



## Utility12

Multipurpose point-source

Engineered using:

1x12" Neodymium woofer – 12NDL88 8 ohm

1x1.4" Neodymium driver – DE780TN 8 ohm, mounted on ME90 Horn



# COMPONENTS



- 1x 12NDL88 8 ohm
- 1x DE780TN 8 ohm
- 1x ME90 Horn
- 2x Neutrik NL4MPR
- 16x M5 Wood T-Nuts
- 8x TSEI M5x30
- 8x TCEI M5x30 with washer and grower washer
- 3mm EPDM stripes
- Edilfiber damping material

Enclosure material: 15mm Birch plywood

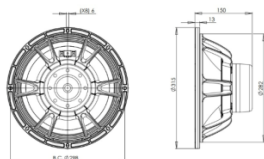
# LF TRANSDUCER



## 12NDL88

8Ω

LF Drivers - 12.0 Inches



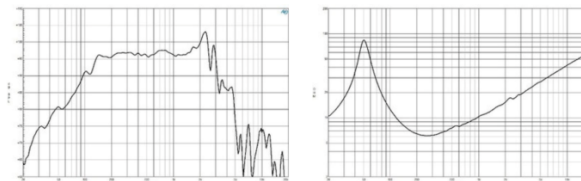
- 1400 W continuous program power capacity
- 88 mm (3.5 in) aluminium voice coil
- 50 - 3000 Hz response
- 98 dB sensitivity
- Aluminium demodulating ring allows a very low distortion figure
- Double silicone spider with optimized compliance
- Ventilated voice coil gap for reduced power compression



The NDL88 series is perfectly balanced for the loudspeaker systems of today. Incorporating a high temperature neodymium magnet inside the 3.5" (88mm) voice coil reduces the amount of steel needed in the motor structure, saving cost and weight. Unexpected low frequency output and midrange extension to meet with almost any driver for two way applications is the hallmark of this new performance-oriented woofer line from B&C Speakers. Do more, with less, with the NDL88 series.

## 12NDL88

LF Drivers- 12.0 Inches



SPECIFICATIONS	DESIGN	PARAMETERS <sup>4</sup>			
Nominal Diameter	320 mm (12.0 in)	Surround Shape	Triple Roll	Resonance Frequency	51 Hz
Nominal Impedance	8 Ω	Cone Shape	Exponential	Re	5.0 Ω
Minimum Impedance	6.0 Ω	Magnet Material	Neodymium Inside Slug	Qes	0.29
Nominal Power Handling <sup>1</sup>	700 W	Spider	Double Silicone	Qms	5.0
Continuous Power Handling <sup>2</sup>	1400 W	Pole Design	T-Pole	Qts	0.27
Sensitivity <sup>3</sup>	98.0 dB	Woofer Cone Treatment	WP Waterproof Front Side	Vas	52.0 dm <sup>3</sup> (1.84 ft <sup>3</sup> )
Frequency Range	50 - 3000 Hz	Recommended Enclosure	40.0 dm <sup>3</sup> (1.41 ft <sup>3</sup> )	Sd	522.0 cm <sup>2</sup> (80.9 in <sup>2</sup> )
Voice Coil Diameter	88 mm (3.5 in)	Recommended Tuning	65 Hz	η <sub>v</sub>	2.3 %
Winding Material	Aluminium			Xmax	8.0 mm
Former Material	Glass Fibre			Xvar	9.5 mm
Winding Depth	21.0 mm (0.85 in)			Mms	71.0 g
Magnetic Gap Depth	10.0 mm (0.4 in)			Bl	19.9 Txm
Flux Density	1.15 T			Le	1.3 mH
				EBP	175 Hz

MOUNTING AND SHIPPING INFO	SERVICE KIT		
Overall Diameter	315 mm (12.4 in)	Recone kit	RCK12NDL88
Bolt Circle Diameter	298 mm (11.73 in)		
Baffle Cutout Diameter	282.0 mm (11.1 in)		
Depth	140 mm (5.51 in)		
Flange and Gasket Thickness	13 mm (0.51 in)		
Air Volume Occupied by Driver	2.5 dm <sup>3</sup> (0.08 ft <sup>3</sup> )		
Net Weight	4.8 kg (10.58 lb)		
Shipping Units	1		
Shipping Weight	5.7 kg (12.57 lb)		
Shipping Box	360x360x200 mm (14.17x14.17x7.87 in)		

1. 2 hours test made with continuous pink noise signal within the range Fs-10fs. Power calculated on rated minimum impedance. Loudspeaker in free air.  
 2. Power on Continuous Program is defined as 3 dB greater than the Nominal rating.  
 3. Applied RMS Voltage is set to 2.83 V for 8 ohms Nominal Impedance.  
 4. Thiele-Small parameters are measured after a high level 20 Hz sine wave preconditioning test.

B&C Speakers s.p.a.  
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# HF TRANSDUCER



## DE780TN

8Ω

HF Drivers - 1.4 Inches

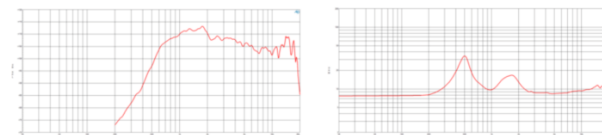


- 220 W continuous program power capacity
- 1.4" horn throat diameter
- 75 mm (3 in) aluminum voice coil
- Titanium diaphragm
- 500 - 18000 Hz response
- 108 dB sensitivity
- Neodymium magnet assembly with shorting copper cap

While shrink-ray technology may not have escaped the 1990s, we have succeeded in creating two more highly compact drivers, not only permitting close spacing but also reducing weight and cost at the same time. In a larger, 3" coil we now offer the DE780: Designed with a sonic character like our famous DE900TN, but in a 112mm diameter package weighing only 3.5 lb (1.6kg). Continuous power handling of 220W combined with 108dB sensitivity primes this driver for consideration in a new generation of lighter, more compact line array loudspeakers.

## DE780TN

HF Drivers- 1.4 Inches



### SPECIFICATIONS<sup>1</sup>

Throat Diameter	36 mm (1.4 in)
Nominal Impedance	8 Ω
Minimum Impedance	8.7 Ω
Nominal Power Handling <sup>2</sup>	110 W
Continuous Power Handling <sup>3</sup>	220 W
Sensitivity <sup>4</sup>	108.0 dB
Frequency Range	0.5 - 18.0 kHz
Recommended Crossover <sup>5</sup>	1.2 kHz
Voice Coil Diameter	75 mm (3.0 in)
Winding Material	Aluminum
Inductance	0.04 mH
Diaphragm Material	Titanium
Flux Density	1.95 T
Magnet Material	Neodymium Ring

### MOUNTING AND SHIPPING INFO

Four M6 holes 90° on 102 mm (4 in) diameter	
Overall Diameter	112 mm (4.41 in)
Depth	56 mm (2.2 in)
Net Weight	1.6 kg (3.53 lb)
Shipping Units	4
Shipping Weight	7.0 kg (15.43 lb)
Shipping Box	295x160x180 mm (11.61x6.30x7.09 in)

### SERVICE KIT

1. Driver mounted on B&C ME 90 horn.
2. 2 hour test made with continuous pink noise signal within the range from the recommended crossover frequency to 20 kHz. Power calculated on rated minimum impedance.
3. Power on Continuous Program is defined as 3 dB greater than the Nominal rating.
4. Applied RMS Voltage is set to 2.83 V for 8 ohms Nominal Impedance.
5. 12 dB/oct. or higher slope high-pass filter.

