

Bijlagen

ontwerpen van luidsprekerkasten

Jeroen Labots

22 Augustus 2012



UNIVERSITEIT TWENTE.

PVS

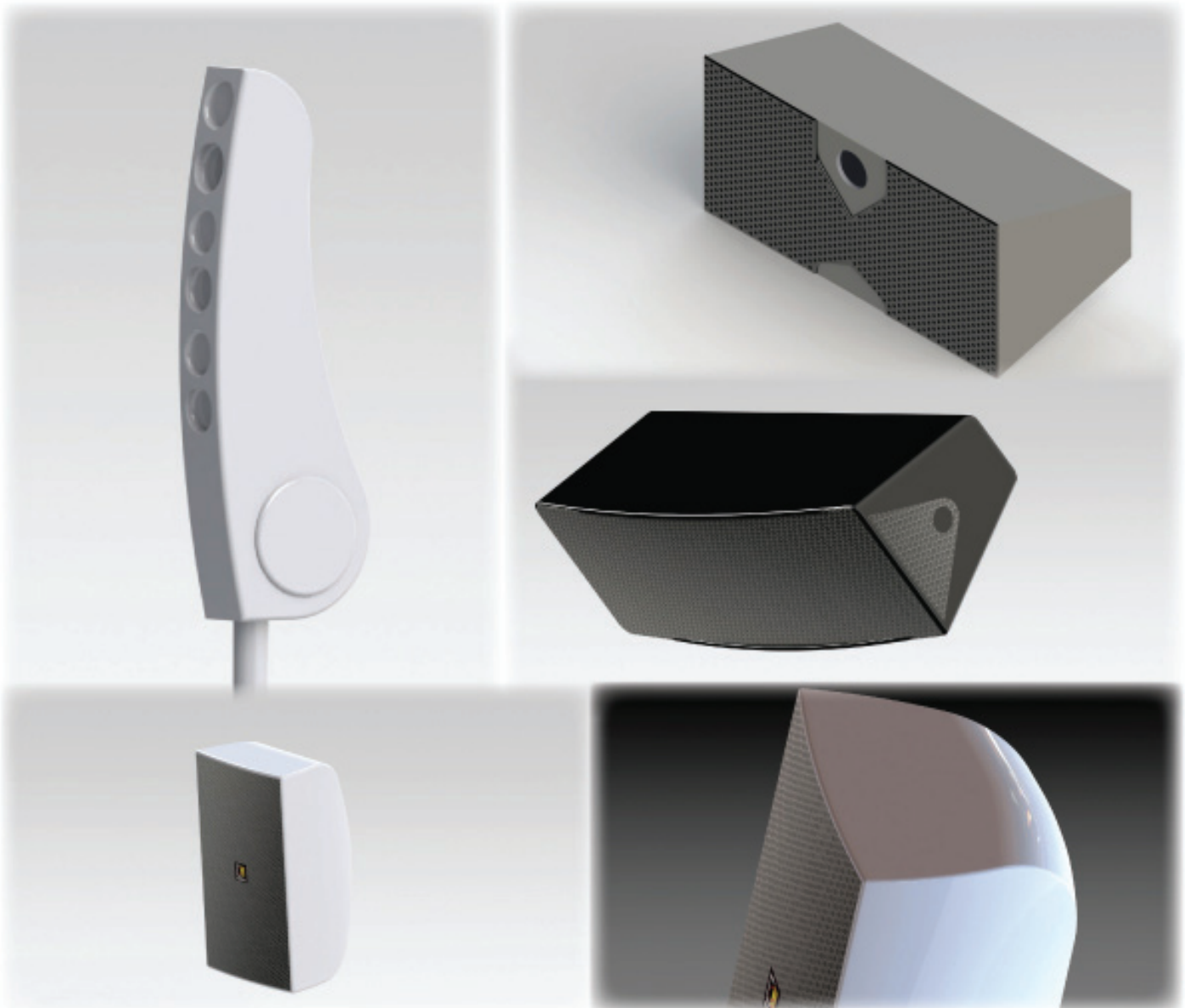
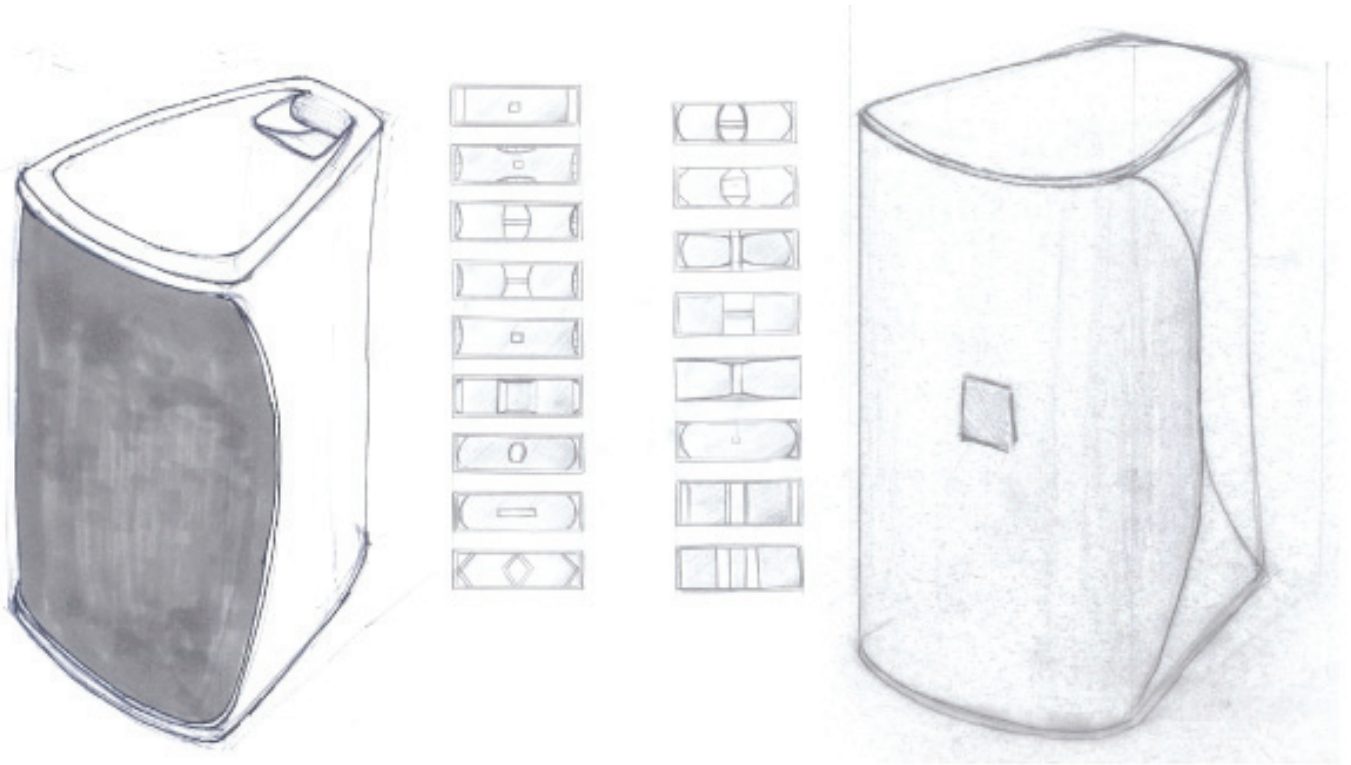
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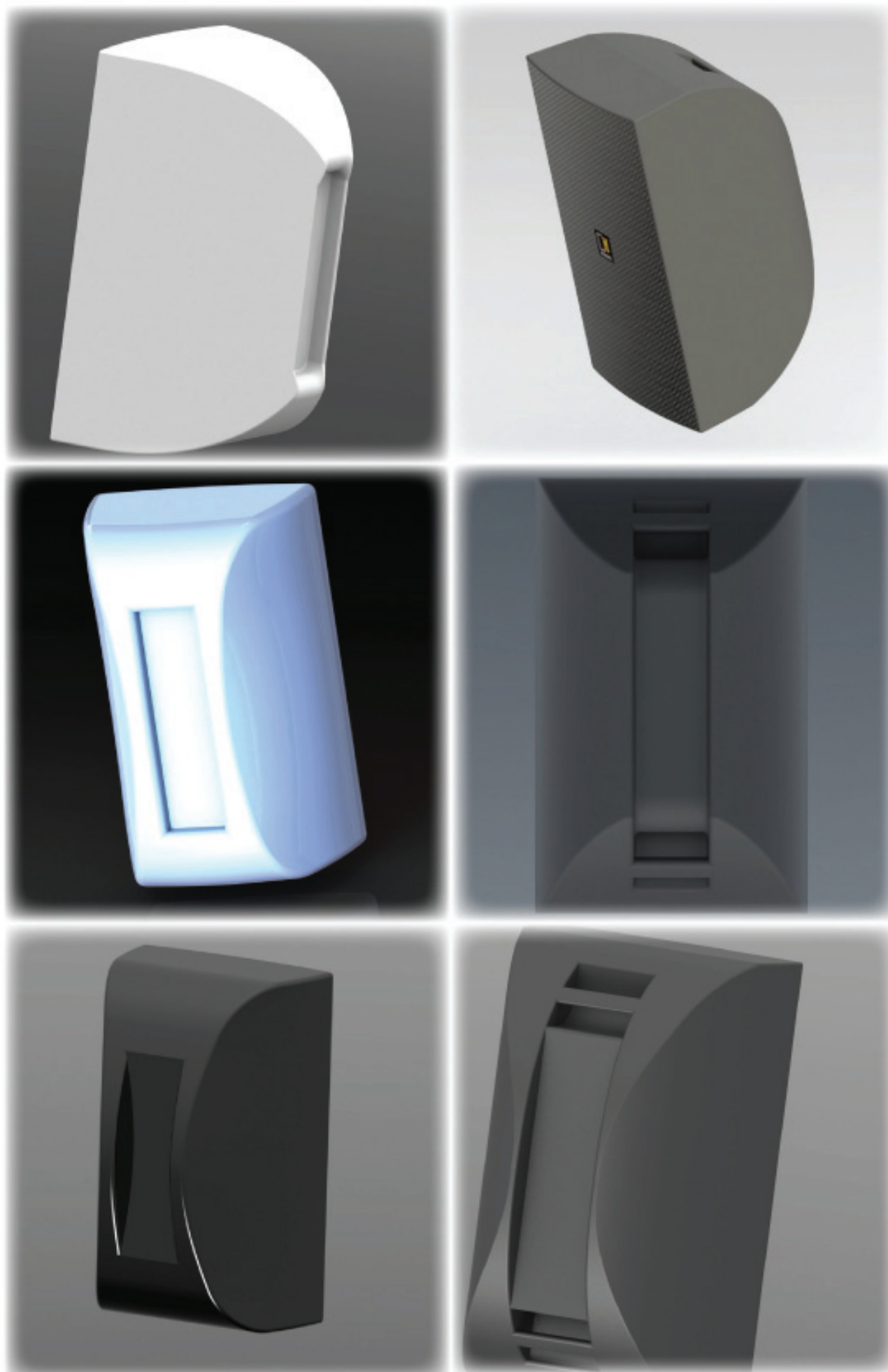
1. Analyse actieve luidspreker



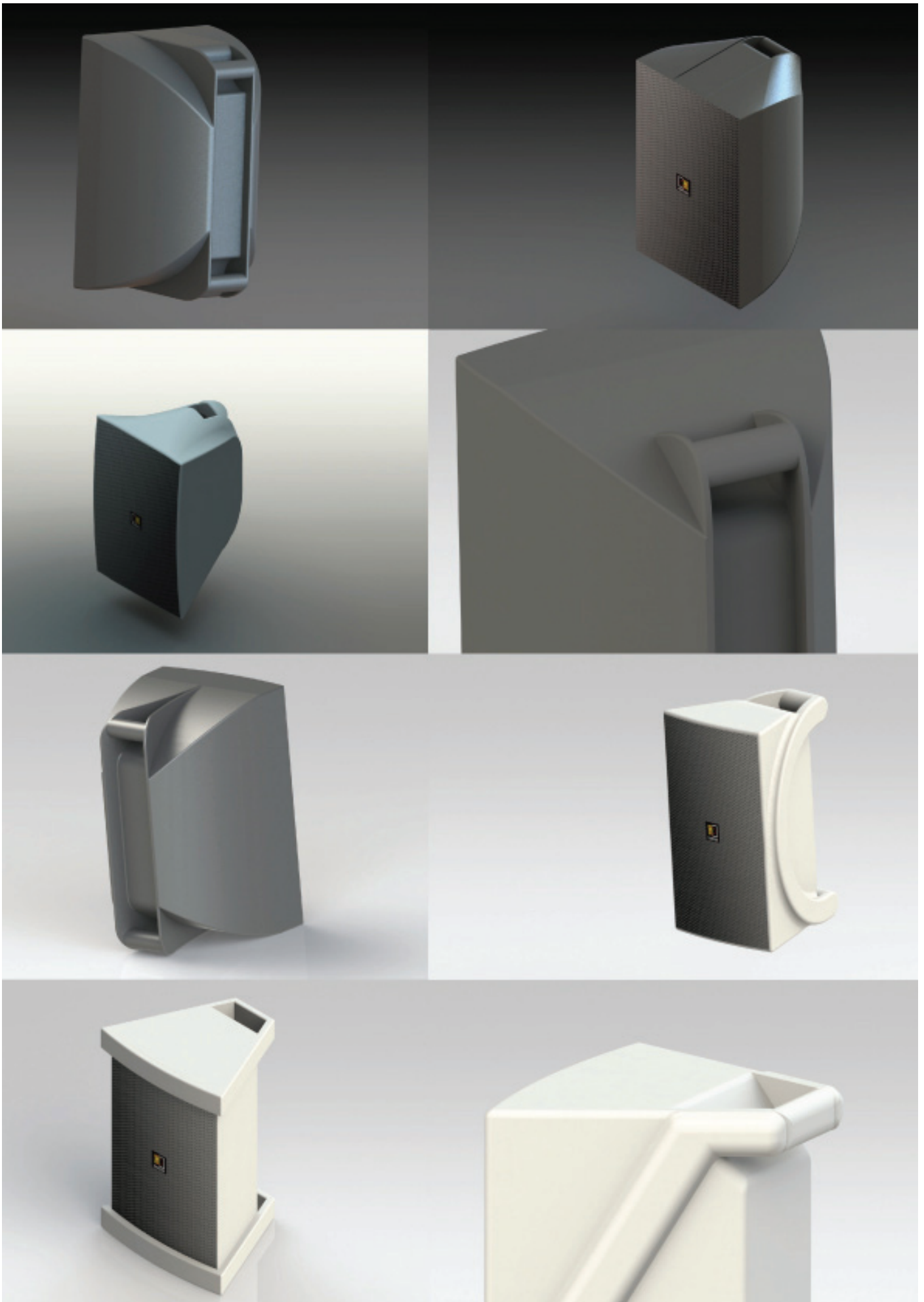
2. Schetsen actieve luidspreker



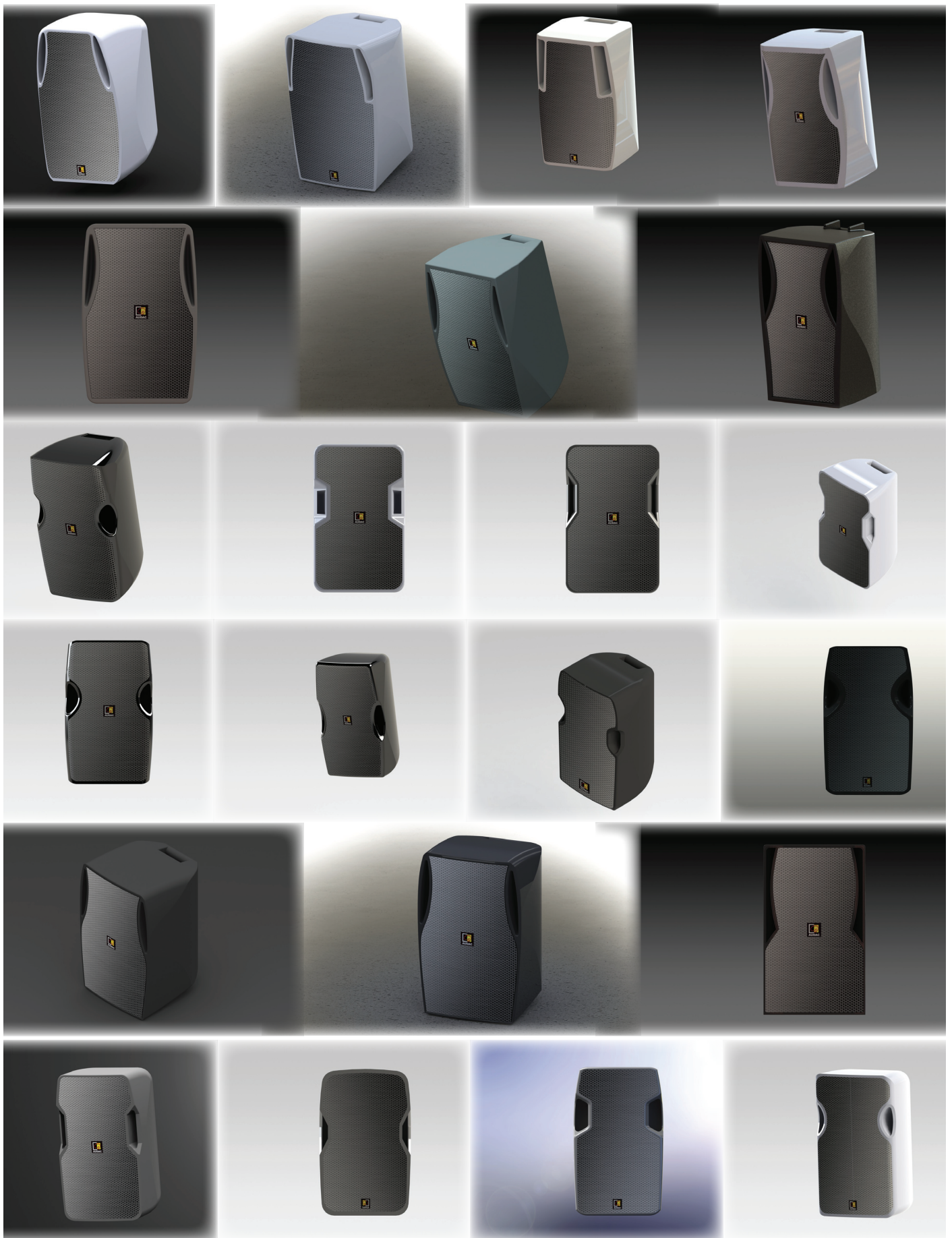
3. Concepten actieve luidspreker



4. Uitwerking handvat



5. Baspoorten



6. Drawing manual



Drawing Manual

Date :	Model :	Ref.No.:
20/05/12	Active 10	Active 10-12-001

Description:

