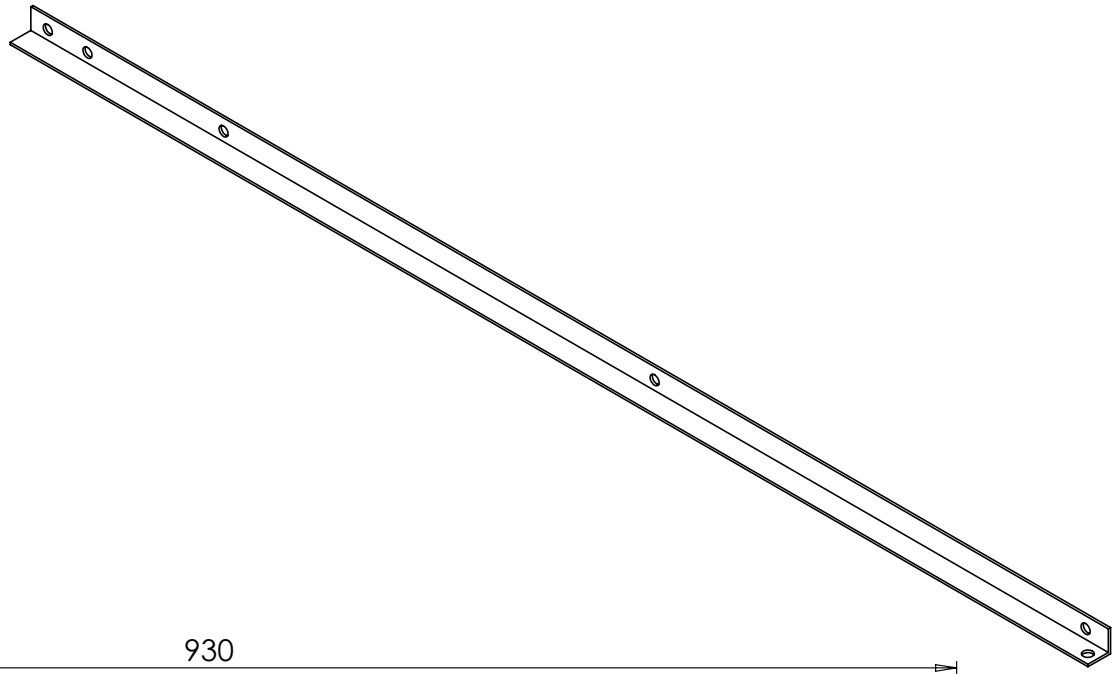


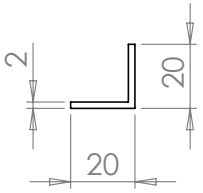
P19 - Mirror Row Balance Offset - x4

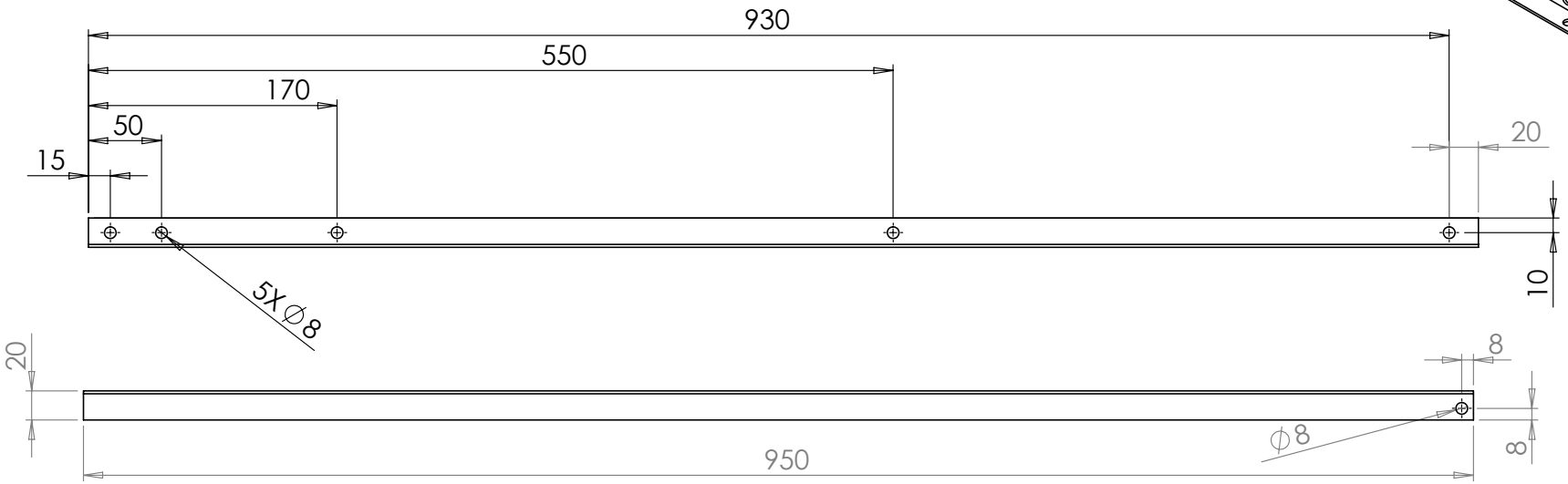