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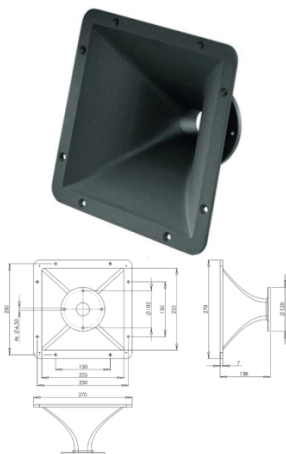
B&C Speakers s.p.a.

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## ME90

0Ω

Horns - 1.4 Inches



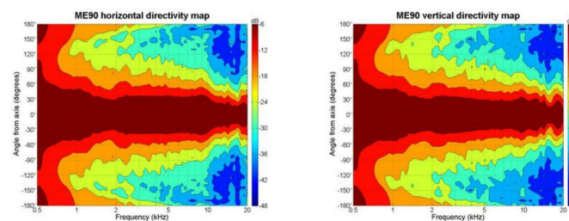
- 1.4" throat entry
- 80° x 60° nominal coverage
- Constant Directivity
- Excellent loading down to 900 Hz

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## ME90

Horns - 1.4 Inches



### SPECIFICATIONS<sup>1</sup>

Throat Diameter	36 mm (1.4 in)
Nominal Coverage Horizontal	80 °
Nominal Coverage Vertical	60 °
Cutoff Frequency	0.9 kHz
Material	Cast Aluminium
Dimensions	270x270x138 mm (10.6x10.6x5.4 in)

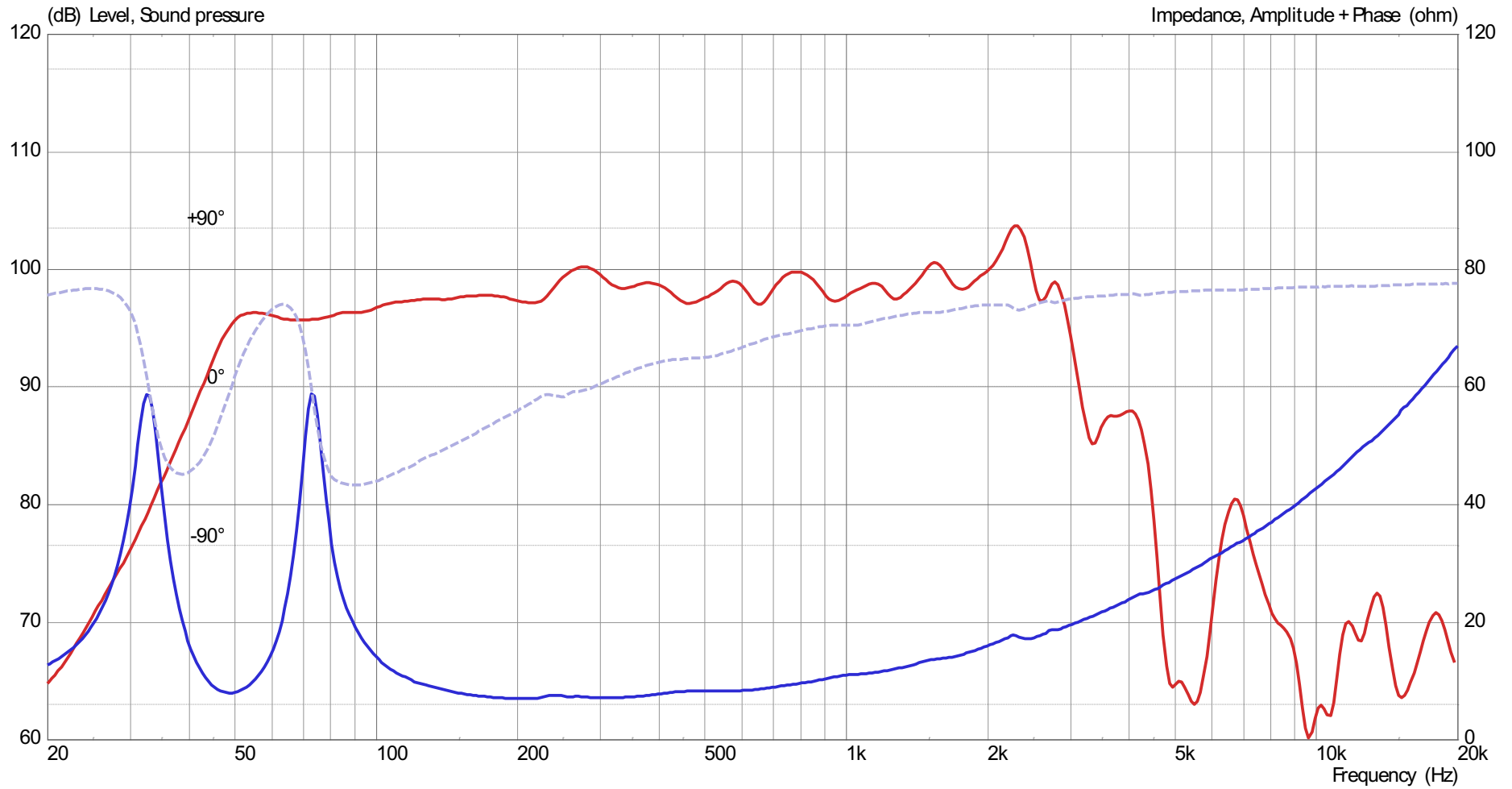
### MOUNTING AND SHIPPING INFO

Baffle Cutout Dimension	255x255 mm (8.8x8.8 in)
Net Weight	1.4 kg (3.1 lb)
Shipping Units	1
Shipping Weight	2.0 kg (4.4 lb)
Shipping Box	290x314x175 mm (11.61x12.36x6.89 in)