AUDAC Active 10 inch Two-Way plastic loudspeaker cabinet

Used components:

LF Driver:

Keep space for a 250mm low-frequency driver

HF Driver:

In the front part a horn should be modeled with coverage of $90^\circ \times 60^\circ$. Behind the horn the high-frequency driver has to be mounted

BR port :

Together the bass ports should have a surface of 7200 mm^2 , so 3600 mm^2 per side. The depth of the ports should be 110 mm. The front end of the bass ports should have a conical opening and runs through on the side of the cabinet.

Cabinet:

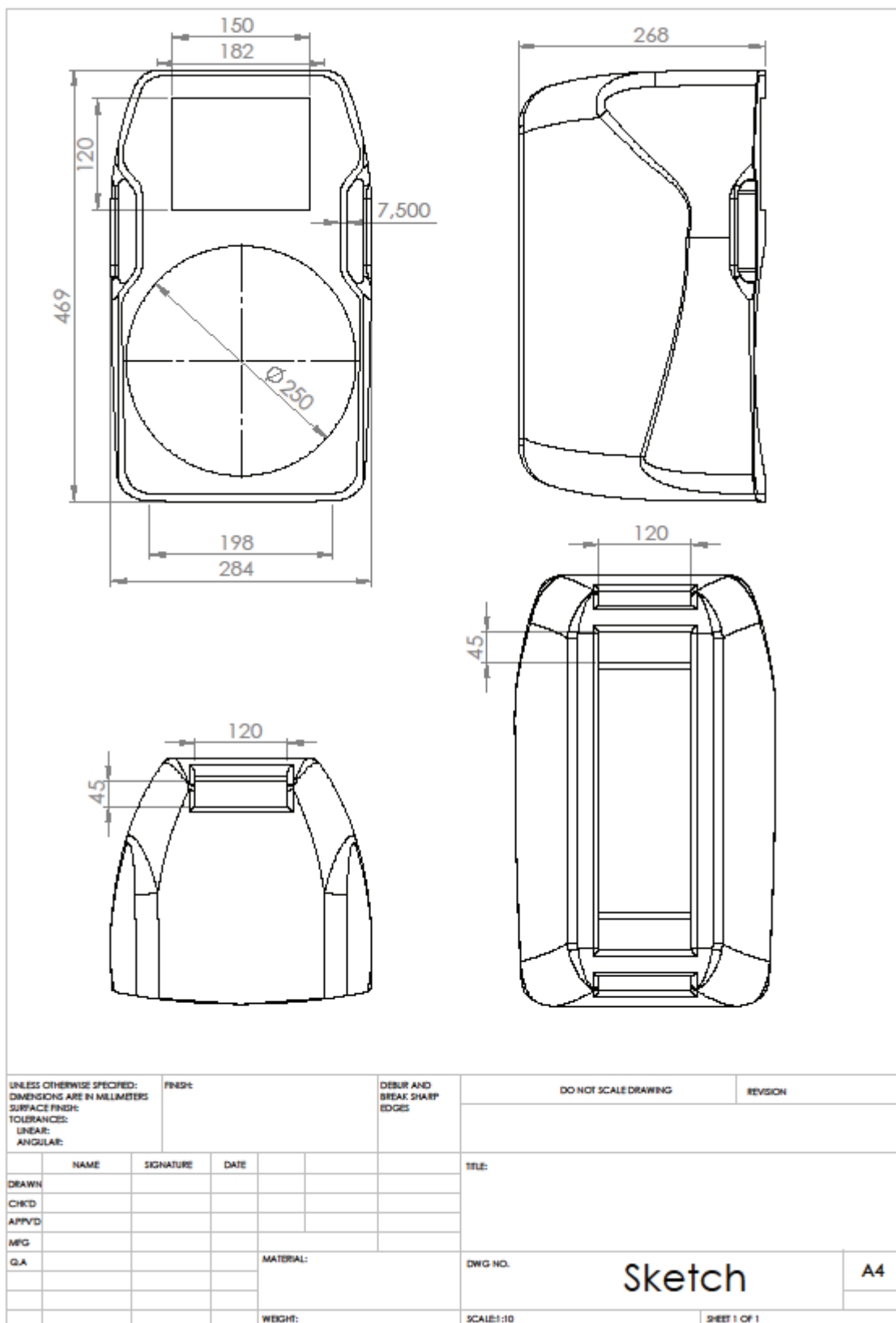
Made out of ABS material

Thickness of ☐ millimeter strengthened with ribs

The volume of the inside of the cabinet should be around 32 liter.



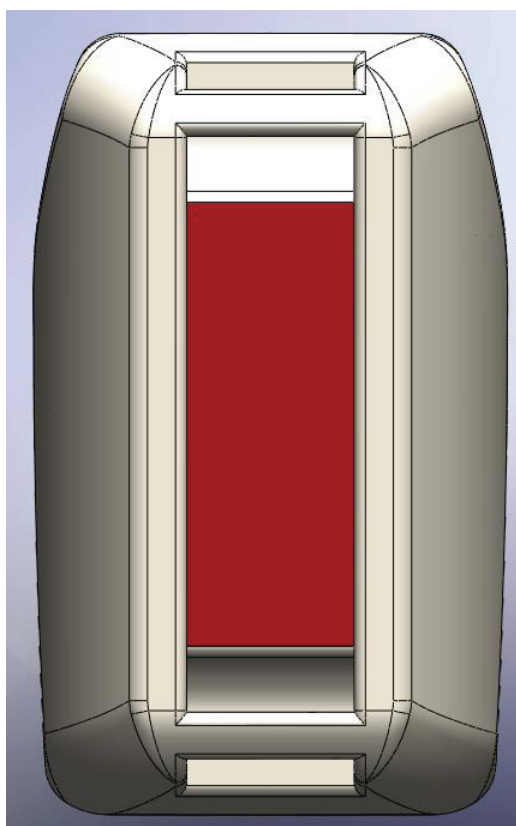
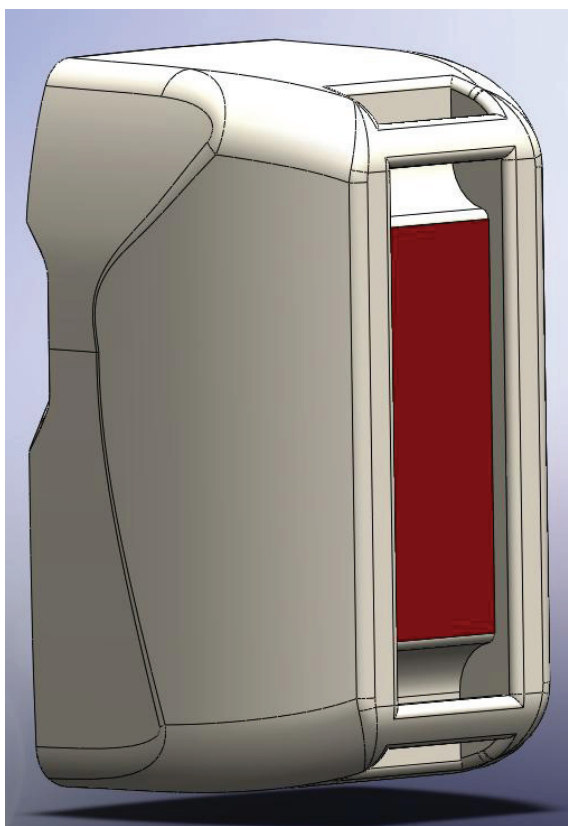
Date :	Model :	Ref.No.:
20/05/12	Active 10	Active 10-12-001



Date :	Model :	Ref.No.:
20/05/12	Active 10	Active 10-12-001

Amplifier:

The amplifier plate has to be detachable at the back of the speaker. In the picture it will be the dark red plate:


Color:

Black

Feet:

At the bottom 4 feet should be drawn so the speaker can stand with the drivers vertically.

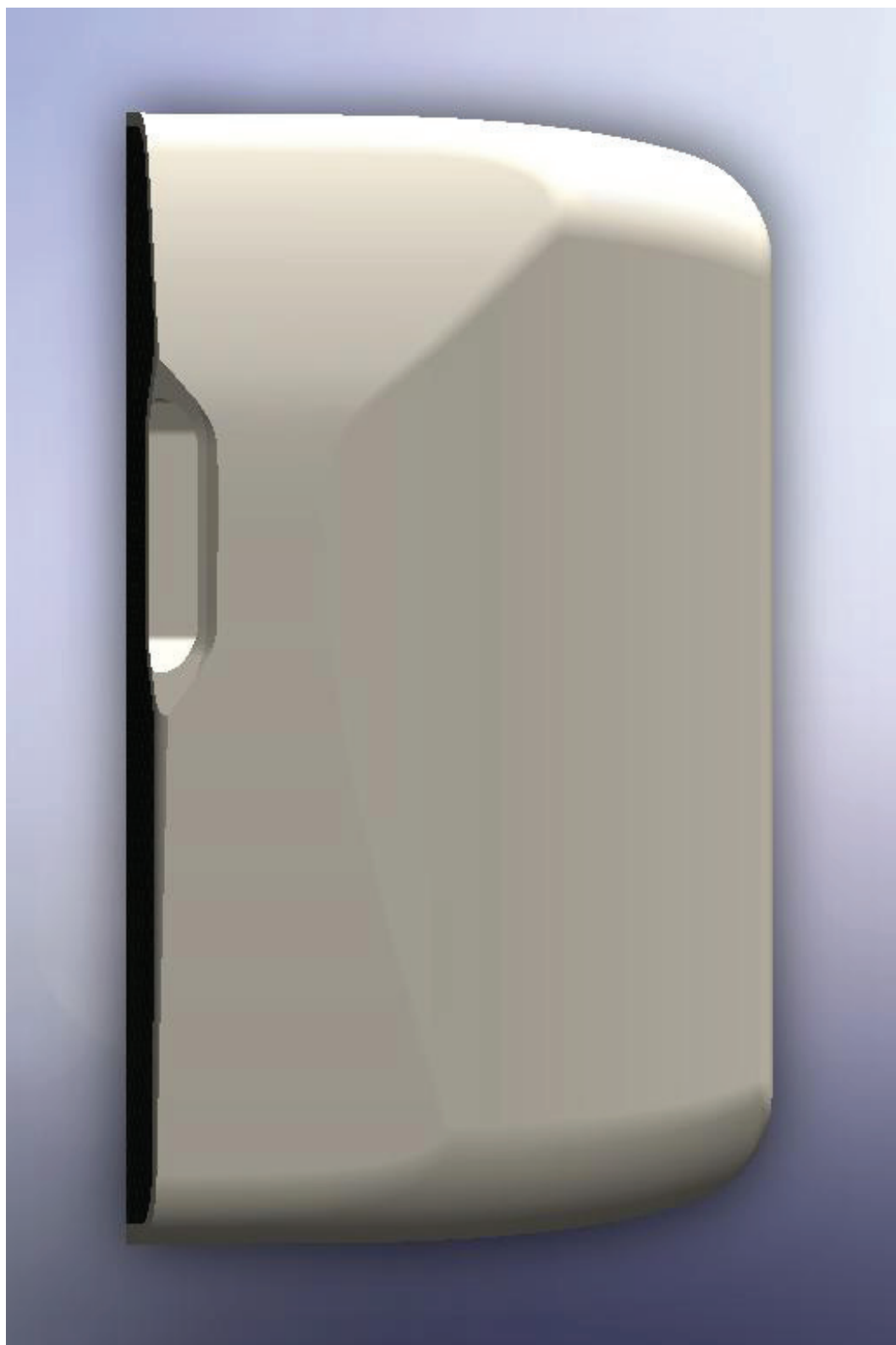
Grill:

The grill should be made out of steel with a plate thickness of at least 1,2 mm with hexagon holes with a size around 4 mm.

Date :	Model :	Ref.No.:
20/05/12	Active 10	Active 10-12-001



Date :	Model :	Ref.No.:
20/05/12	Active 10	Active 10-12-001



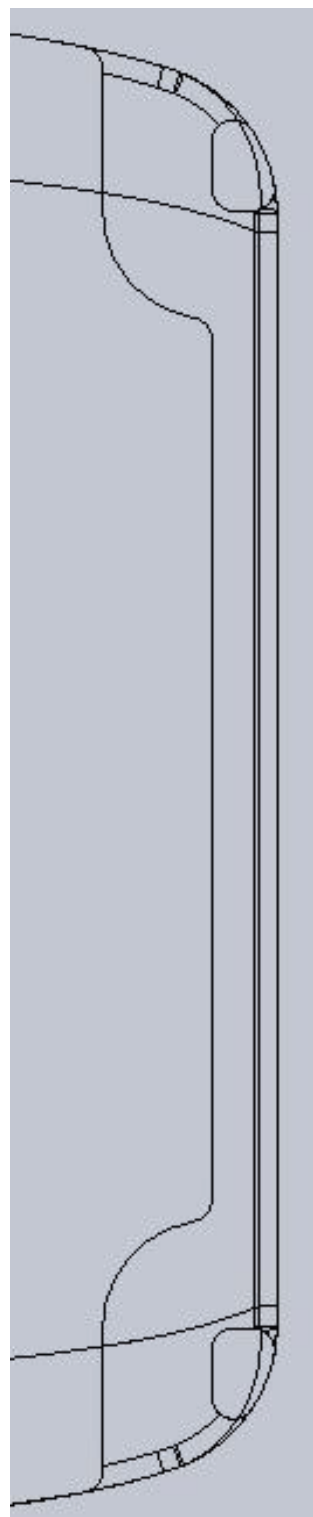
Date :	Model :	Ref.No.:
20/05/12	Active 10	Active 10-12-001

Handle:

The handle should be made out of a separate tooling from the rest of the back tooling. The handle and amplifier plate are both recessed in the back and should run through fluently.

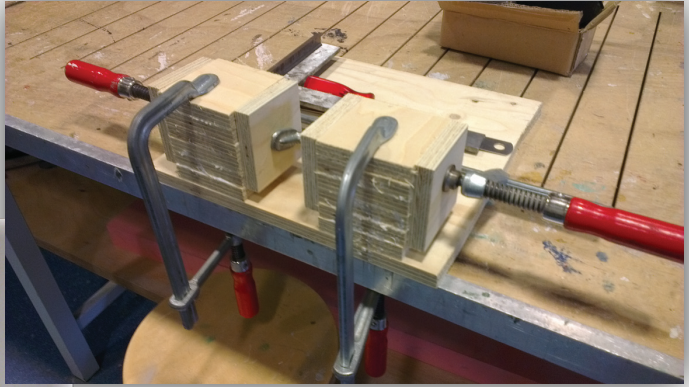

Logo:

Logo should be recessed in the front grill and placed 4 mm from the bottom of the grill.