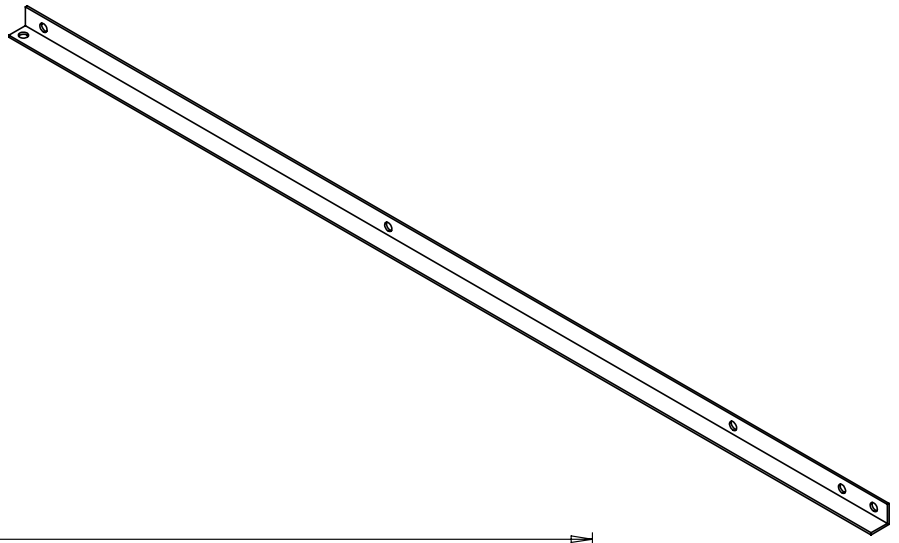
P20 - Mirror Support Diagonal A

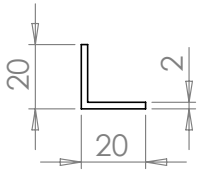


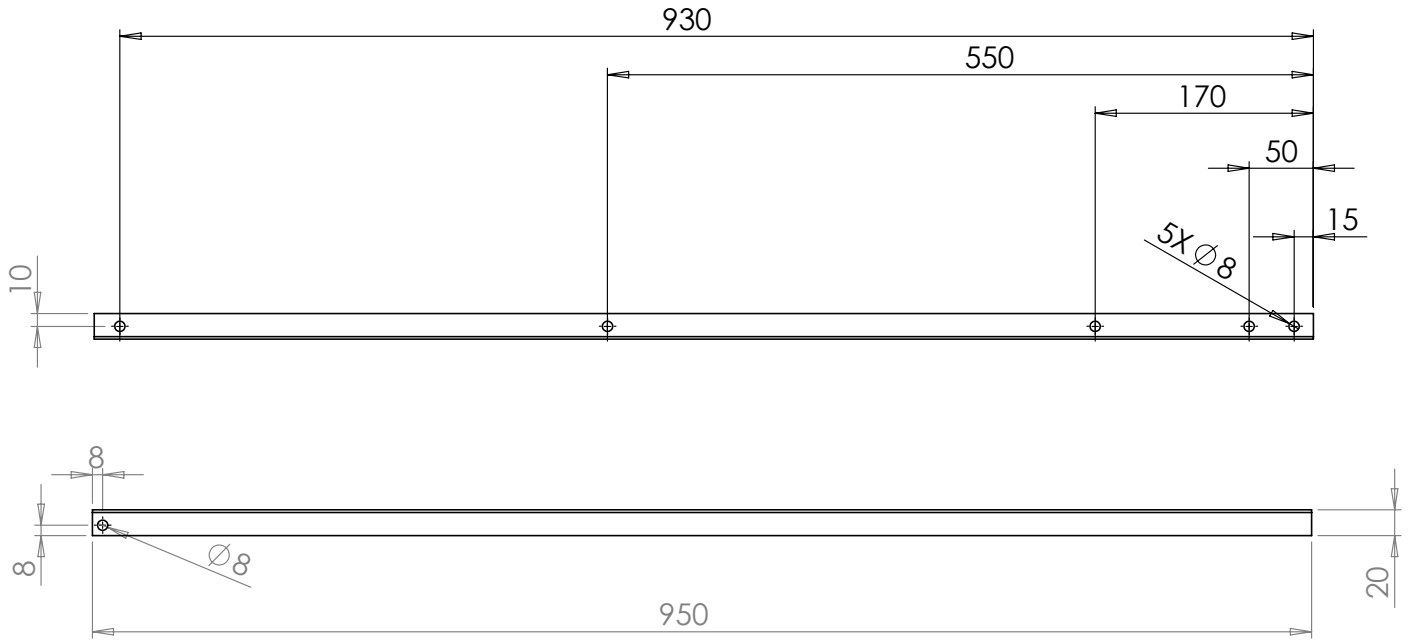