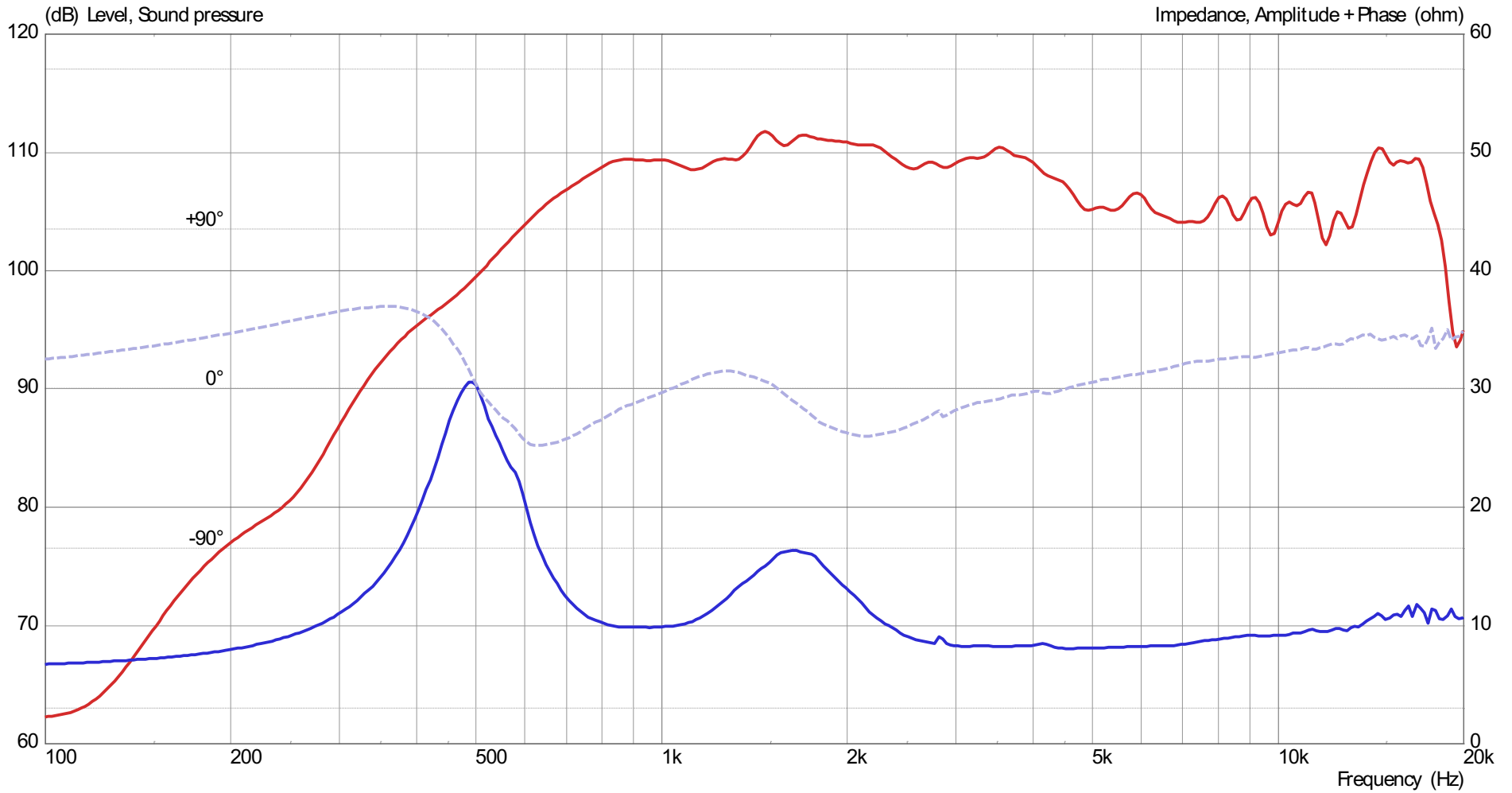
1. Horn mounted on B&C DE 900 compression driver.

B&C Speakers s.p.a.

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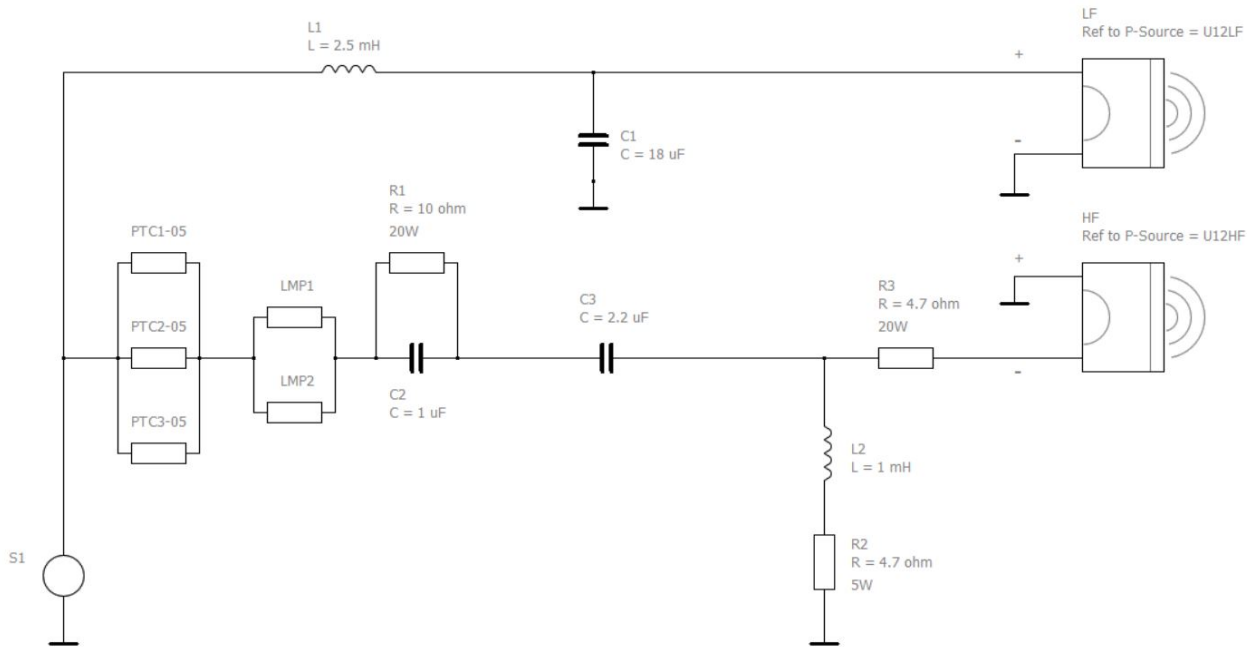
LF Frequency response 2.83V@1m and Impedance response