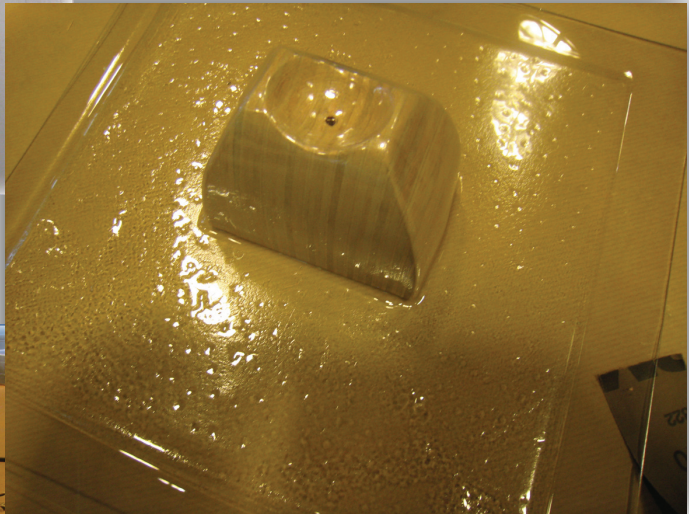


7. Ateo prototypes

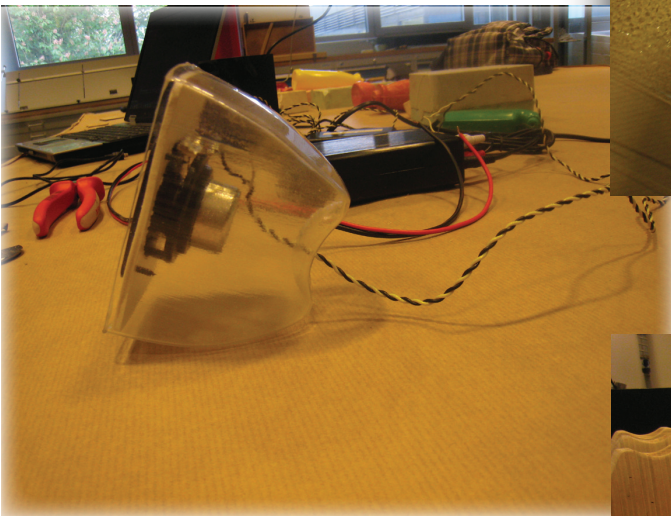
- ① Hout verlijmen tot blokken



- ② Blokken verwerken tot juiste vorm



- ③ Vacuumentrekken van vorm



- ④ Overige componenten toevoegen



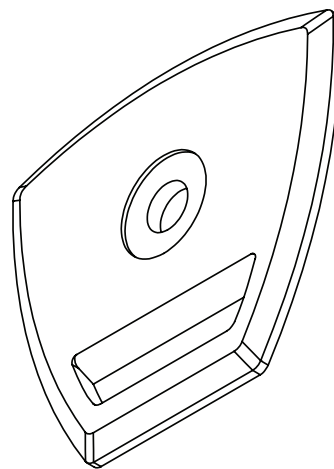
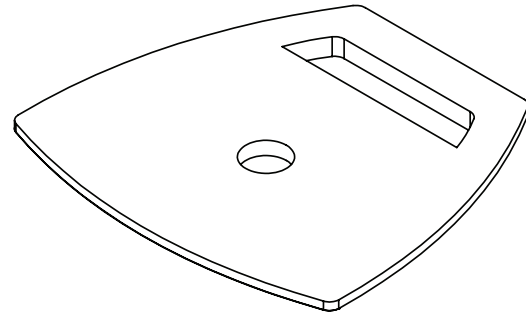
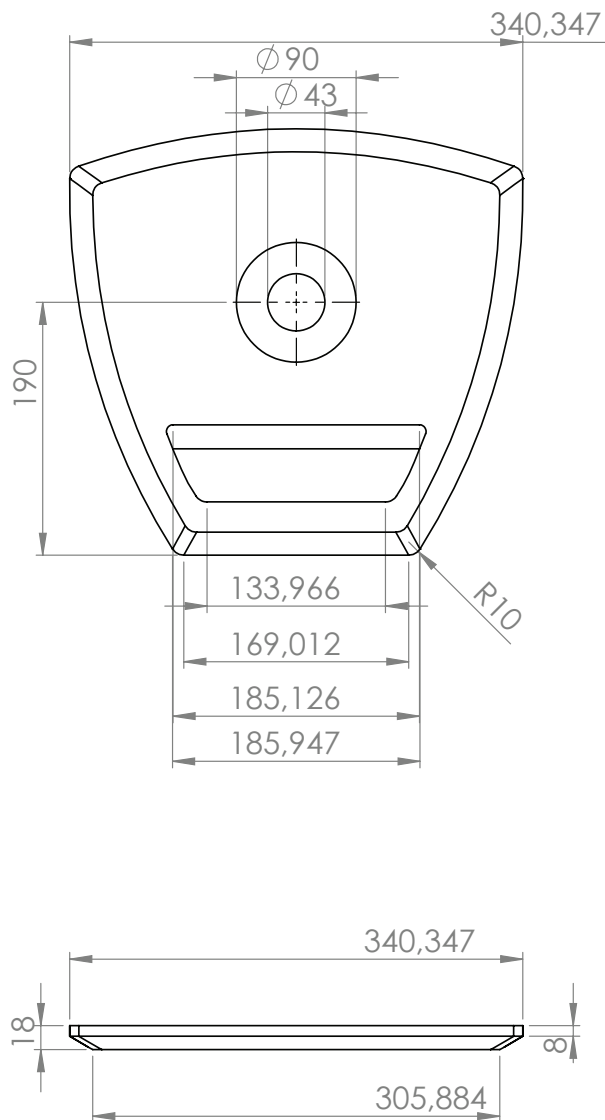
- ⑤ Variabelen veranderen



- ⑥ Testen doormiddel van vergelijking

8. Technische tekeningen PX





UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND
BREAK SHARP
EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE			
DRAWN						
CHK'D						
APPV'D						
MFG						
Q.A						

MATERIAL:

Plywood

WEIGHT:

TITLE:

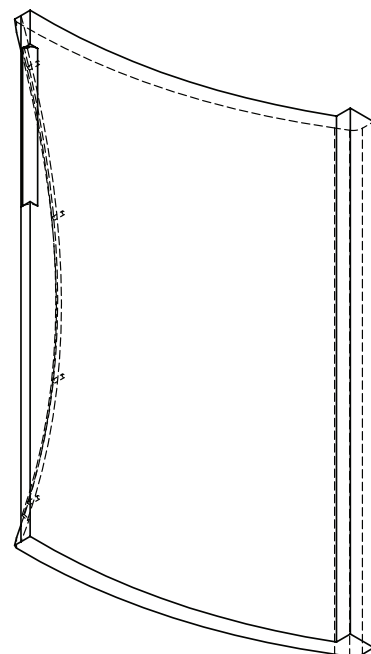
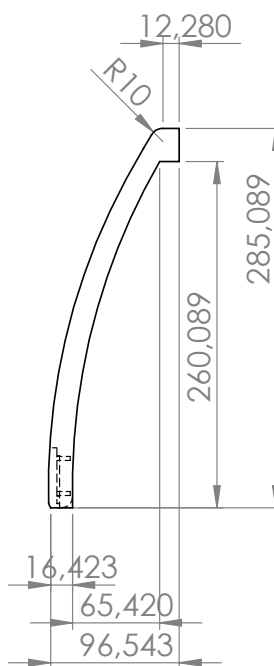
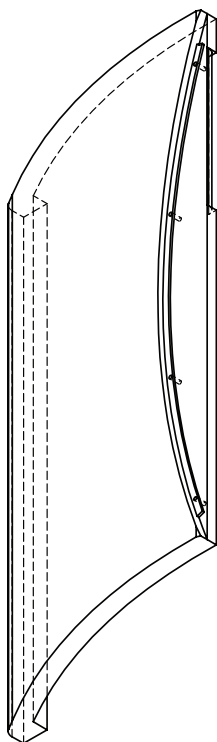
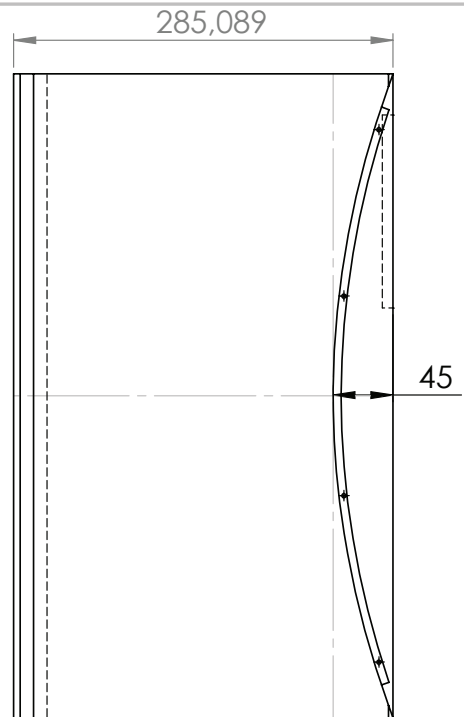
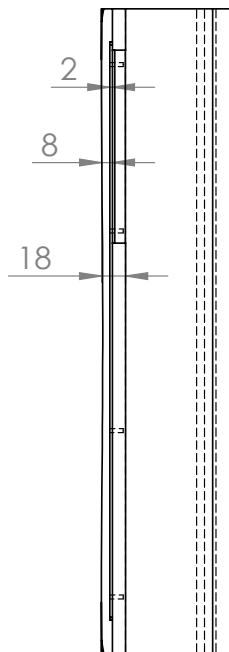
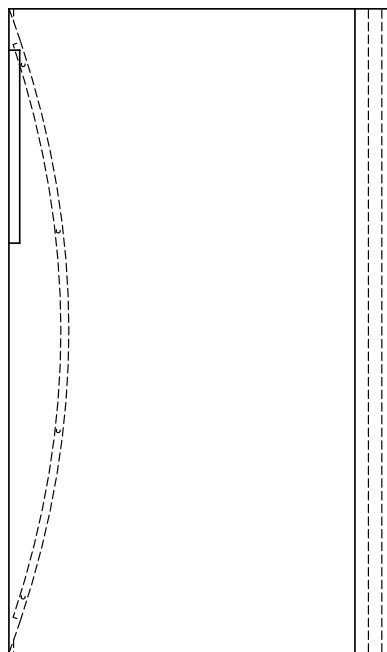
DWG NO.

Bottom

A4

SCALE:1:10

SHEET 1 OF 1



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND
BREAK SHARP
EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE			
DRAWN						
CHK'D						
APPV'D						
MFG						
Q.A						

MATERIAL:

Plywood

WEIGHT:

TITLE:

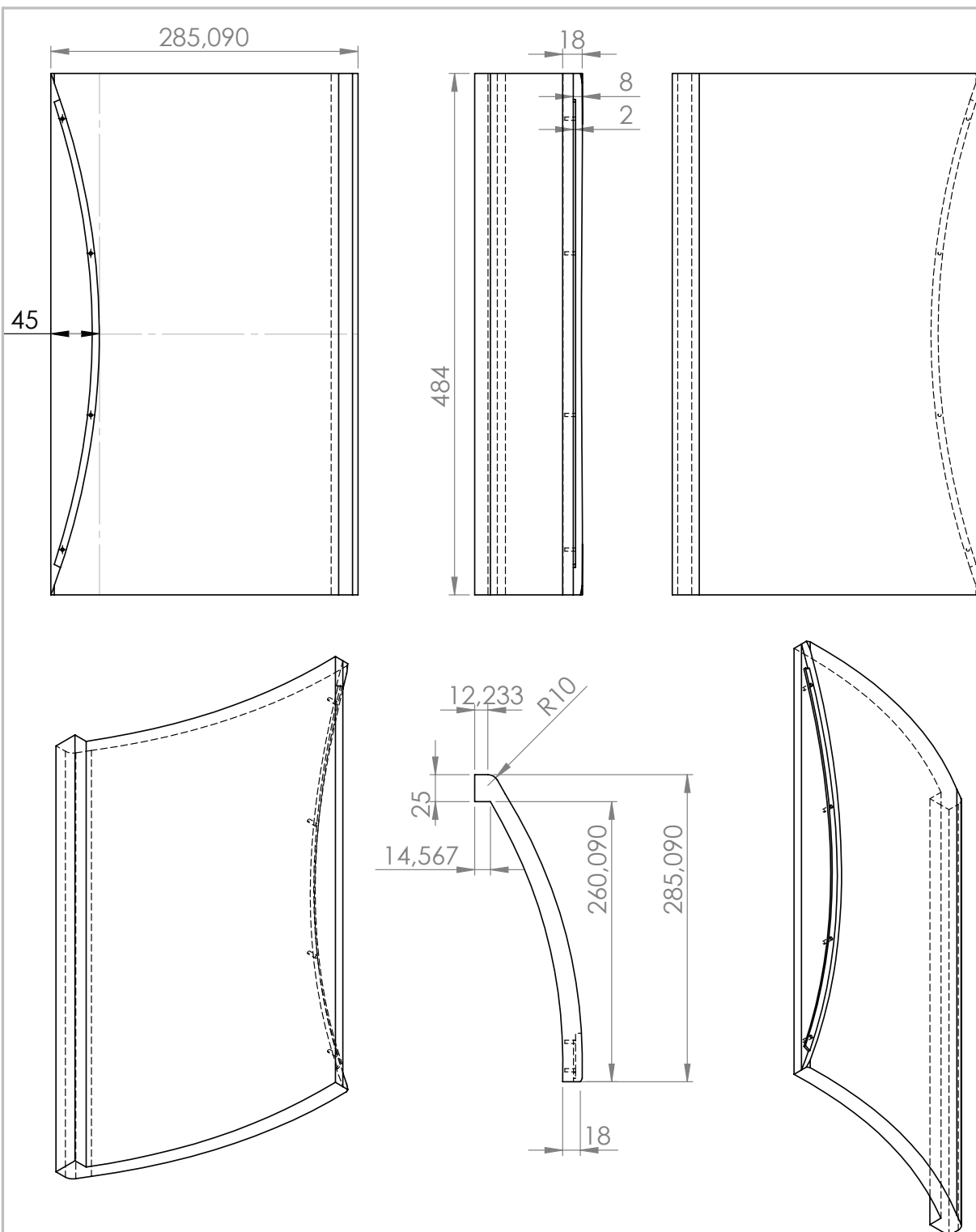
DWG NO.

Left side

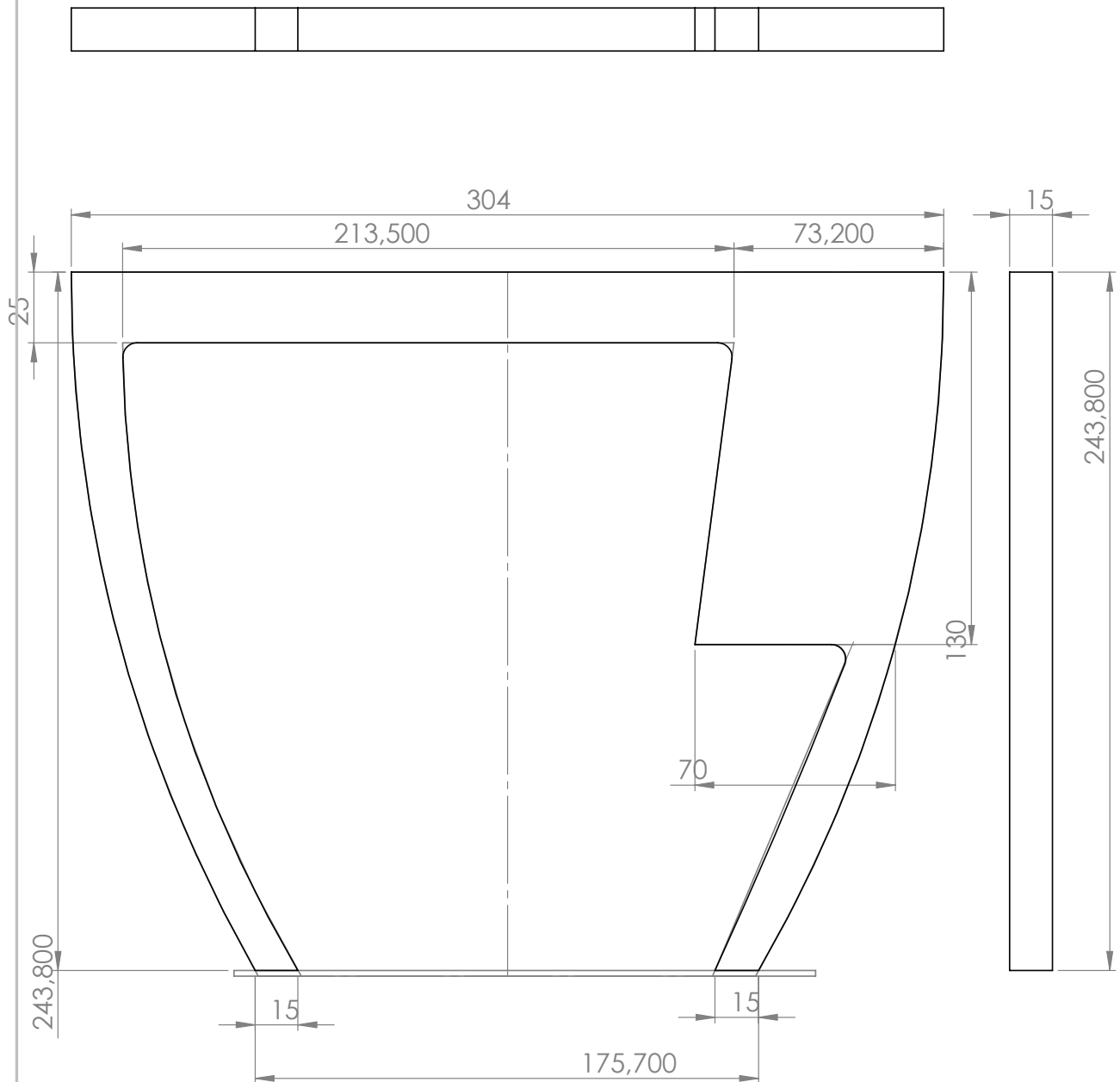
A4

SCALE:1:5

SHEET 1 OF 1



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:		DEBUR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING		REVISION	
NAME		SIGNATURE		DATE		TITLE:			
DRAWN									
CHK'D									
APPV'D									
MFG									
Q.A									
				MATERIAL:		DWG NO.		A4	
				Plywood		Right side			
				WEIGHT:		SCALE:1:5		SHEET 1 OF 1	