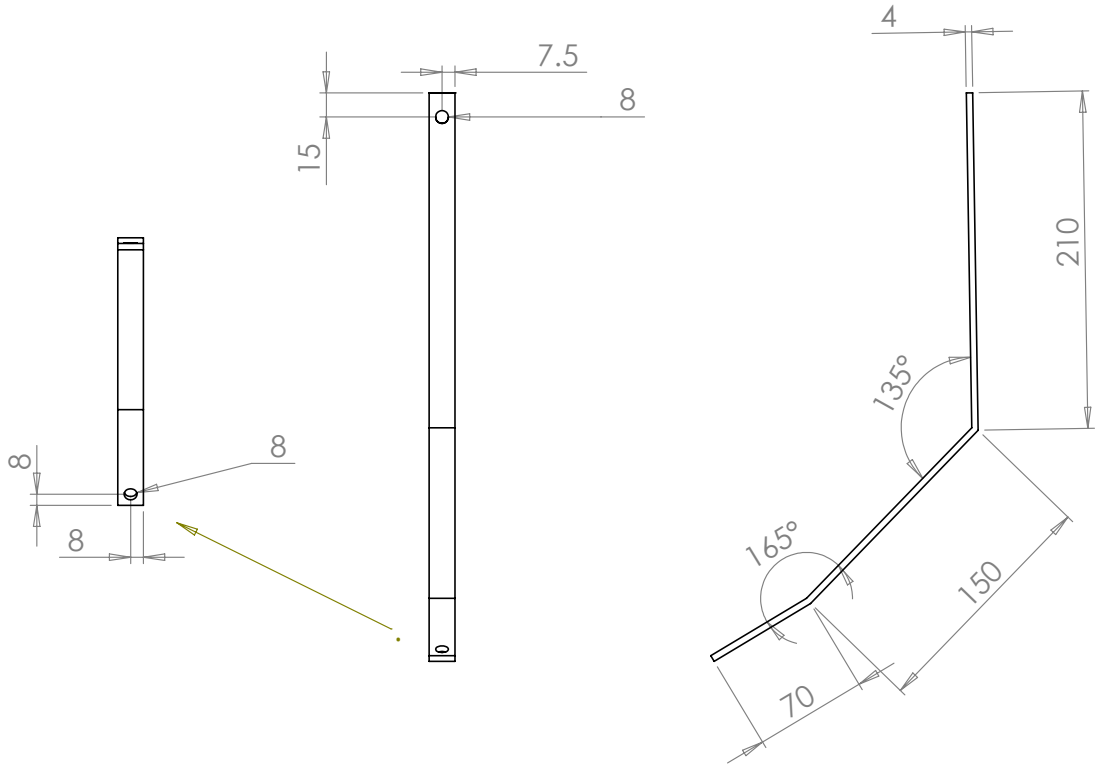
P21 - Mirror Support Diagonal B

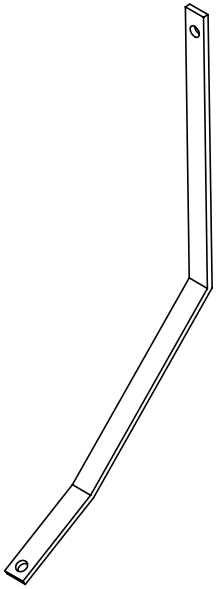




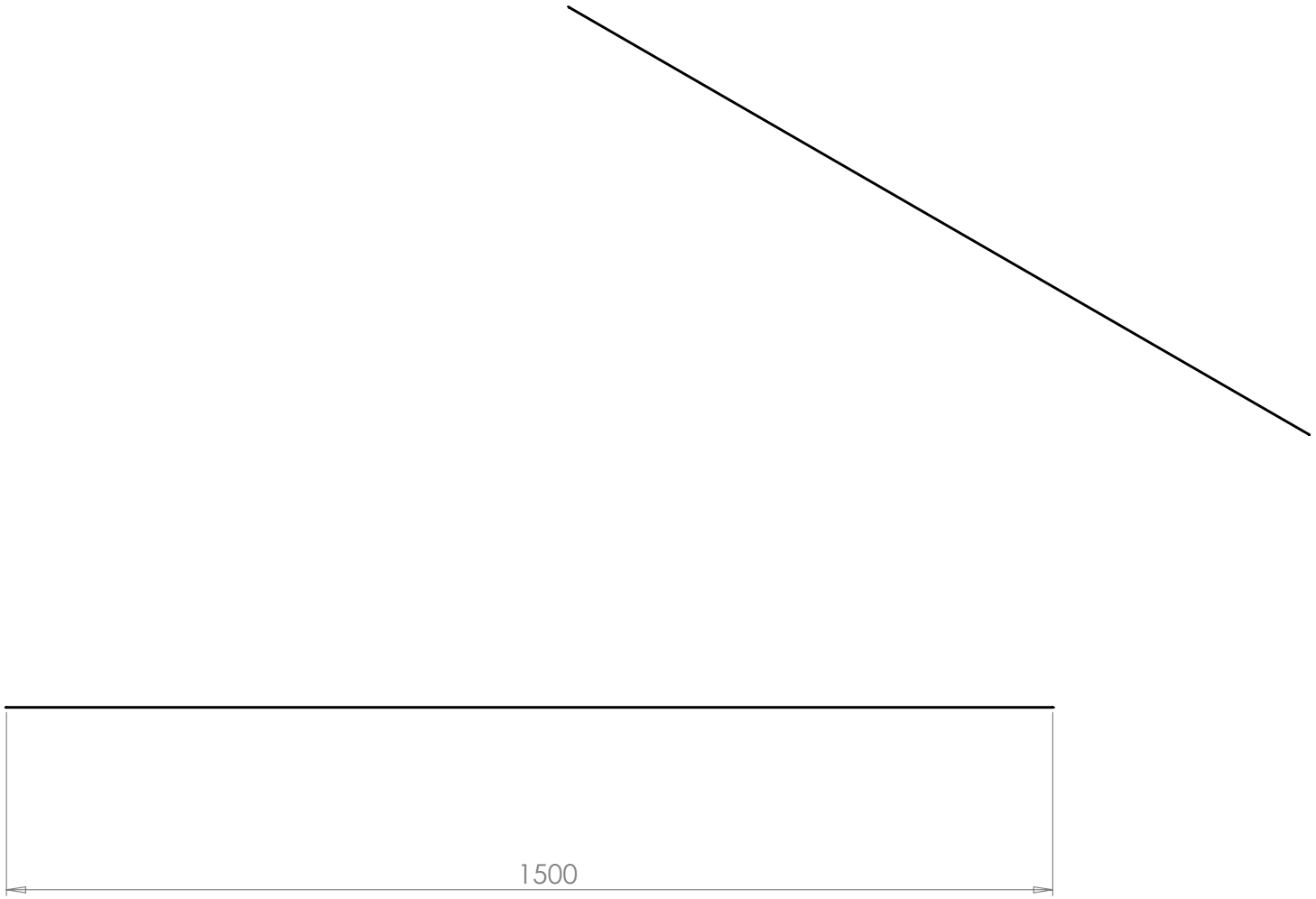