HF Frequency response 2.83V@1m and Impedance response

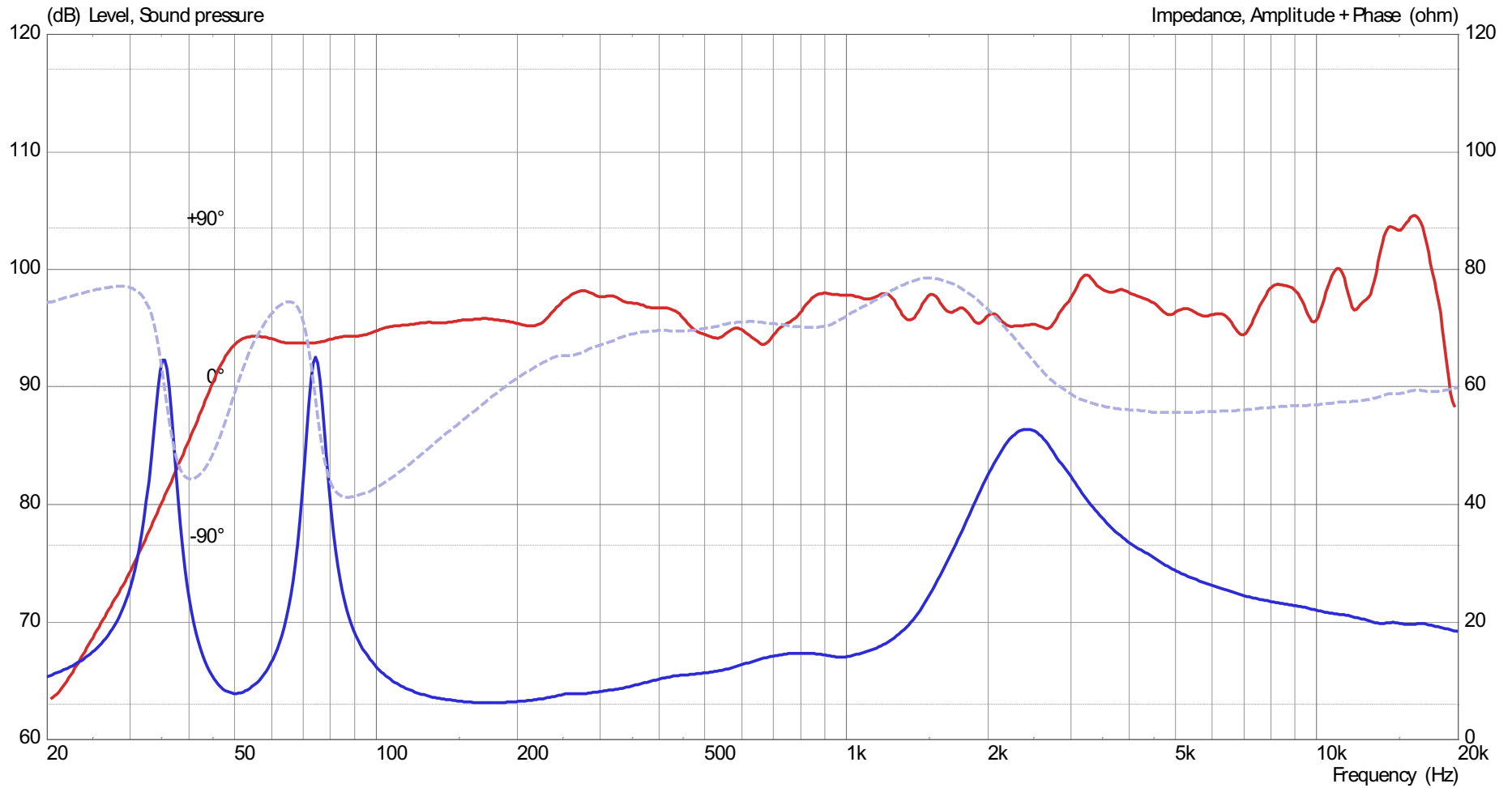


# PASSIVE CROSSOVER



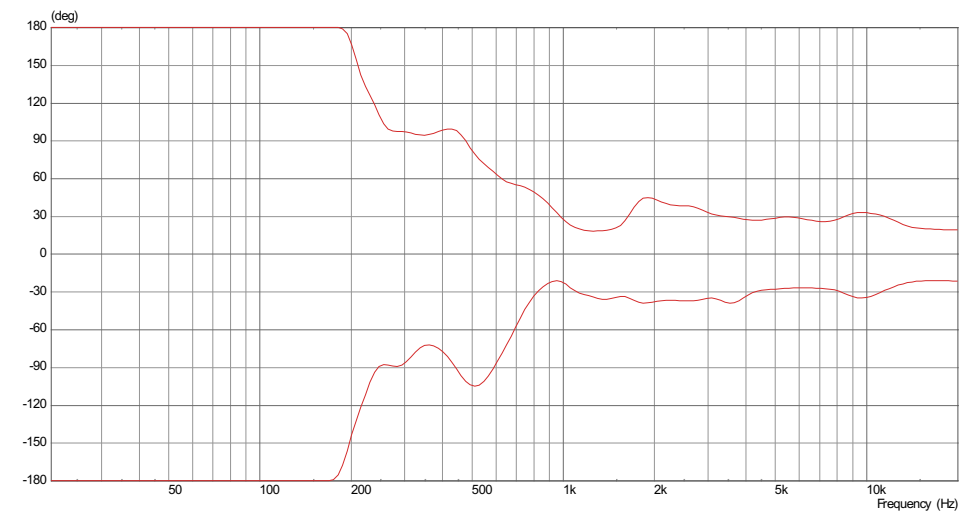
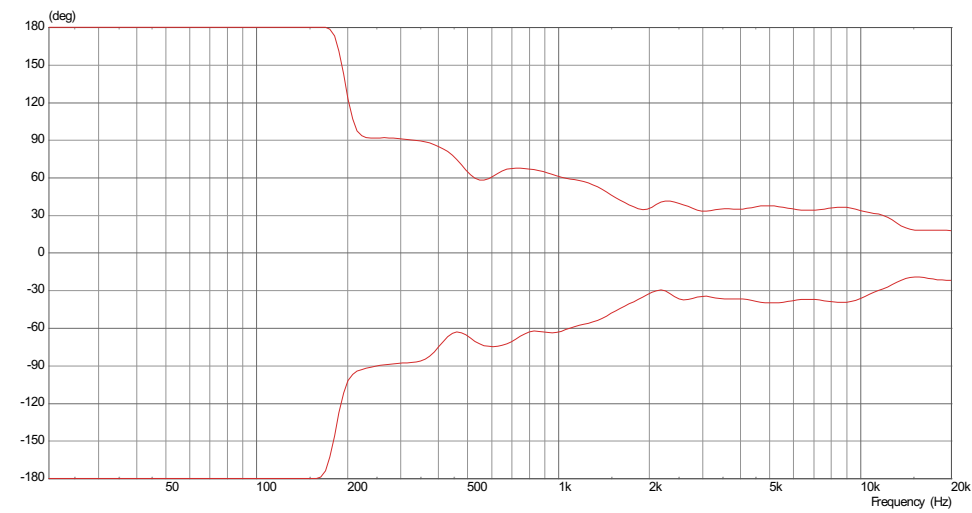
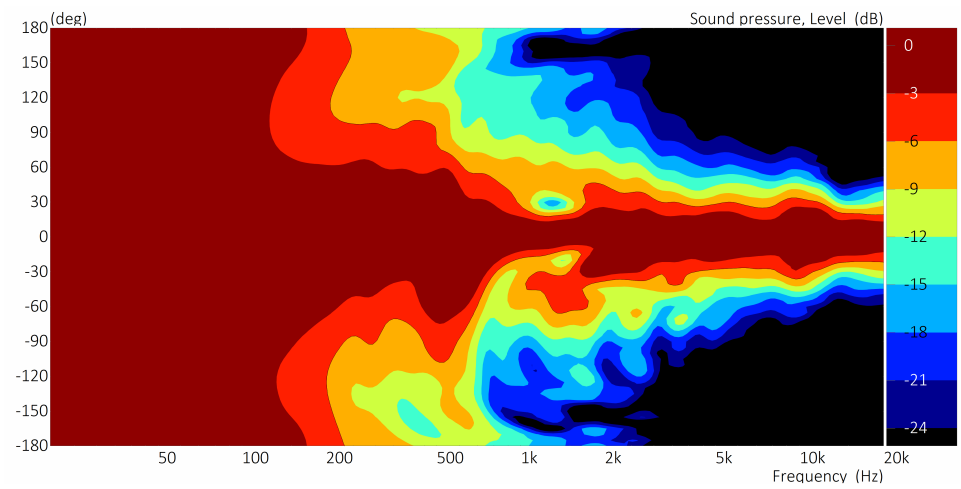
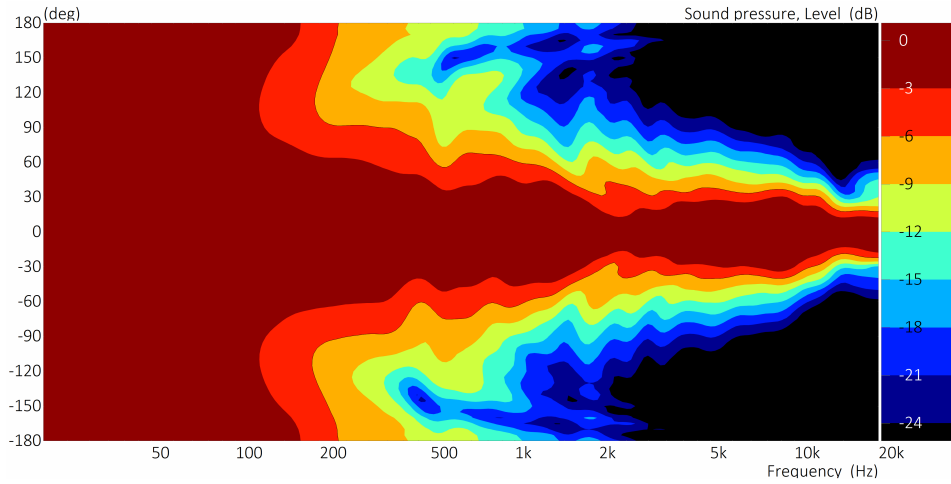
Part	Value	Specs	Qty
L1	2.5mH	RCC 0.4ohm	1