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SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

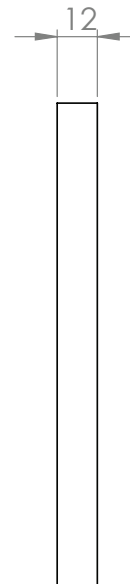
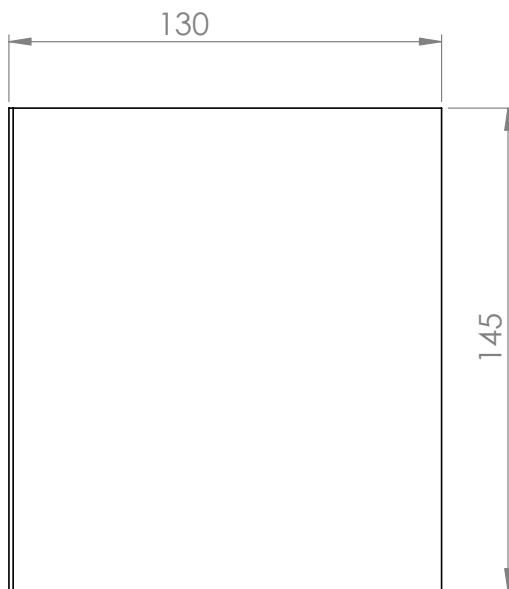
DEBUR AND
BREAK SHARP
EDGES

DO NOT SCALE DRAWING

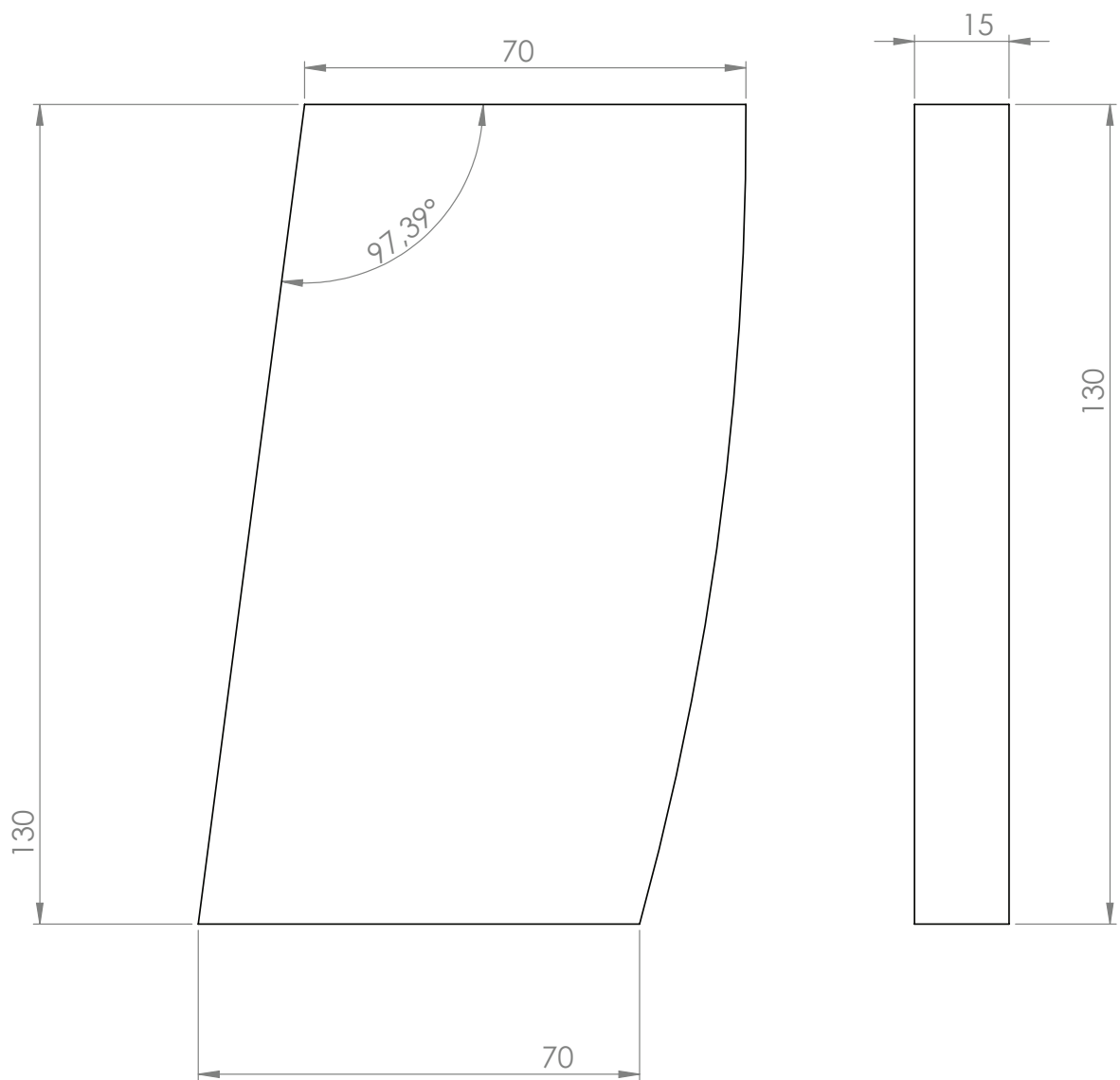
REVISION

NAME	SIGNATURE	DATE			
DRAWN					
CHK'D					
APPV'D					
MFG					
Q.A					
MATERIAL: Plywood					
WEIGHT:					

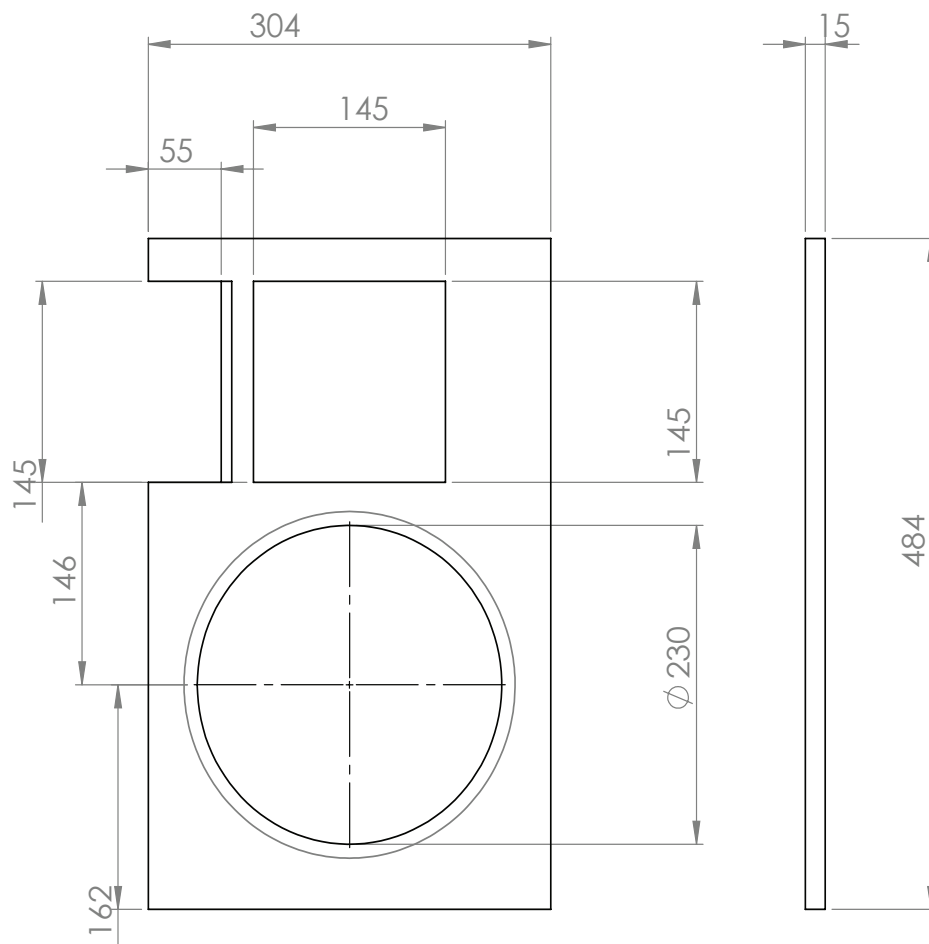
TITLE:		DWG NO.		A4	
midplate		SCALE:1:5		SHEET 1 OF 1	



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NAME		SIGNATURE		DATE		TITLE:			
DRAWN									
CHK'D									
APPV'D									
MFG									
Q.A									
				MATERIAL:		DWG NO.		A4	
				Plywood					
				WEIGHT:		SCALE:1:2		SHEET 1 OF 1	



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NAME		SIGNATURE		DATE		TITLE:			
DRAWN									
CHK'D									
APPV'D									
MFG									
Q.A									
						MATERIAL:			
						Plywood			
						DWG NO.		Top BR	
						SCALE:1:1		SHEET 1 OF 1	
						WEIGHT:			
								A4	



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND
BREAK SHARP
EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE			
DRAWN						
CHK'D						
APPV'D						
MFG						
Q.A						

MATERIAL:

Plywood

WEIGHT:

TITLE:

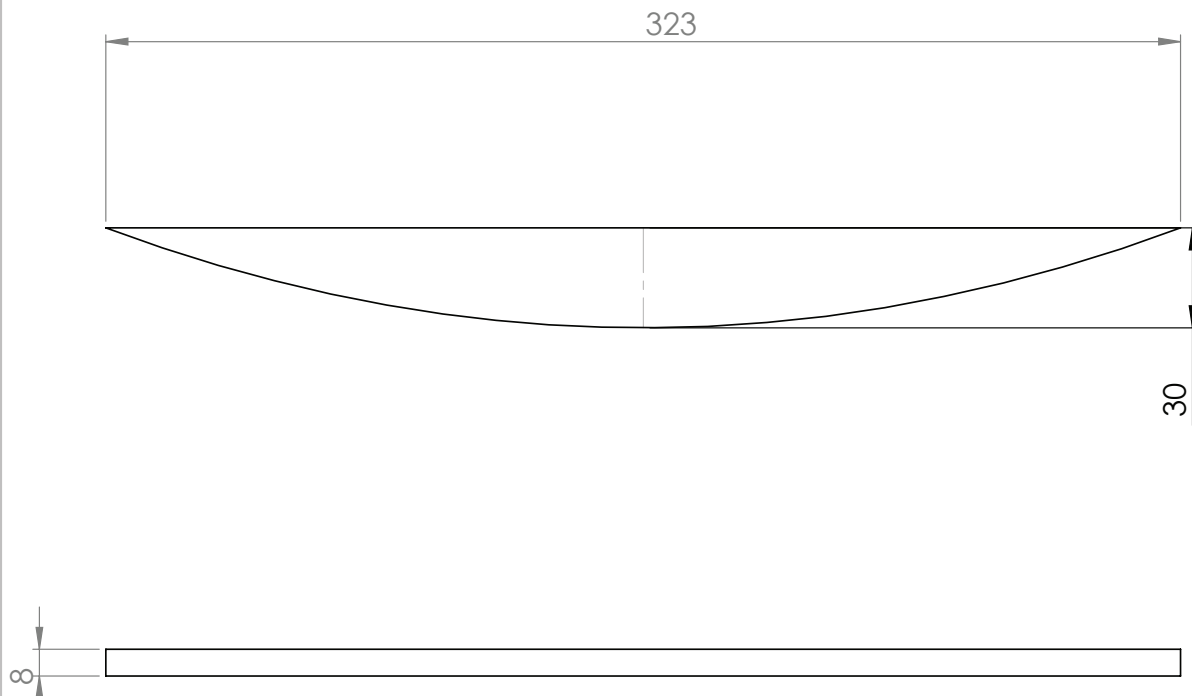
DWG NO.