P22 - Guy-Wire Attachment Antennas

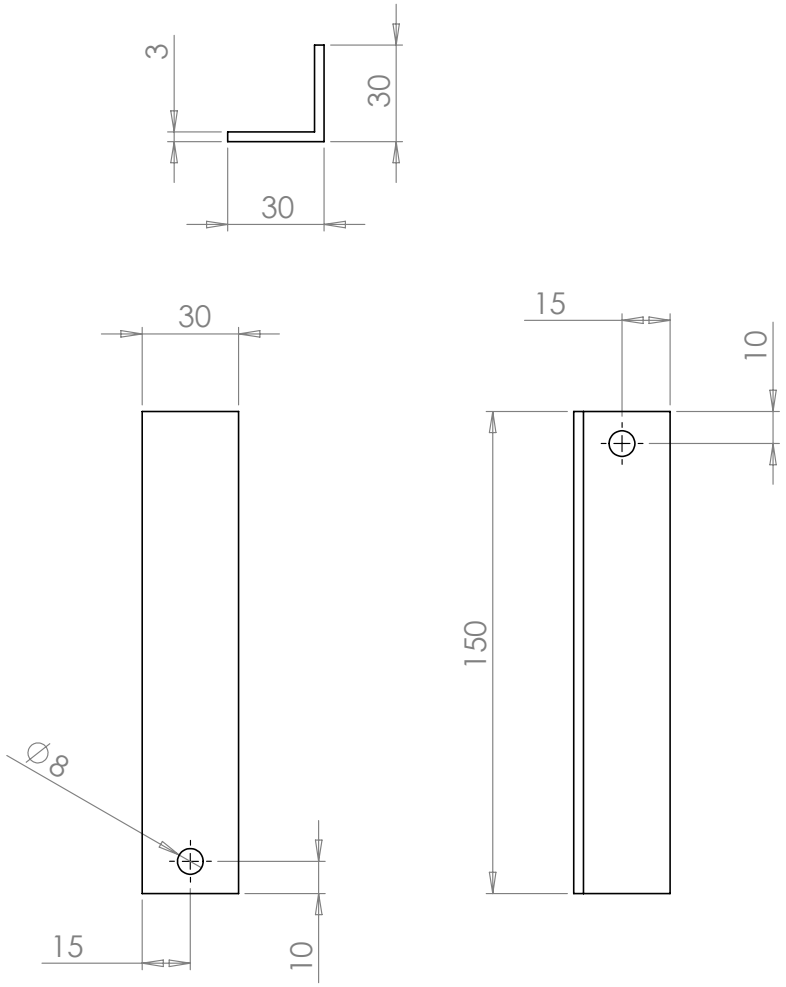


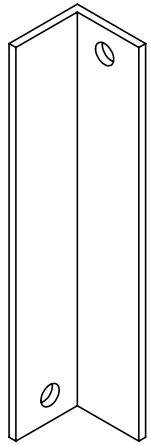


P23 - Guy-Wire

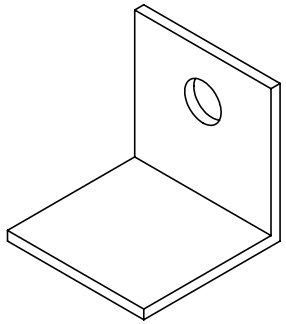