L2	1mH	RCC 0.4ohm	1
C1	18uF		1
C2	1uF		1
C3	2.2uF		1
R1	10ohm	<u>20W</u>	1
R2	4.7ohm	<u>5W</u>	1
R3	4.7ohm	<u>20W</u>	1
PTC	0.5A	Rmax 0.8 ohm	3
LMP	37Veff	1.5A - RCC 1.35ohm	2

# MEASUREMENTS with PASSIVE CROSSOVER



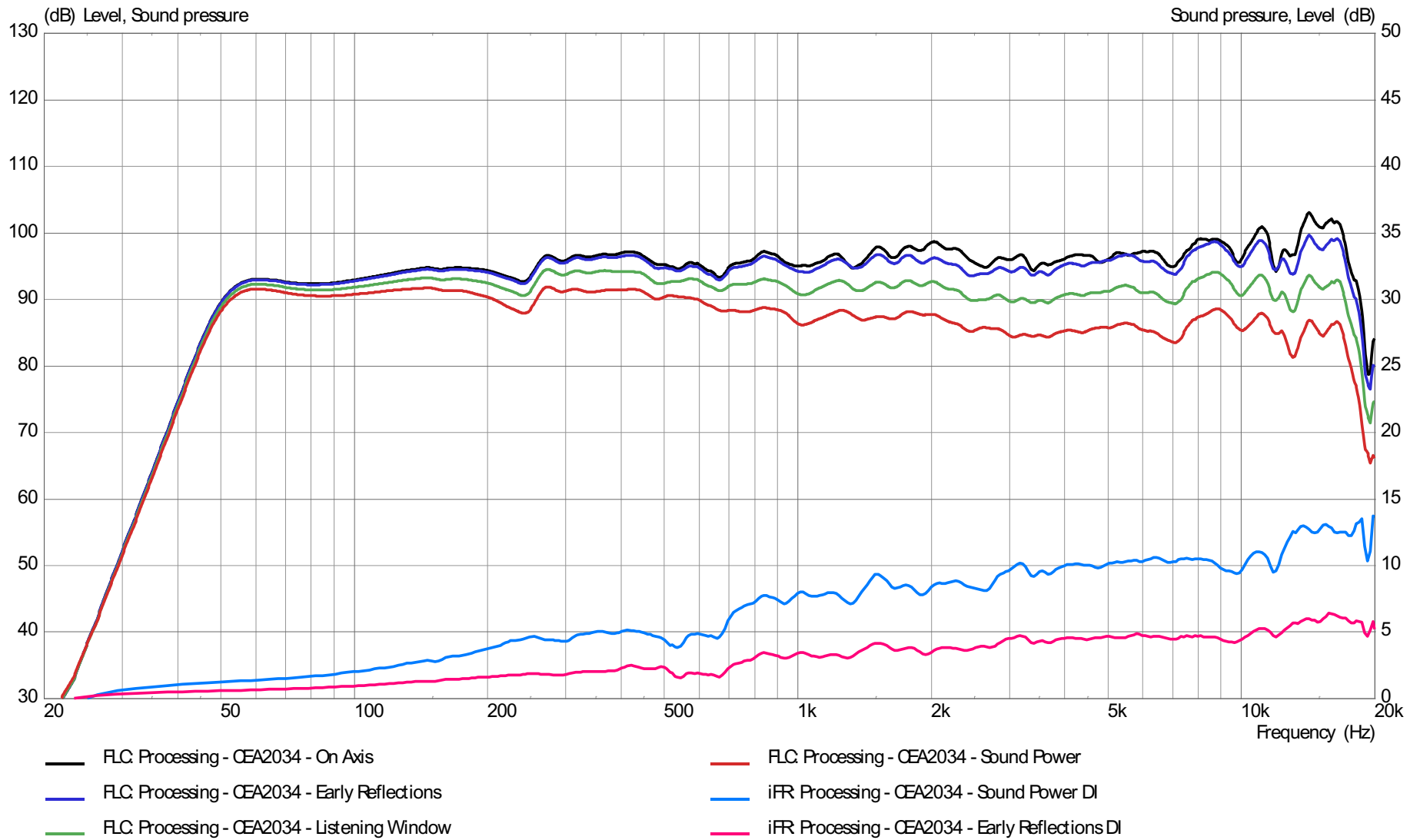
TOTAL Frequency response 2.83V@1m and Impedance response with Passive Crossover