SCALE:1:5

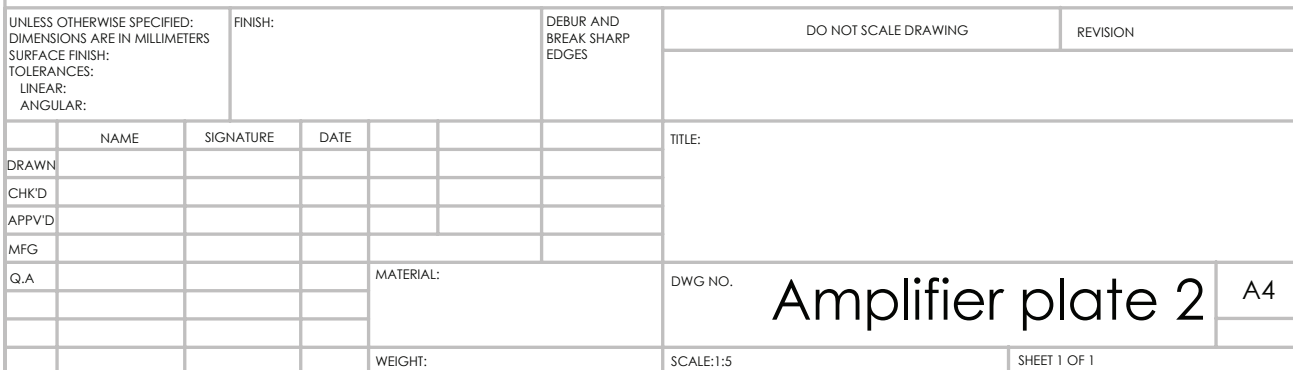
Front

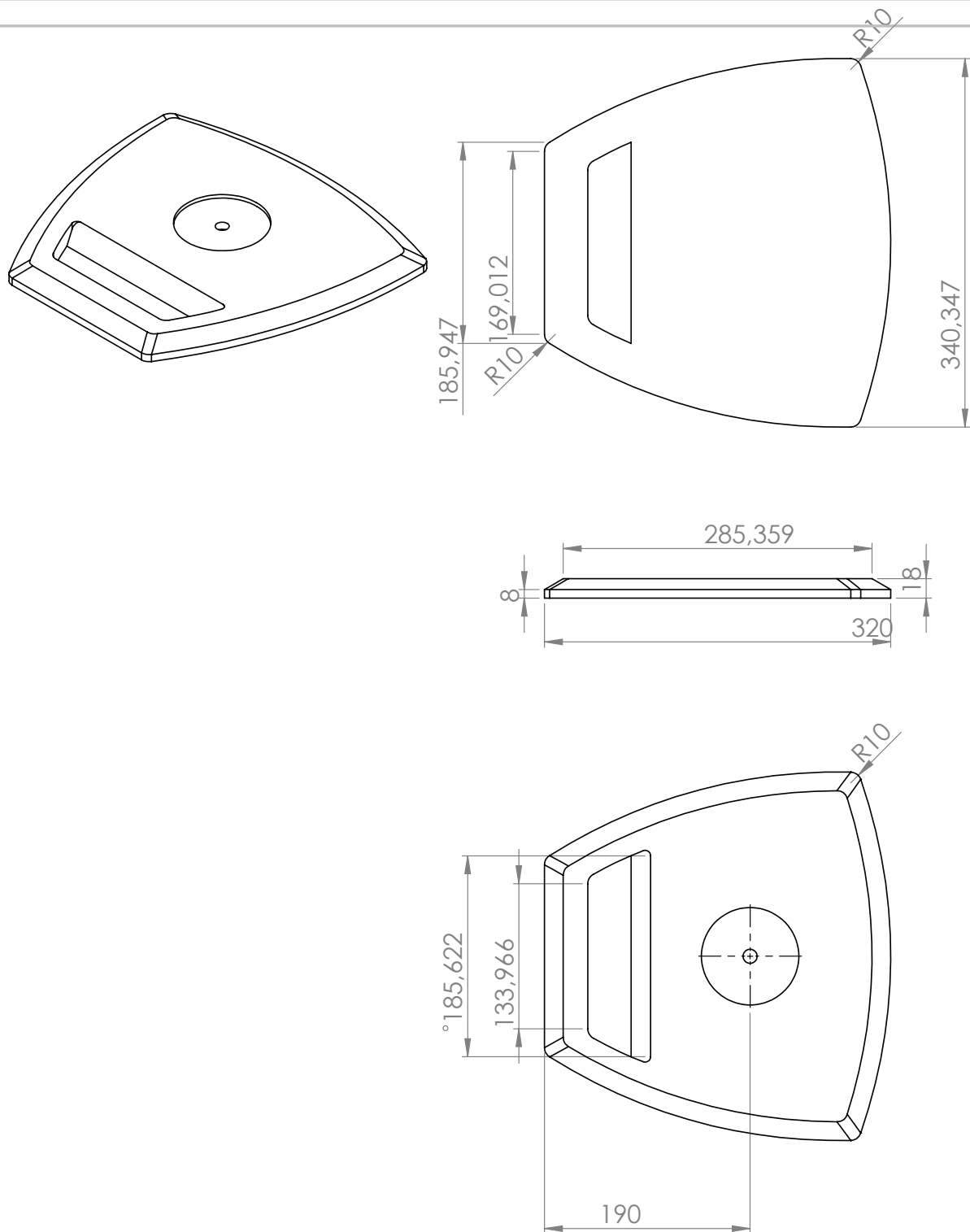
A4

SHEET 1 OF 1

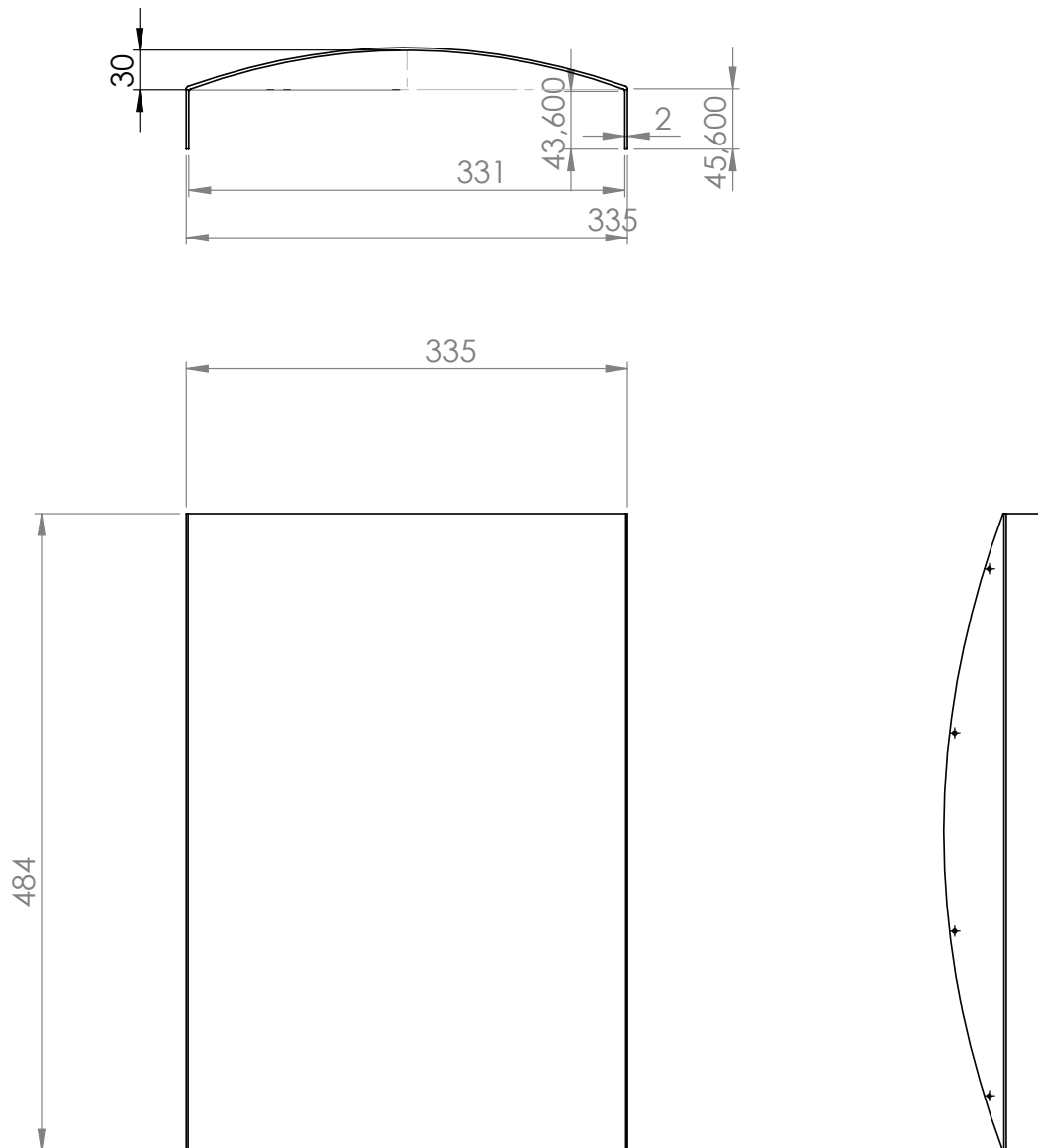


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NAME		SIGNATURE		DATE		TITLE:			
DRAWN									
CHK'D									
APPV'D									
MFG									
Q.A									
MATERIAL:				Plywood				DWG NO.	
								Front-grill	
								A4	
WEIGHT:				SCALE:1:5				SHEET 1 OF 1	

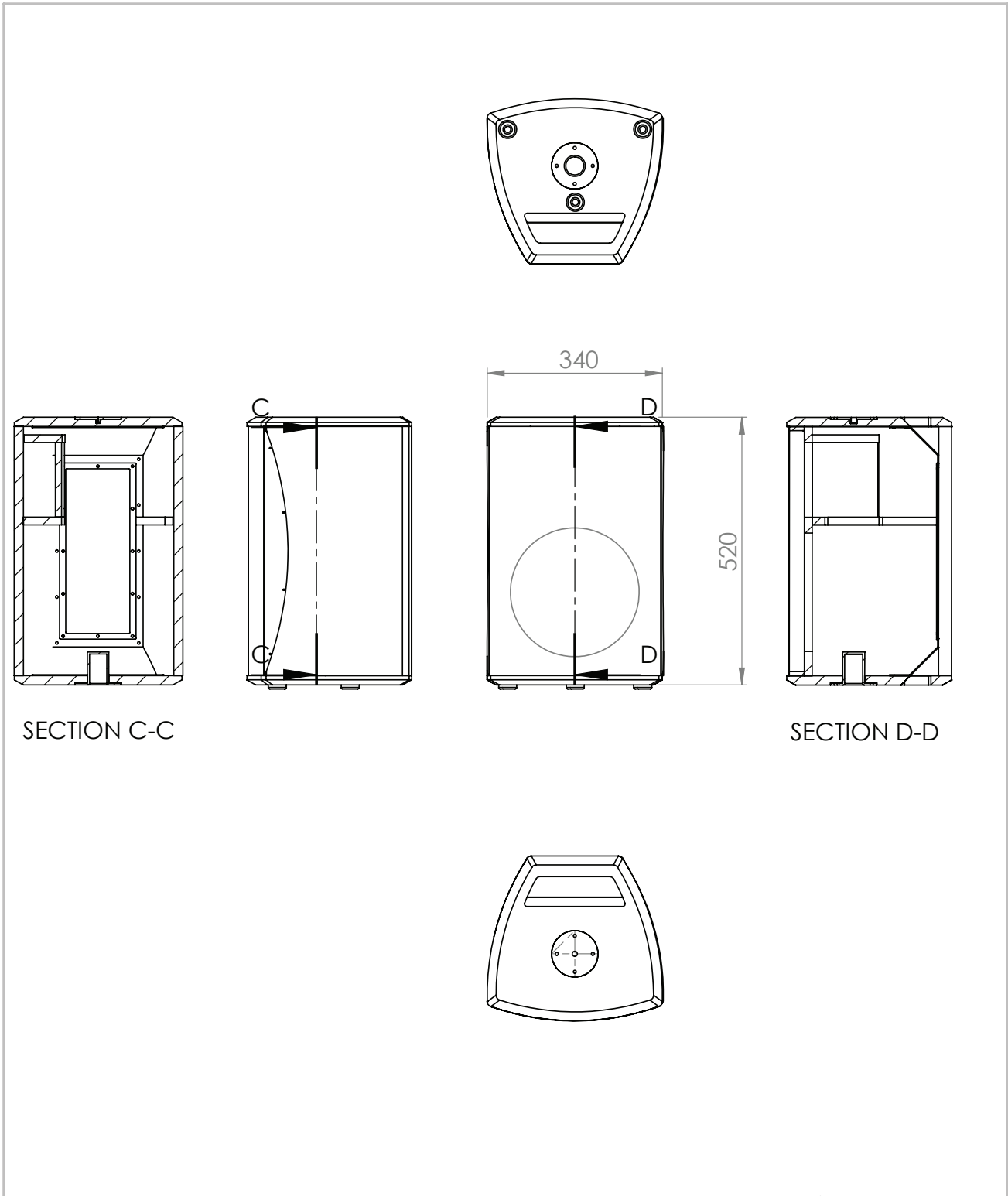




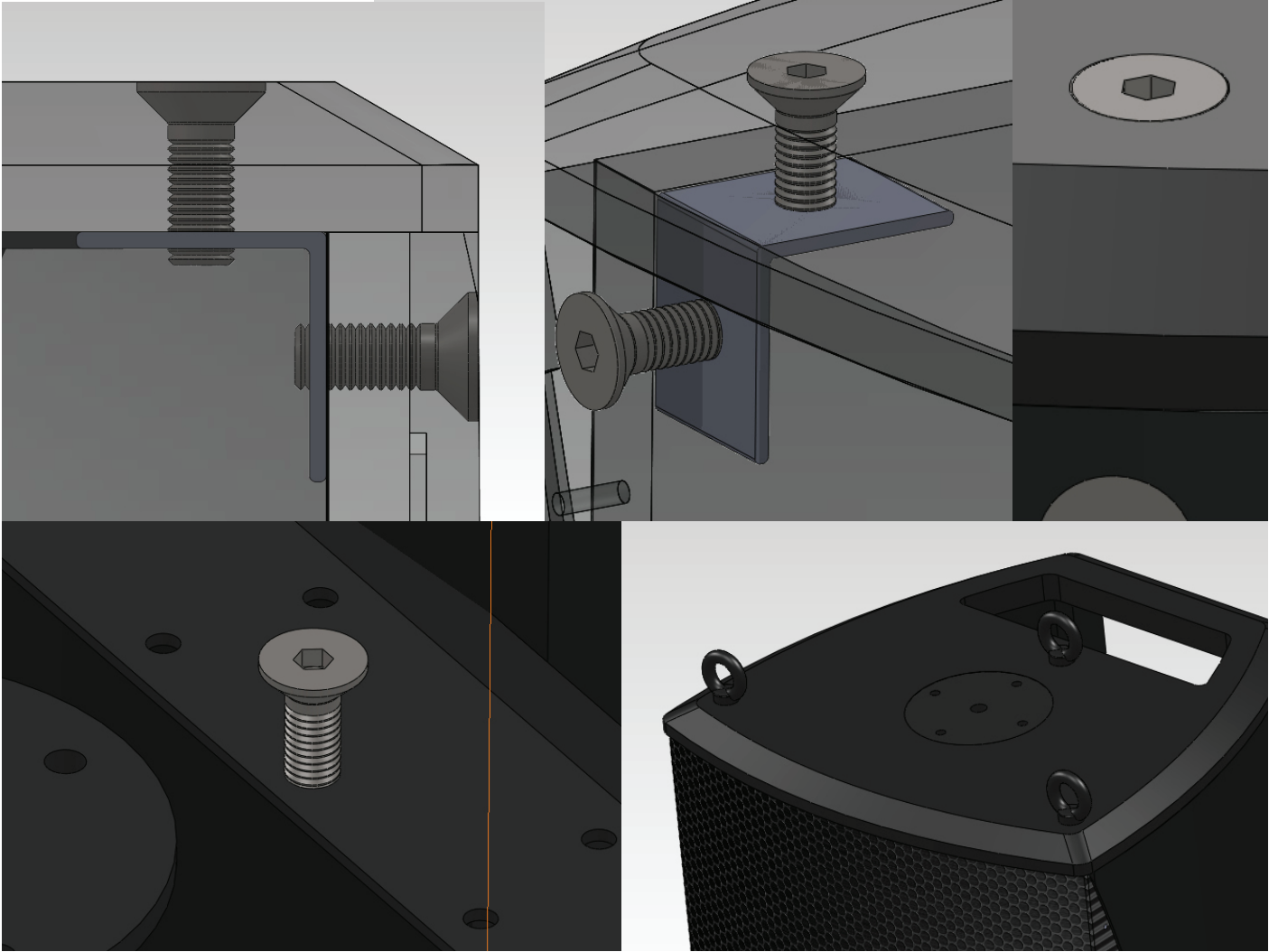
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NAME		SIGNATURE		DATE		TITLE:			
DRAWN									
CHK'D									
APPV'D									
MFG									
Q.A									
						MATERIAL: Plywood		DWG NO. Bovenkant	
						WEIGHT:		SCALE:1:10	
								SHEET 1 OF 1	
								A4	

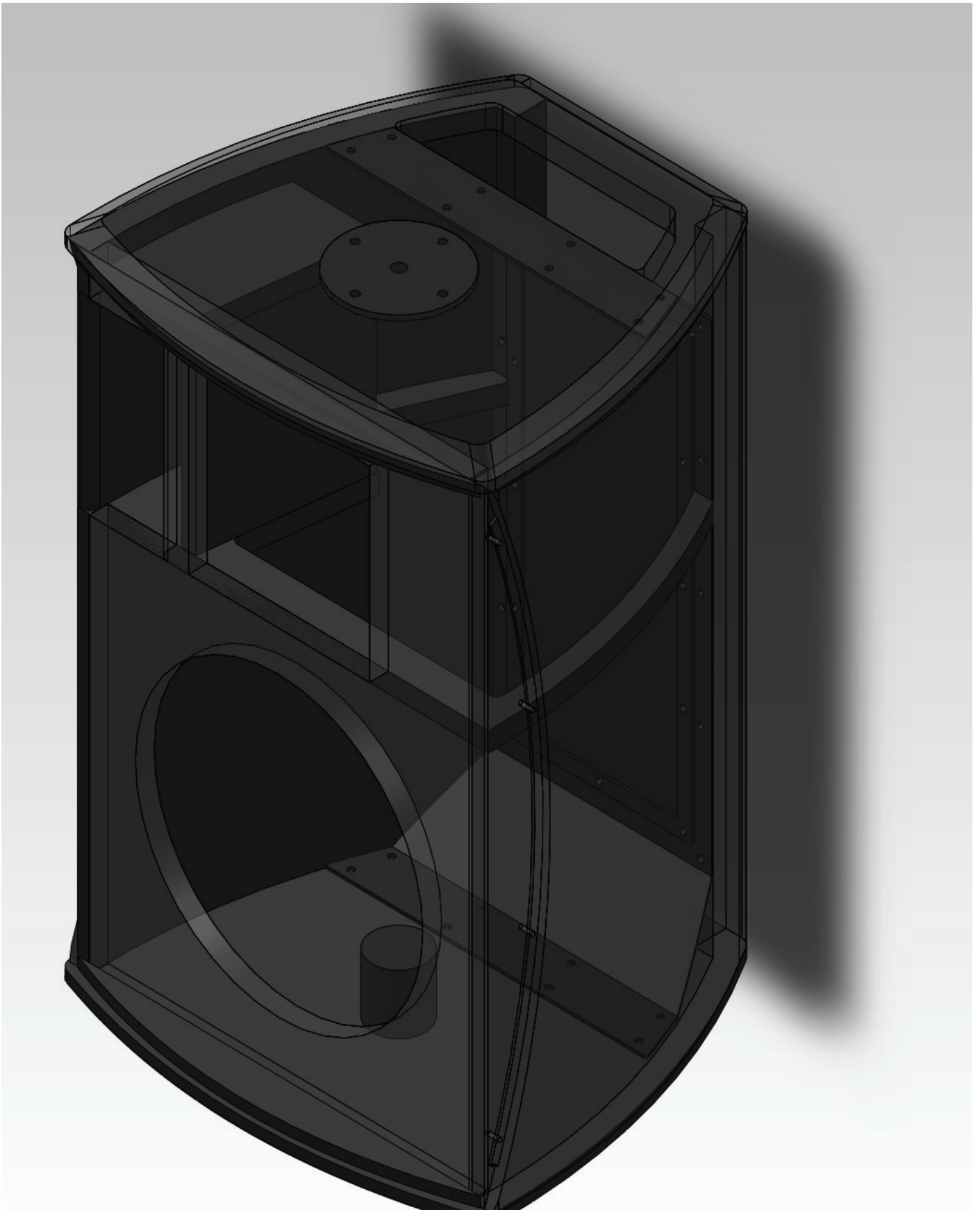


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NAME		SIGNATURE		DATE		TITLE:			
DRAWN									
CHK'D									
APPV'D									
MFG									
Q.A									
				MATERIAL:		DWG NO.		A4	
				Aluminum					
				WEIGHT:		SCALE:1:5		SHEET 1 OF 1	