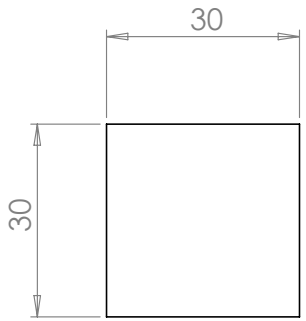
P24 - Row to Mirror Angle-Iron - x16

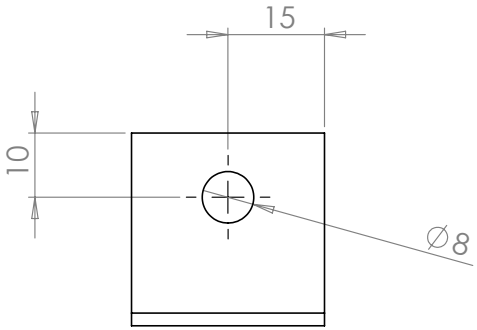


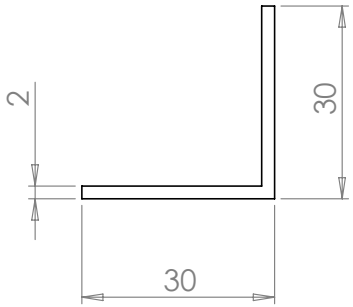