# MEASUREMENTS - DIRECTIVITY

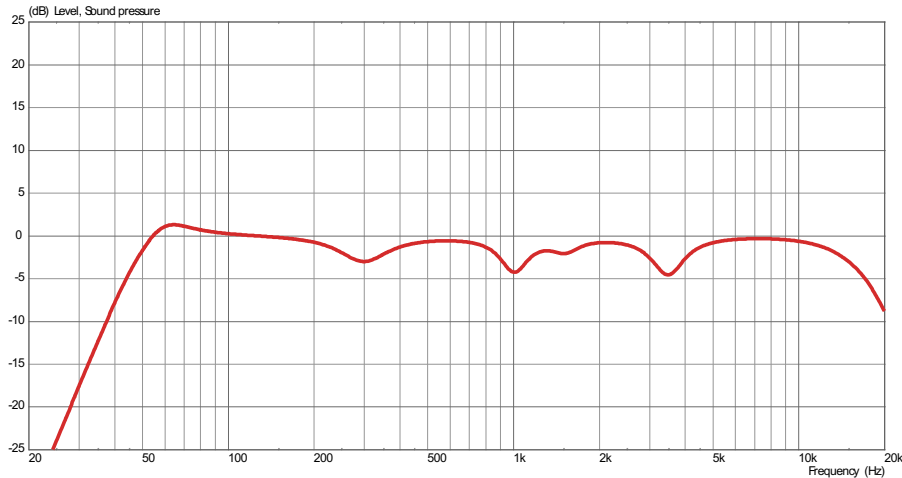


Horizontal (-6dB Beamwidth)

Vertical (-6dB Beamwidth)

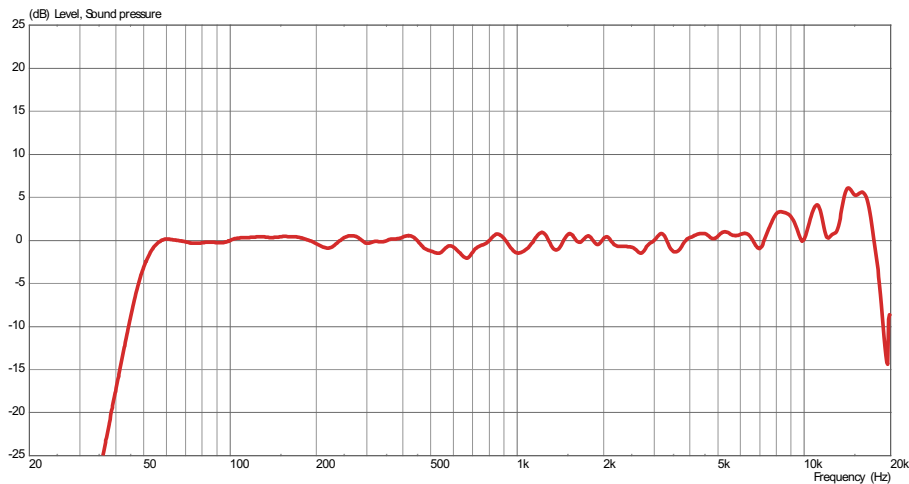


# PROCESSING with PASSIVE CROSSOVER



*EQ transfer function*

- Peaking #1: +2dB – Q:2 – Frq:60Hz*
- Peaking #2: -3dB – Q:2 – Frq:299Hz*
- Peaking #3: -4dB – Q:3.5 – Frq:1007Hz*
- Peaking #4: -1.5 – Q:3.5 – Frq:1520Hz*
- Peaking #5: -4.5 – Q:3 – Frq:3490Hz*