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:				FINISH:		DEBUR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING		REVISION	
NAME		SIGNATURE		DATE				TITLE:			
DRAWN								DWG NO. Assembly1			
CHK'D											
APPV'D											
MFG											
Q.A											
				MATERIAL:				SCALE:1:10			
				WEIGHT:				SHEET 1 OF 1			
								A4			







9. Eerste Rapport PX



Production Manual

Date :	Model :	Ref.No.:
23/05/12	PX212	PX212-12-001

Description:

AUDAC PX 12 Two-Way wooden loudspeaker cabinet

Used components:

HF Driver:

A&D AUDIO number HB450

Horn mounted on HF Driver:

Dimensions 205 x 205 mm

Hole front plate 185 x 185 mm

Coverage 90° x 60°

8 mounting points



LF Driver:

A&D AUDIO number K12F360



PVS NV
Veldstraat 99
B-3500 Hasselt
Belgium

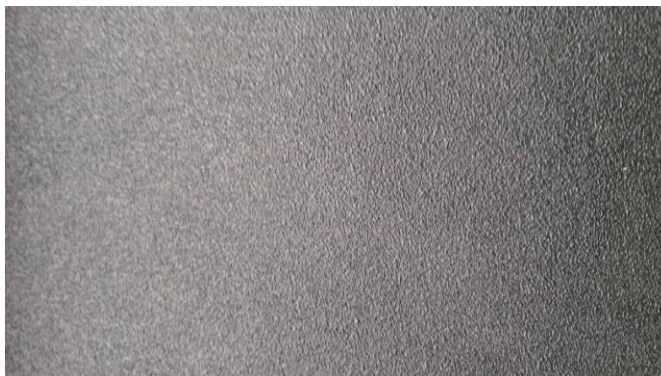
Date :	Model :	Ref.No.:
23/05/12	PX212	PX212-12-001

Cabinet:

Made out of plywood material
Thickness of 18 millimeter
Side panels curved

Paintwork:

In black and white. There are two types of finish from which we would like price a estimation. The first is the EPDM finish used on the PX speakers. The second we would like to see a finer finish with higher scratch-resistant like the image.



Damping inside:

The panels of the cabinet should be provided with damping material.

Aluminum plate:

The aluminum plate in the speaker will be manufactured in another factory. The assembly of it has to take place in your factory. The plate is at the back of the speaker will be 2 millimeter aluminum and should have the same color as the cabinet. The amplifier plate should be detachable from the back to perform maintenance. The passive version of this speaker will have a flat plate at the back with two speakon connectors.

Screws:

For the black cabinets, all screws should be electroplated in black colour. For all white cabinets, all screws should have a white colour

Screw Thread adapter:

At the top side of the cabinet, an M10 screw thread adapter should be provided. This screw thread adapter should have the same colour as the cabinet (Black for Black cabinet, White for White cabinet). The depth of the thread should be at least 25 mm.



35 mm pole adapter on bottom side:

At the bottom side of the cabinet, a 35 mm pole adapter should be provided. This pole adapter should have the same colour as the cabinet (Black for Black cabinet, White for White cabinet). The depth of the adapter should be at least 60 mm.

Bass port:

The port has a size of surface of 120 cm² and has to be 140 millimeters long. If possible the end of the bass ports should have a rounded opening.

Sealing:

All parts (Horn, Woofer, M10 thread adapter, Aluminum plate, ☐) should be properly sealed to make sure there is no air leakage from the loudspeakers cabinet.



Date :	Model :	Ref.No.:
23/05/12	PX212	PX212-12-001

Logo:

AUDAC Logo
 Aluminum plate with Black, Red & Yellow color
 Diamond cut arrow
 Dimensions 30 x 30 Millimeter
 Logo should be recessed in the front grill.
 The colours of the logo should be :
 - Yellow Pantone 7408c
 - Red Pantone 179c

The logo should be placed centered at 30 millimeter from to bottom of the grill.



Rubber feet:

At the bottom side of the cabinet, Tree rubber feet should be mounted.
 The rubber feet have a diameter of 30 mm. This is not the best looking solution so we would like to see some other solutions for the feet at the bottom of the speaker.

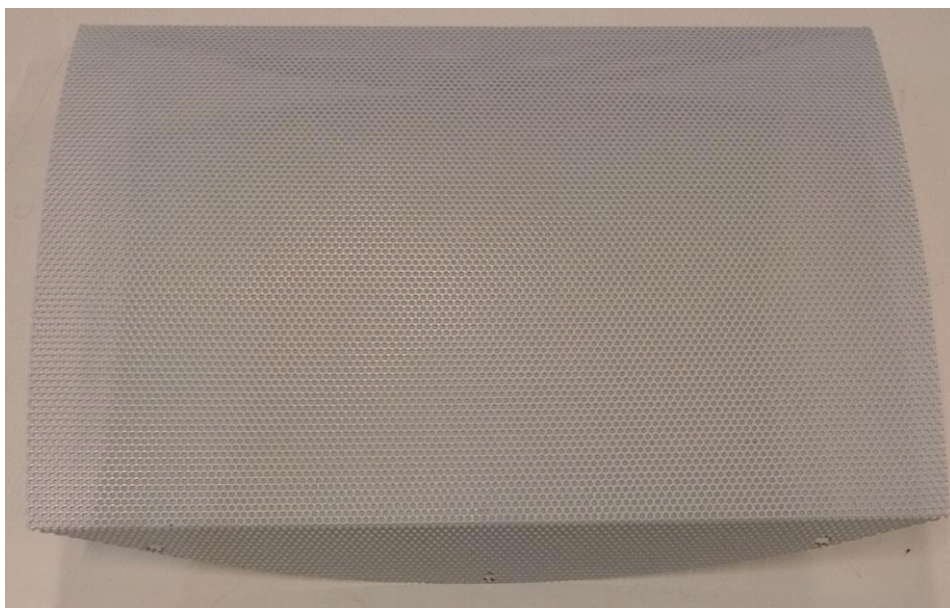
Mounting screws:

The cabinet has to be provided with mounting screws. The position of these are two in the front corners and one in the middle which is attached at the aluminum plate. This connection in the front corners has to be done with a metal corner plate with two holes with thread. The bolts have to be recessed in the plate. They also have to be detachable so they can be replaced with eyebolts so it is possible for the speaker to be hanged. In the document with the drawings an example is shown.
 The mounting screws should have the same colour as the cabinet.

Date :	Model :	Ref.No.:
23/05/12	PX212	PX212-12-001

Grill:

The grill should be made out of steel with a plate thickness of 2 mm. The paintwork should be in the same colour as the cabinet colour (black colour for black cabinet and white colour for white cabinet). The holes in the grill should be 4 millimeter. The grill structure moves along all sides and will not stop at the edge. Behind the grill, a cloth or other material should be assembled. This material should have the same colour as the cabinet. Don't use acoustic foam due to its discolor after a while. The grill will be fastened with screws who will be recessed like you see in the picture below.



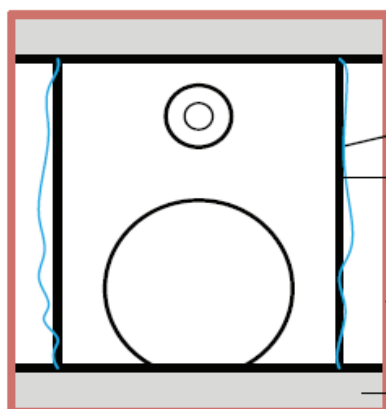
Date :	Model :	Ref.No.:
23/05/12	PX212	PX212-12-001

Box packaging:

The speakers should be individual packed inside a brown cardboard box, whereof the design will be provided later.

The mounting bracket and instruction manual should be included inside the cardboard box packaging.

On top and bottom of the loudspeaker, a foam plate should be provided, protecting the loudspeaker.



Product: Loudspeaker

Protection: PE Bag around loudspeaker

Brown cardboard box

Protection: Foam plate on top and bottom

10. Prototype PX





11. Tweede Rapport PX



Production Manual

Date :	Model :	Ref.No.:
14/06/12	PX212	PX212-12-002

Description:

AUDAC PX 12" Two-Way wooden loudspeaker cabinet

Used components:

LF Driver:

A&D AUDIO number K12F360

The hole needs to be 282 millimeters and the driver also needs to be recessed into the front plate for 8 millimeter. The outside diameter of the driver is 315 millimeter. Otherwise the driver and the grill don't fit.



HF Driver:

Only two holes in the horn match with the HF-driver



Cabinet:

At the curved side-panel there are visible vertical lines were the plywood is bend. The curve of the side has to be smooth and the lines were the wood is bend may not be seen at the outside.

Wrong

Good:



Date :	Model :	Ref.No.:
14/06/12	PX212	PX212-12-002

Paintwork:

Looks good

Damping inside:

The panels of the cabinet should be provided with damping material.

Aluminum plate:

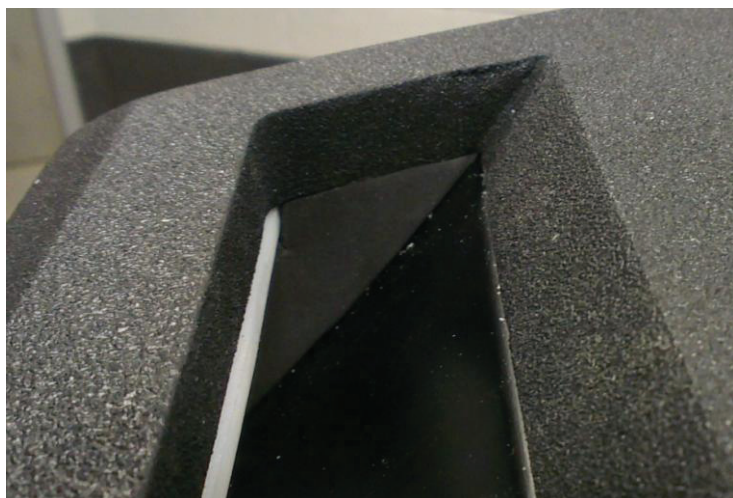
The aluminum plate needs to be thicker, otherwise it is too flexible. It should be around 4 millimeters. It is important that the angle in the plate transfers smoothly into the angle of the top and bottom plate. The plate has to lay far enough to the rear so that the handle is big enough to put your hand through.

Handles:

The handles should be extended with the white parts you can see in the picture. These should be made from an extrusion profile, so they can be used for the whole new series. This part should have a nice rounding so that the handle has a good grip. The profile has to be the same colour as the cabinet and the material should be plastic. You will find the technical drawing of the extrusion on the last page.



The corners in the handles should be filled with hard foam as shown in the picture below. This foam should fill the gap, so that the corner is sealed from air leakage. The foam also has to be the same colour as the rest of the parts.



Date :	Model :	Ref.No.:
14/06/12	PX212	PX212-12-002

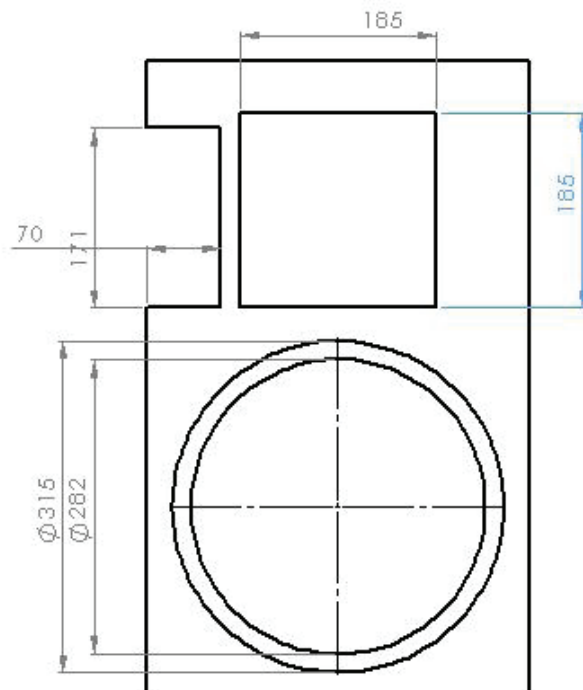
Bass port:

The port has a surface of 120 cm² and has to be 140 millimeters long including the front plate. So in the drawing of the mid plate it has to be 122 instead of 140. The port should be 70 mm wide and 171 high, so that it is possible to reach the mounting screws in the corner.

Feet:

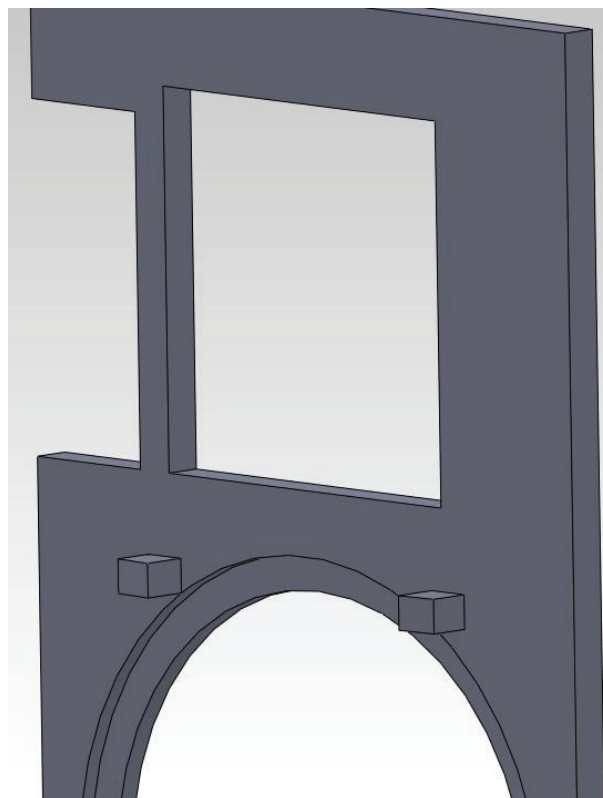
At the bottom side of the cabinet, four plastic feet should be mounted.

The rubber feet that you send were a too high. We would like to see the feet like in the technical drawing at the end of this document. The feet should be recessed 6 millimeters into the wood en be mounted with two screws.



Front:

To prevent the grill from being pushed in some block has to be added at the front plate. In the picture on the right you will see the example of this. Between the blocks and the grill should be some foam to absorb vibrations.



Date :	Model :	Ref.No.:
14/06/12	PX212	PX212-12-002

Logo:

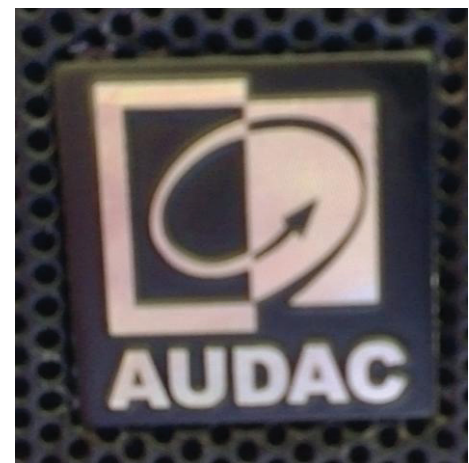
AUDAC Logo

Aluminum plate in color of the grill, Diamond cut arrow

Dimensions 30 x 30 Millimeter

Logo should be recessed in the front grill.

The logo should be placed in the center of the grill and should be rotatable. If you want we can send you a sample of how we want it.