P25 - Mirror Backing Tab - x16

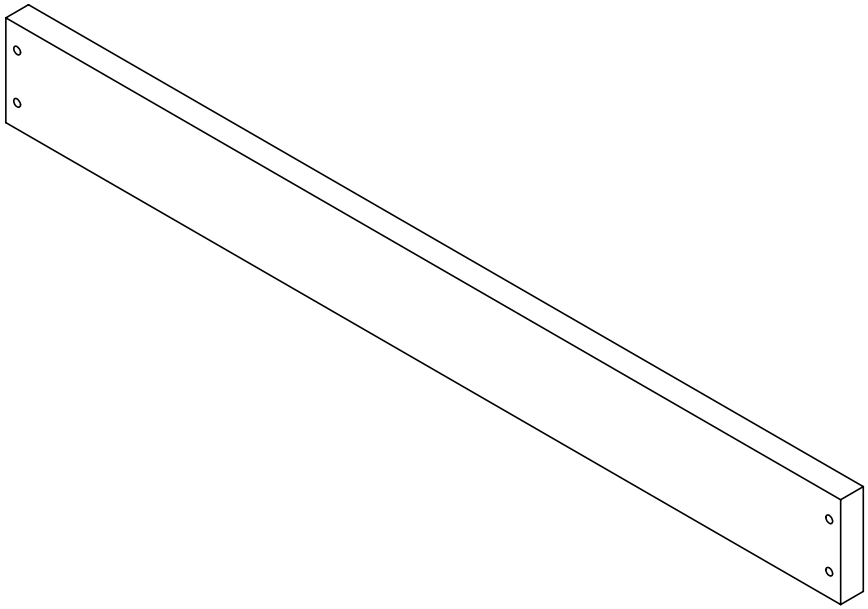




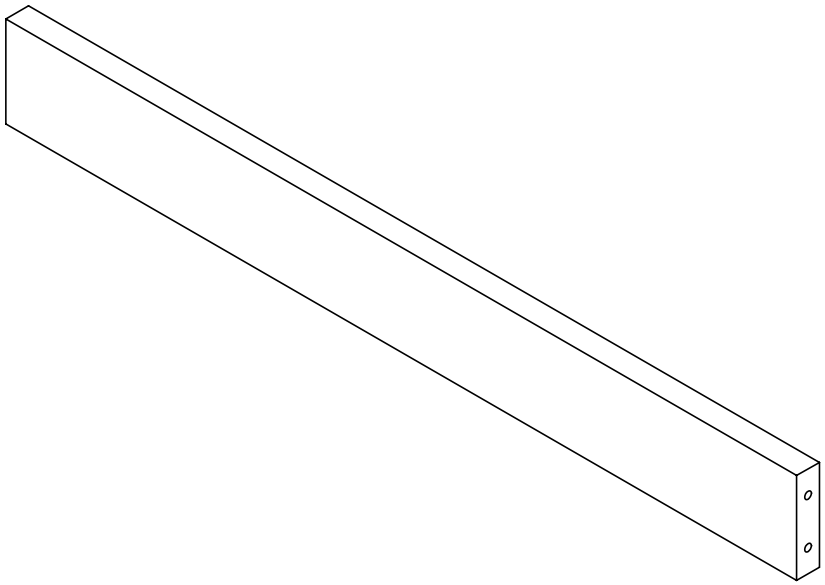




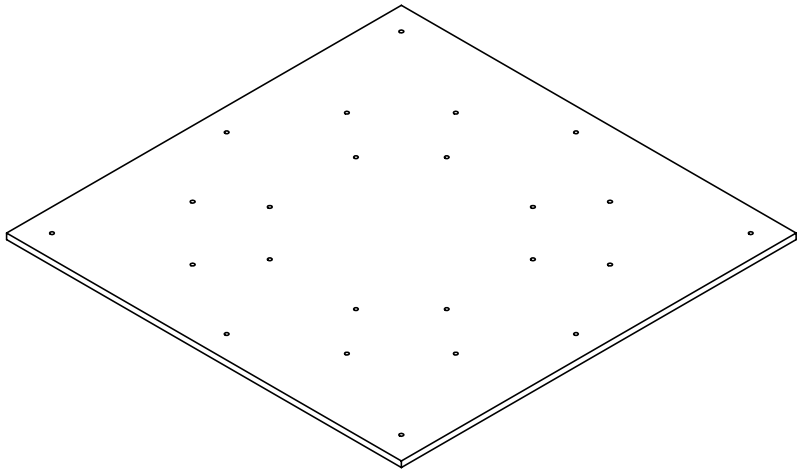