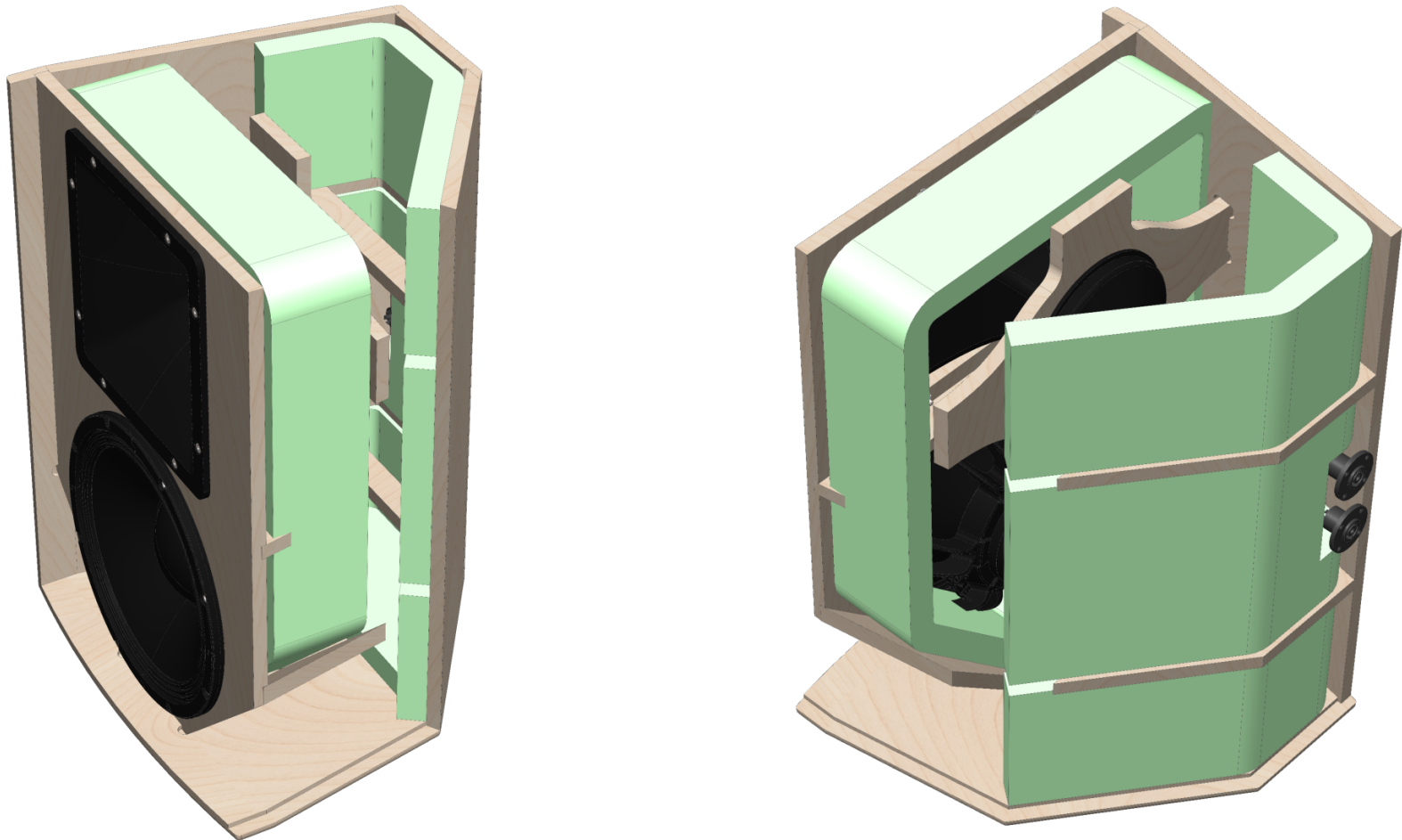


*Target transfer function*

- HPF and LPF:*
- HPF: 50Hz – BTW 24dB/Oct*
- LPF: 18000Hz – LR 24dB/Oct*

## DAMPING MATERIAL

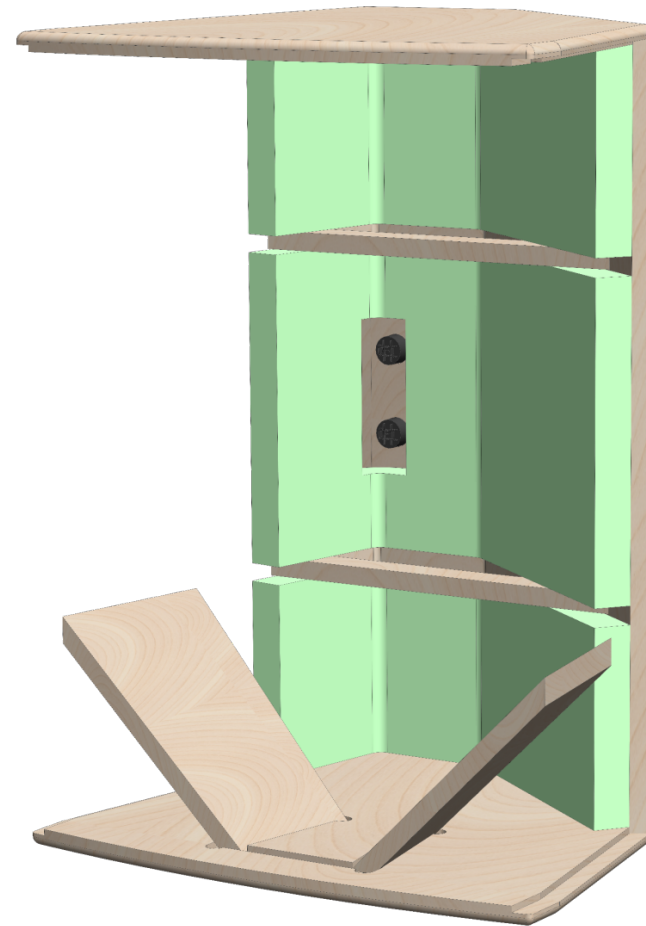
EDILFIBER (Polyester) 30Kg/m<sup>3</sup> – 30mm thick



*Follow carefully the quantity and positioning*

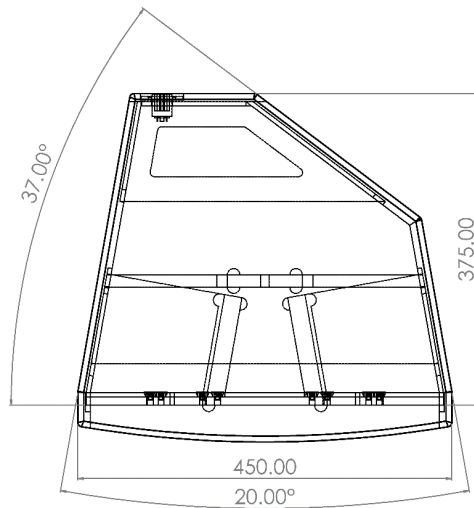
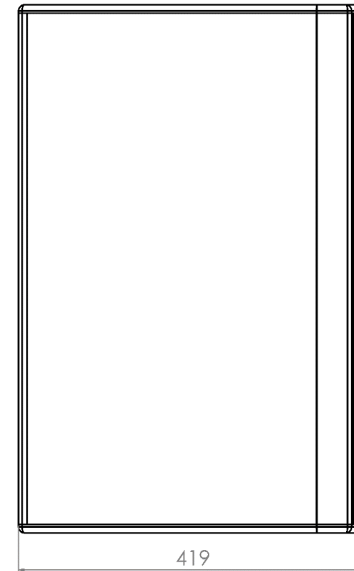
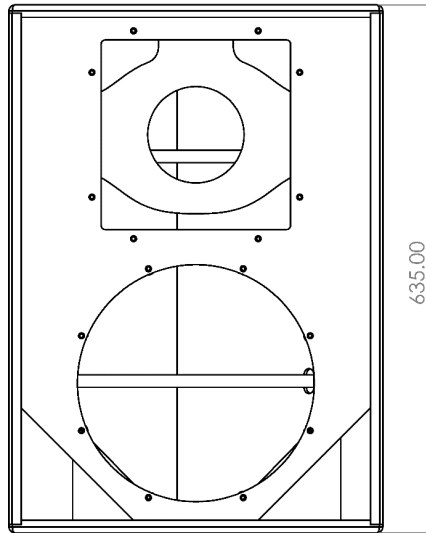
## DAMPING MATERIAL