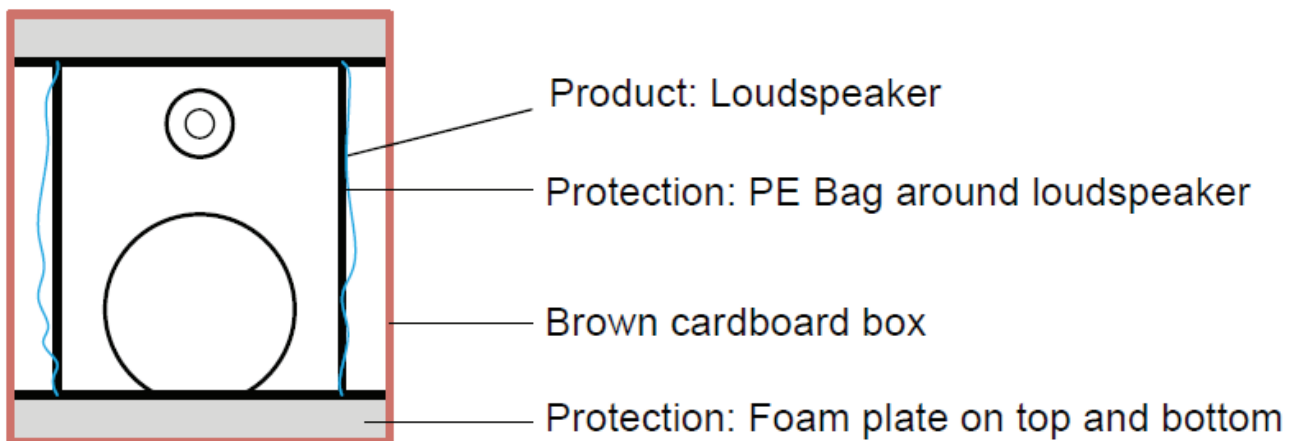


Box packaging:

The speakers should be individual packed inside a brown cardboard box, whereof the design will be provided later.

The mounting bracket and instruction manual should be included inside the cardboard box packaging.

On top and bottom of the loudspeaker, a foam plate should be provided, to protect the cabinet.

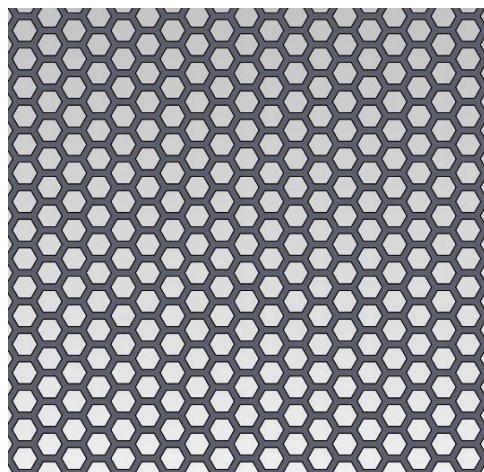


PVS NV
Veldstraat 99
B-3500 Hasselt
Belgium

Date :	Model :	Ref.No.:
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Grill:

It's good that the holes stop before the edge. We would like to see the grill with hexagon holes as shown on the picture. These holes should be around 3 millimeters



The curve of the side of the grill should run through the top. It is also the intention the grill lays slightly behind the wooden edge, so that the grill won't be damaged. As you can see in the picture this is not the case at the side and the corners of the grill. In the picture below from the bottom of the grill this is done properly.

The screws in the grill should be recessed! Also you should use allen screws to mount the grill.

Behind the grill, an acoustic foam or other material should be assembled. This material should have the same color as the cabinet. Be sure that you use material (especially with the white version) that doesn't discolor after a while.

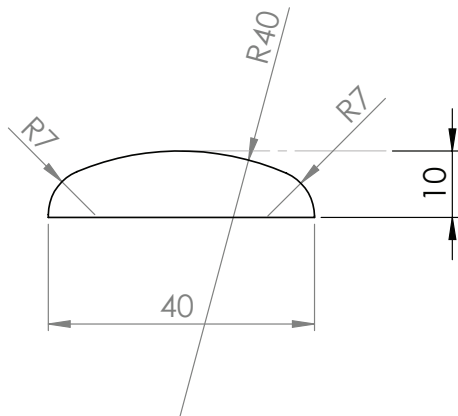
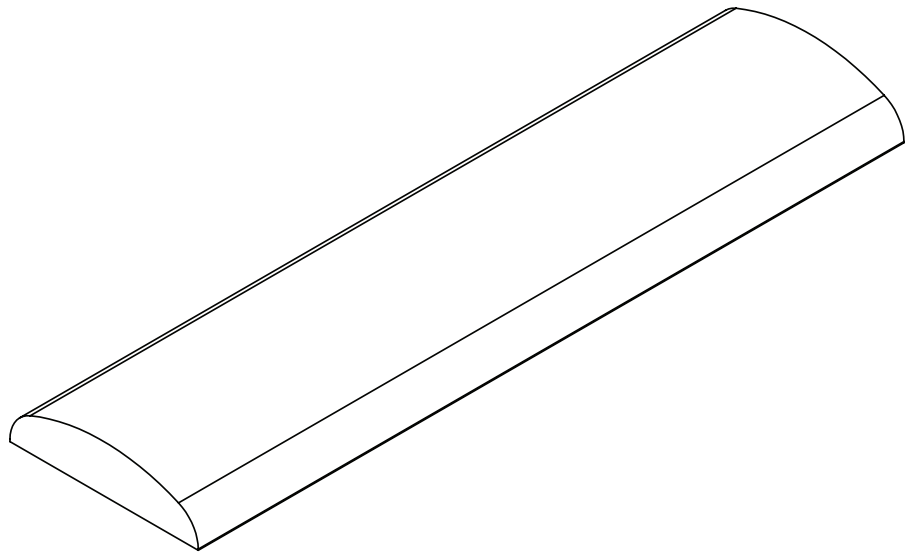


Date :	Model :	Ref.No.:
14/06/12	PX212	PX212-12-002

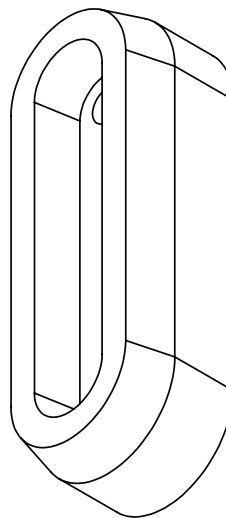
Backside:

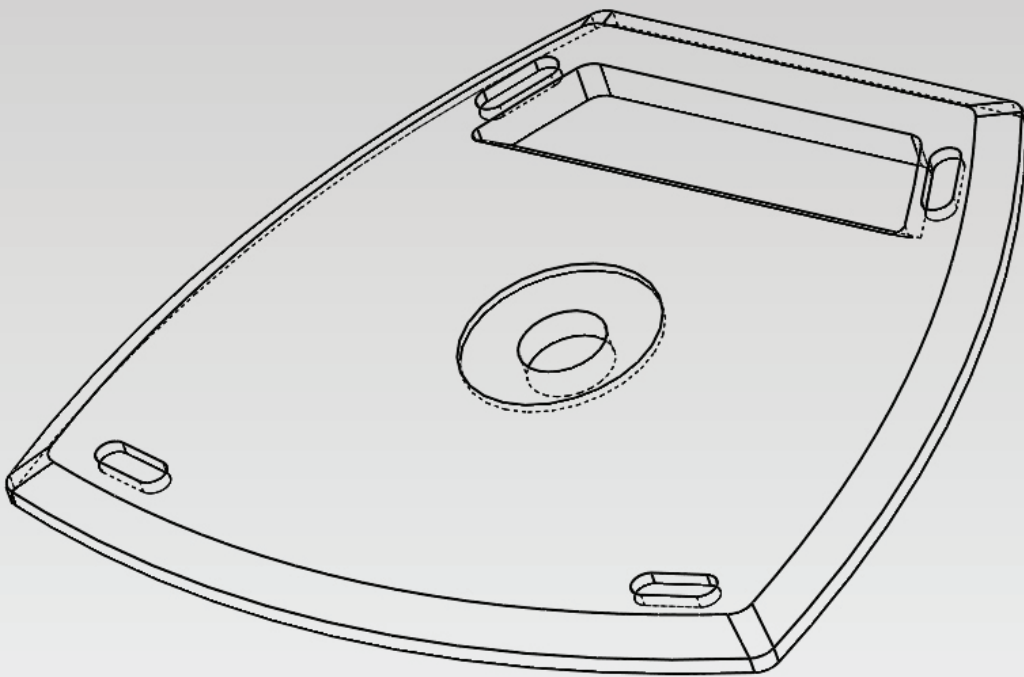
As you can see the finish at the end of the plate is not good. It should have the same finish as the rest of the cabinet. The plate is also too small at the back which ensures that there is a gap between the aluminum and the plywood plate.





UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:				FINISH:		DEBUR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING		REVISION	
DRAWN				SIGNATURE		DATE		TITLE:			
CHK'D								MATERIAL: WEIGHT: DWG NO. Handle A4			
APPV'D											
MFG											
Q.A											
								SCALE:1:2			
								SHEET 1 OF 1			