P26 - Wood frame long - x2

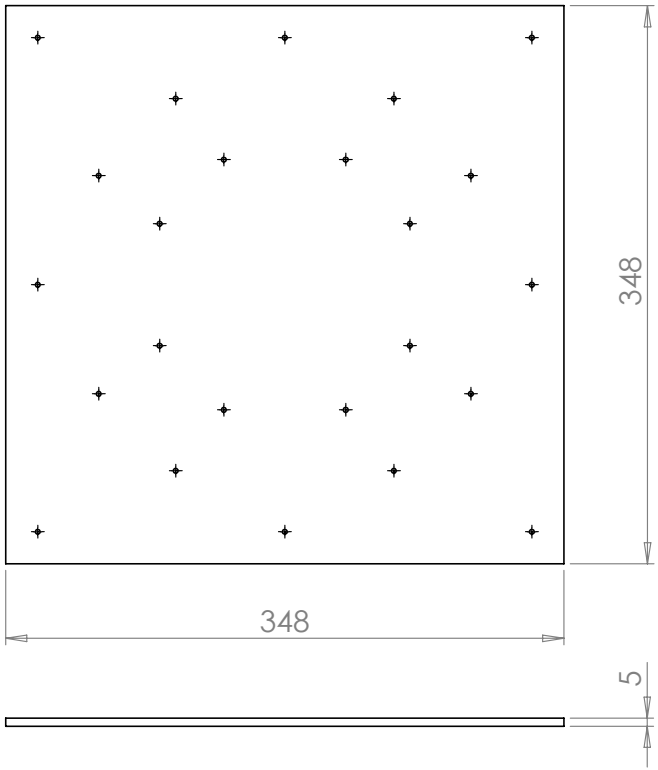


P27 - Wood frame short - x2



P28 - Square piece of wood.
Hole dimensions on next page.





P28