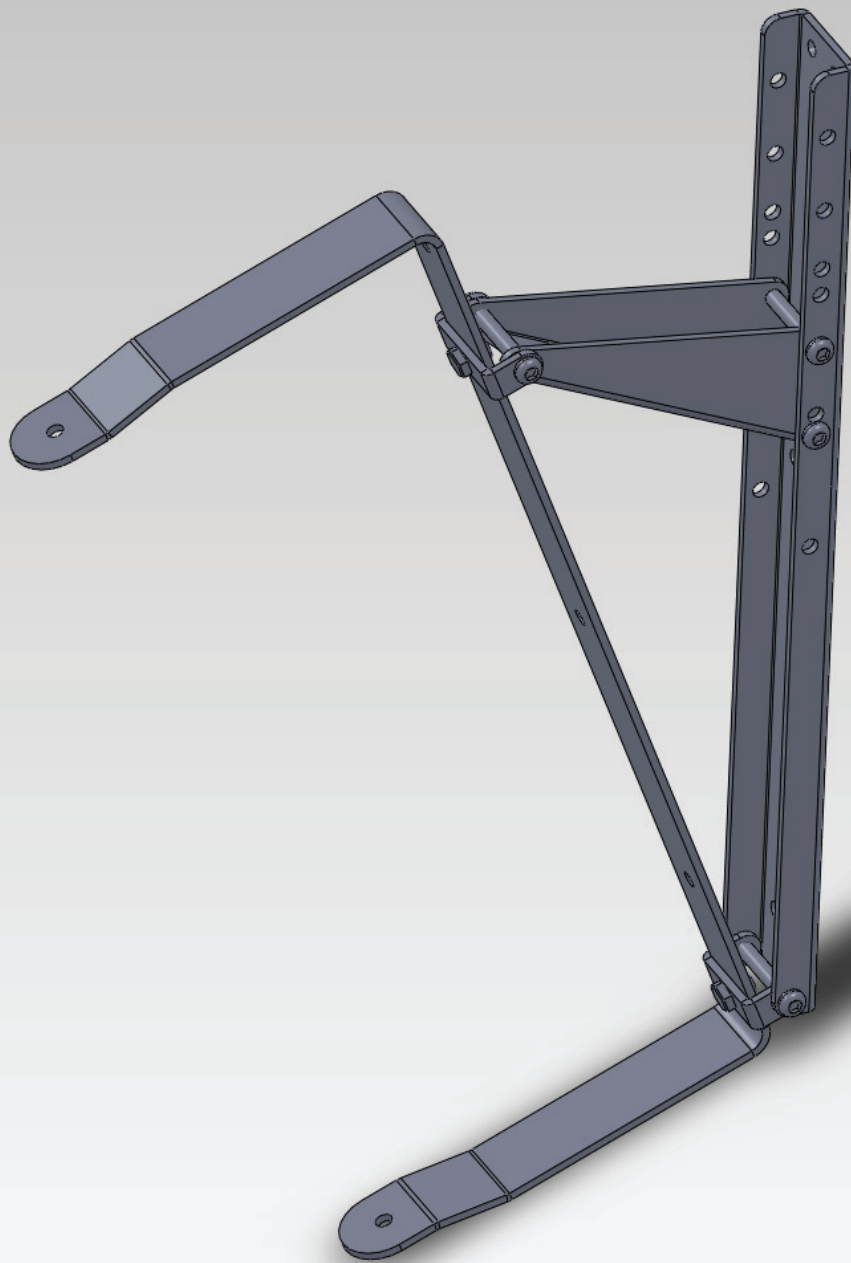


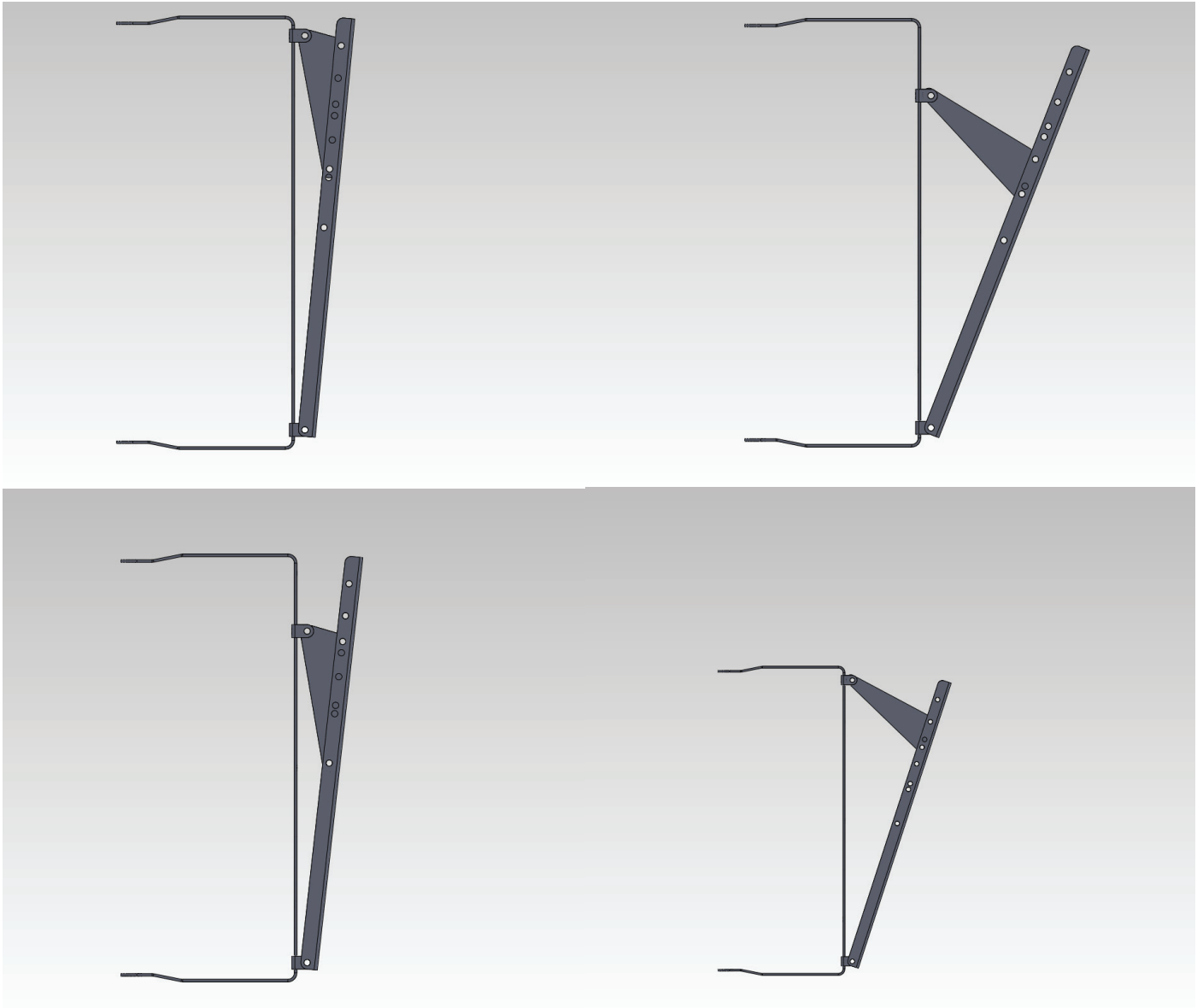


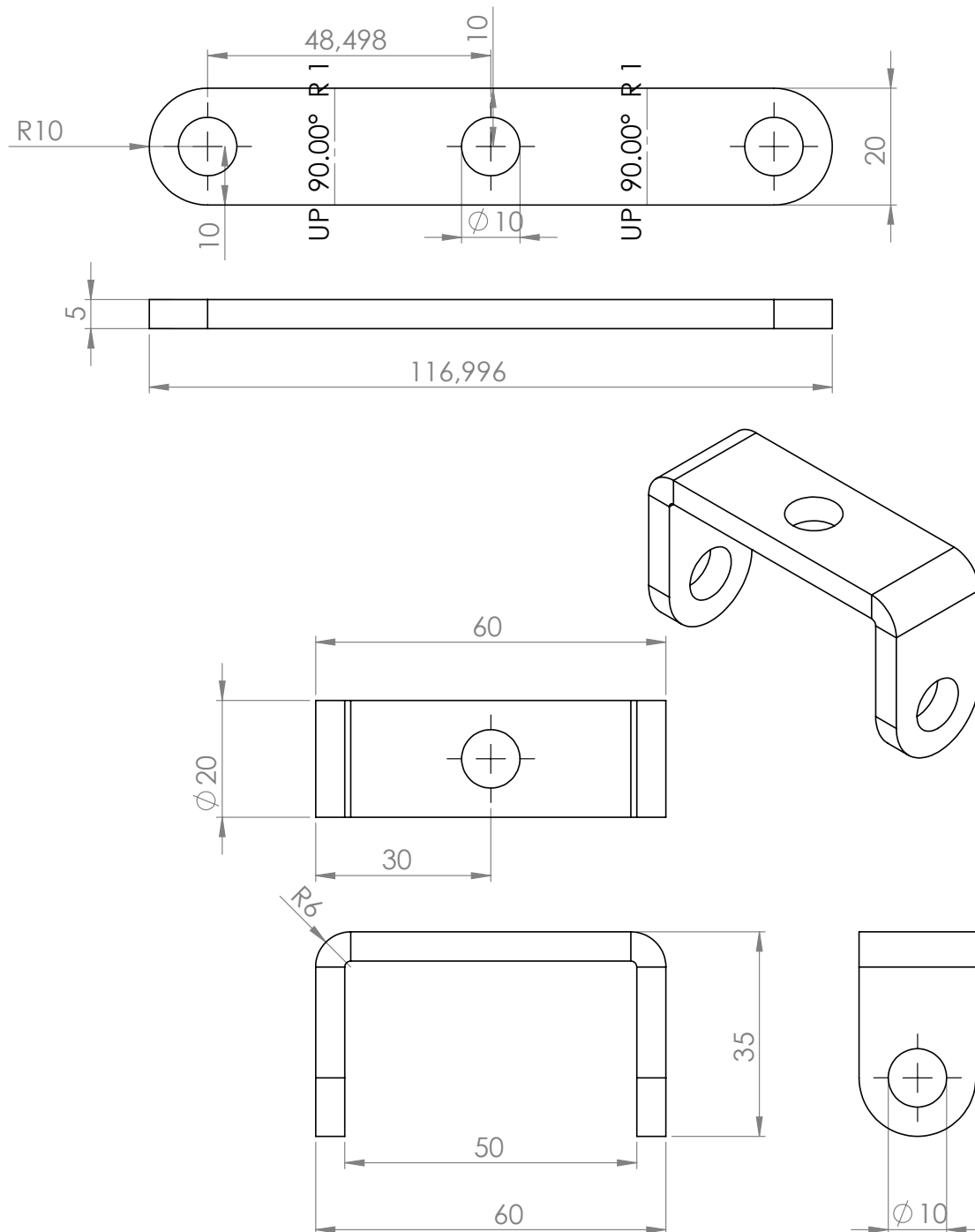


11. Beugel PX

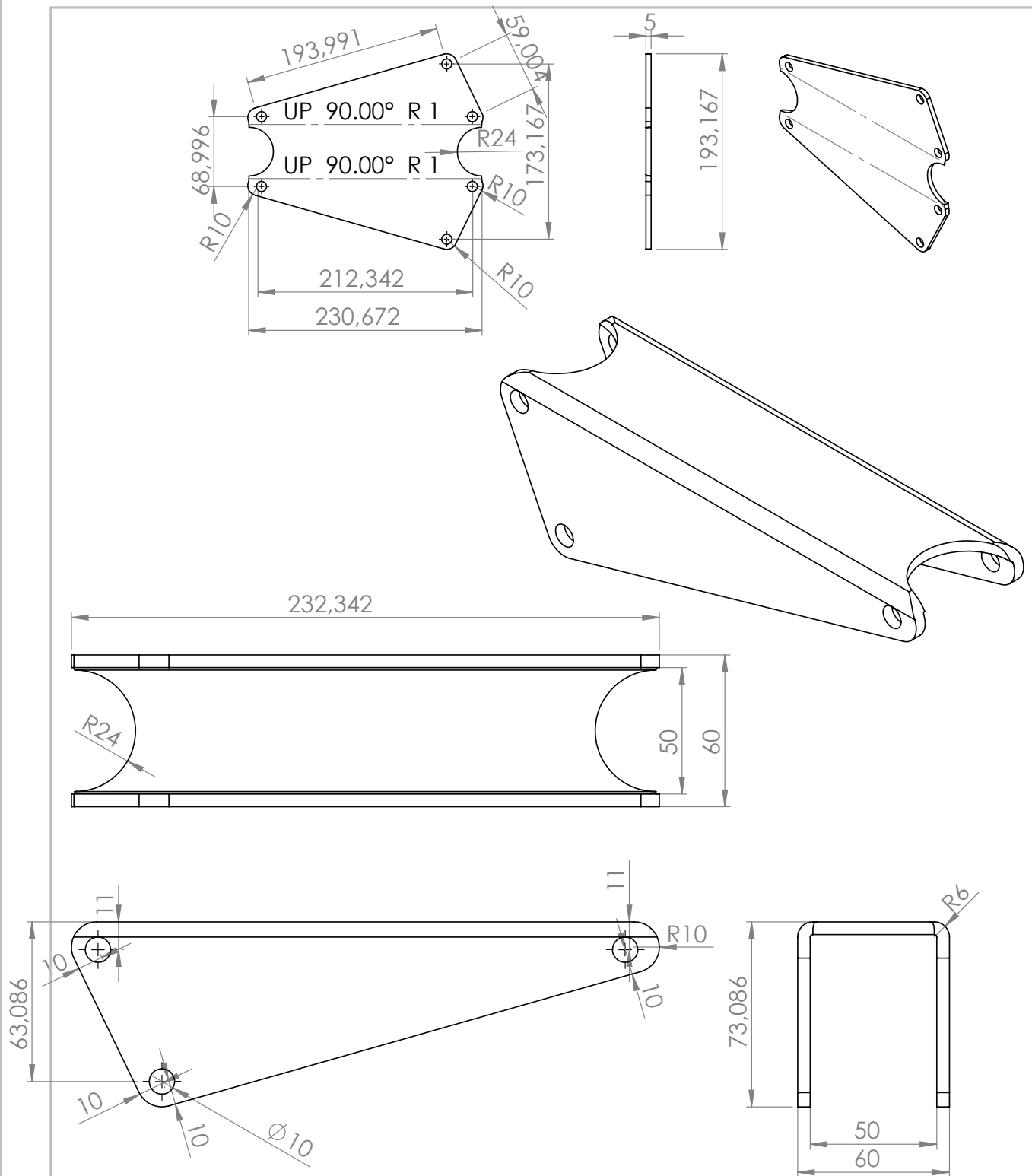








UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:				FINISH:		DEBUR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING		REVISION	
NAME				SIGNATURE		DATE		TITLE:			
DRAWN								DWG NO. Bottom bracket A4			
CHK'D											
APP'V'D											
MFG											
Q.A						MATERIAL:		SCALE:1:1			
						WEIGHT:		SHEET 1 OF 1			



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND
BREAK SHARP
EDGES

DO NOT SCALE DRAWING

REVISION

NAME	SIGNATURE	DATE			
DRAWN					
CHK'D					
APPV'D					
MFG					
Q.A					
			MATERIAL:		
			WEIGHT:		

TITLE:

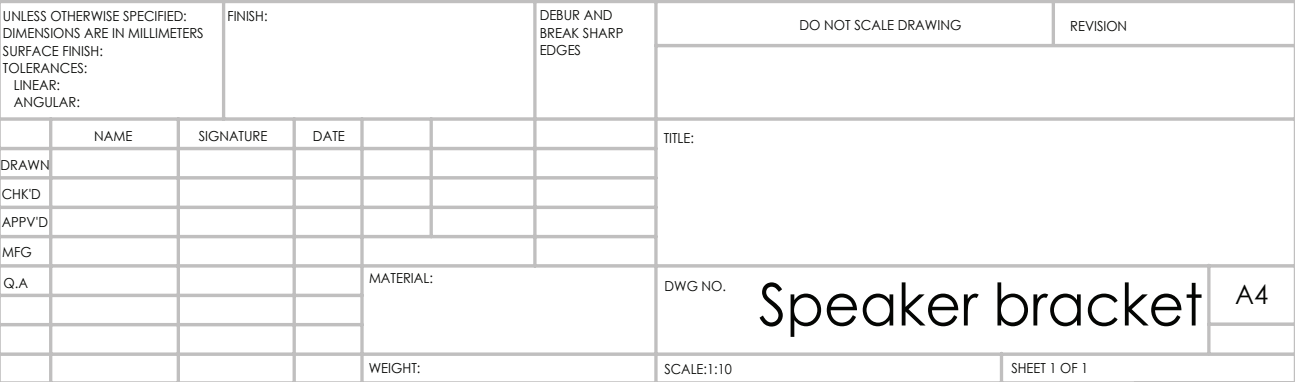
DWG NO.

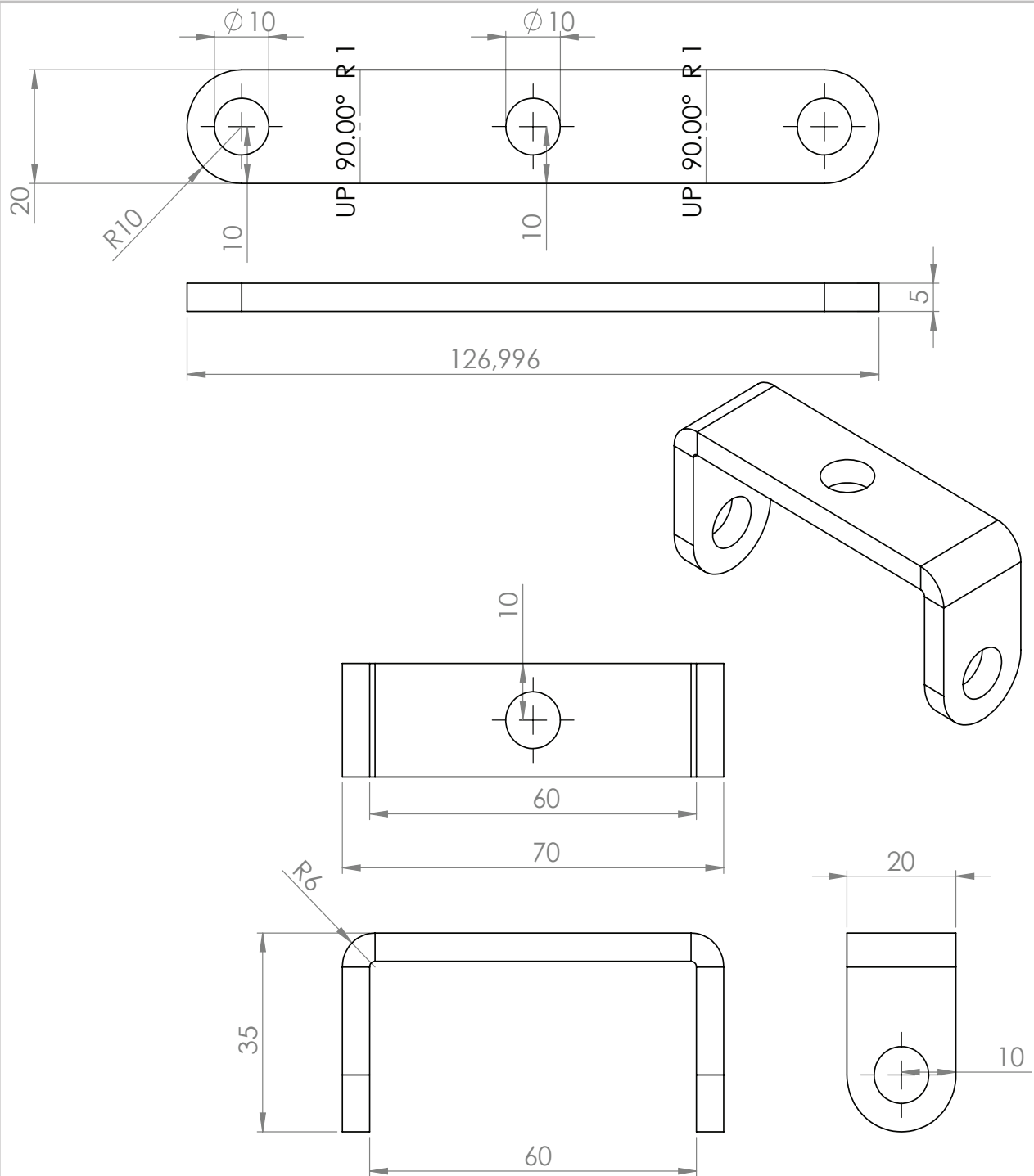
Corner part

A4

SCALE:1:5

SHEET 1 OF 1





UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND
BREAK SHARP
EDGES

DO NOT SCALE DRAWING

REVISION

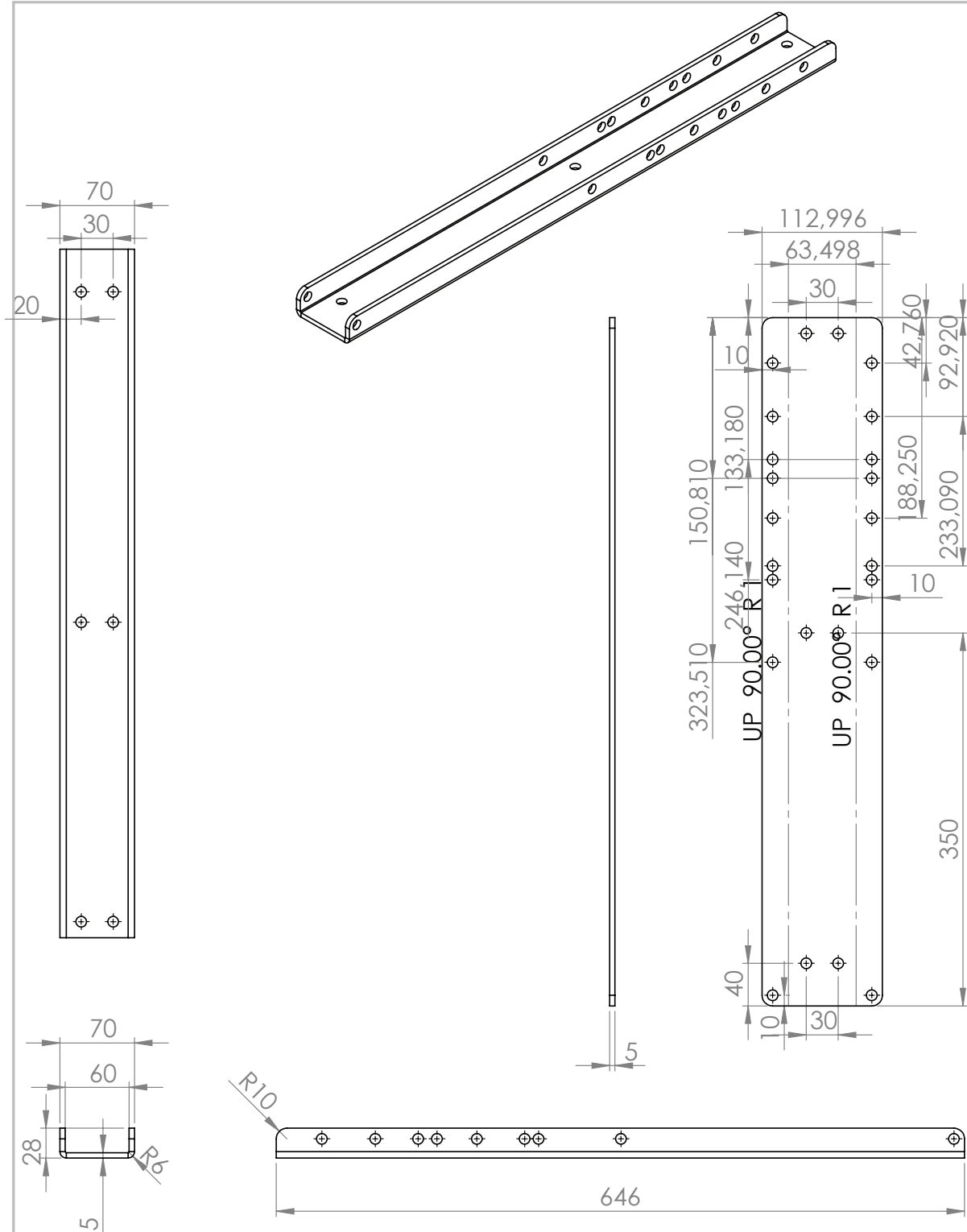
	NAME	SIGNATURE	DATE		
DRAWN					
CHK'D					
APPV'D					
MFG					
Q.A					

MATERIAL:

WEIGHT:

TITLE:	
DWG NO.	Top bracket
SCALE:1:1	SHEET 1 OF 1

A4



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:				FINISH:		DEBUR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING		REVISION	
NAME				SIGNATURE		DATE		TITLE:			
DRAWN											
CHK'D											
APP'VD											
MFG											
Q.A						MATERIAL:		DWG NO.			
								Wallpanel			
								A4			
						WEIGHT:		SCALE:1:5			
								SHEET 1 OF 1			