EDILFIBER (Polyester) 30Kg/m<sup>3</sup> – 30mm thick



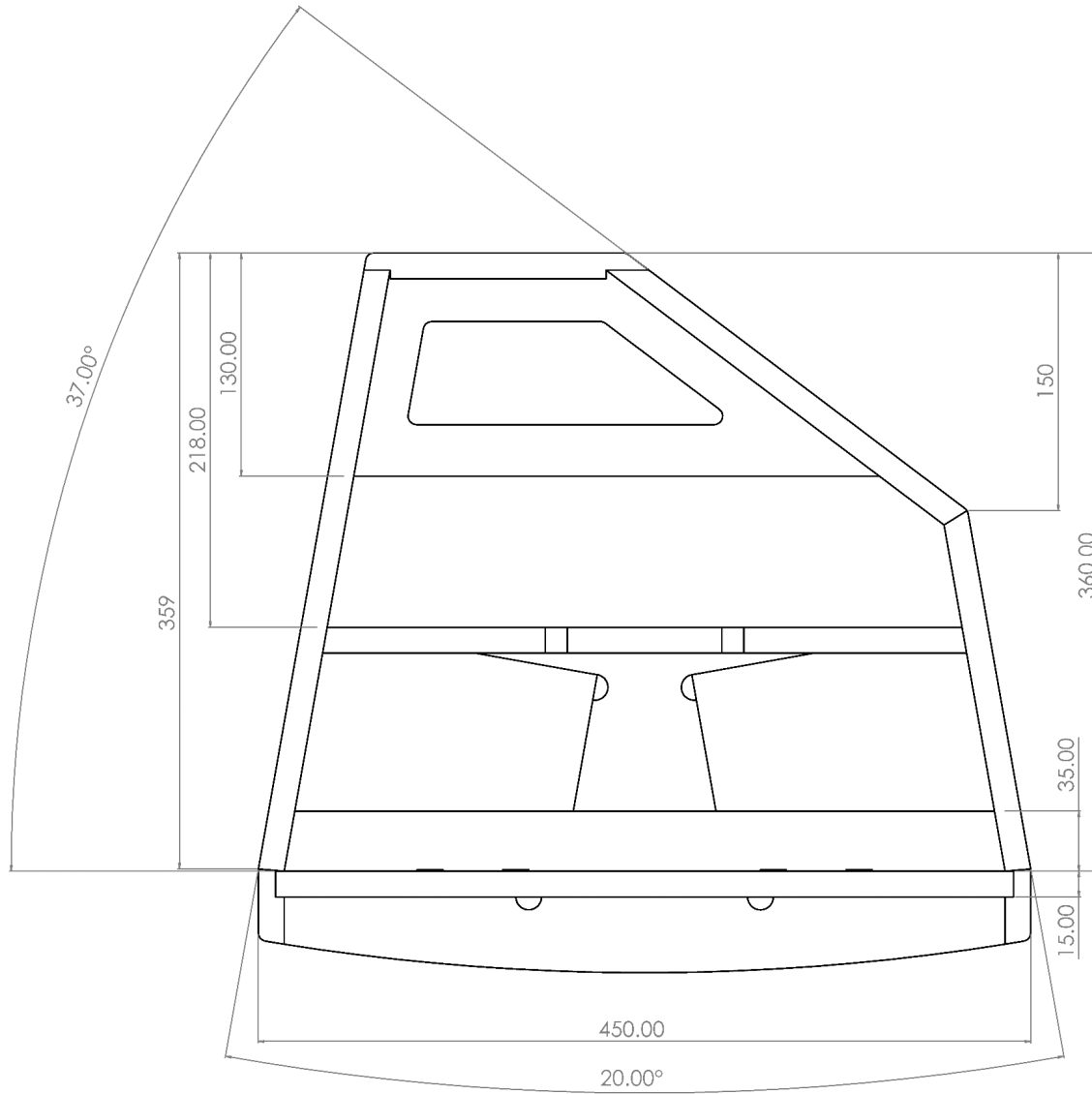
*Follow carefully the quantity and positioning*

# GLOBAL DIMENSIONS

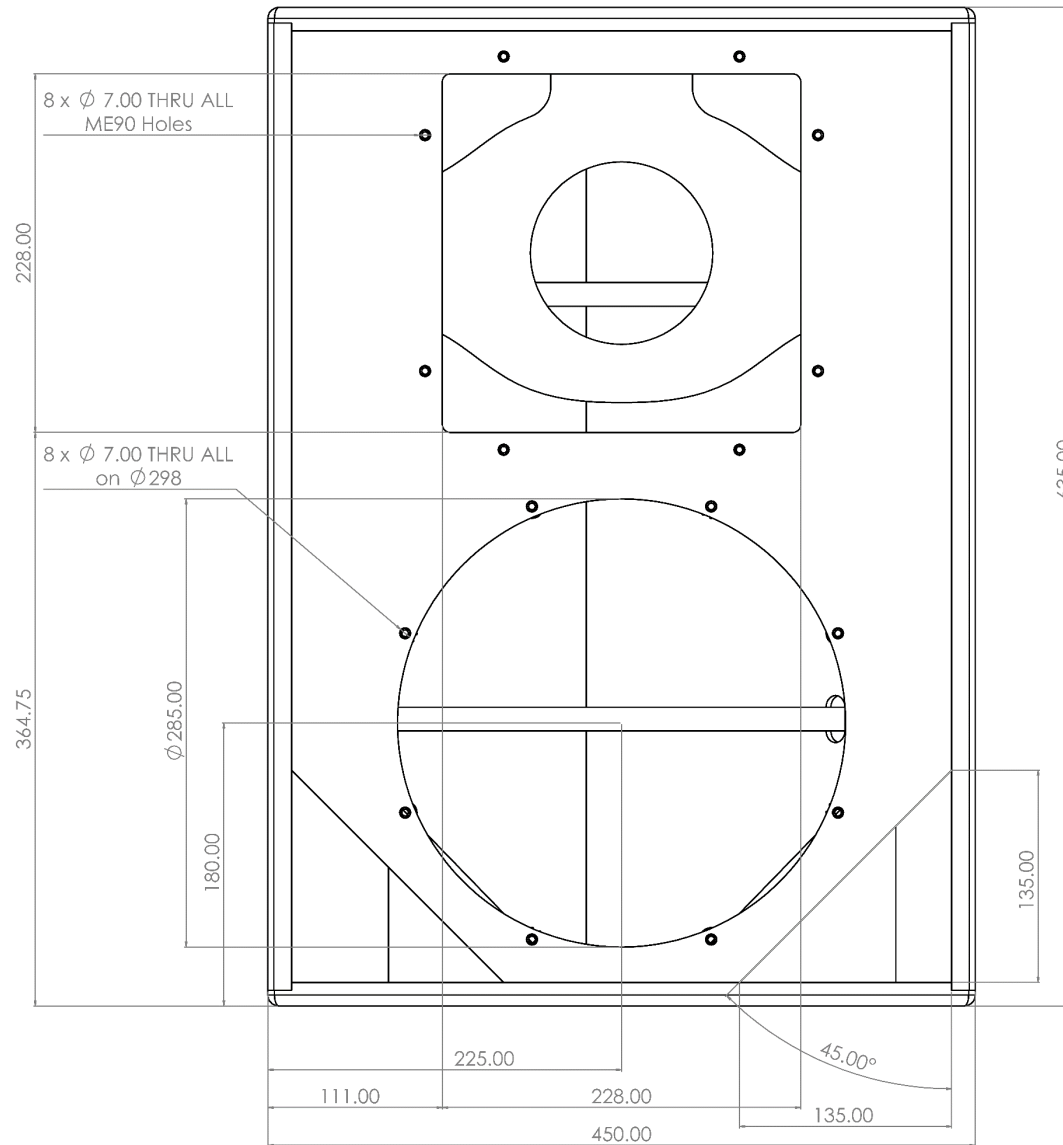




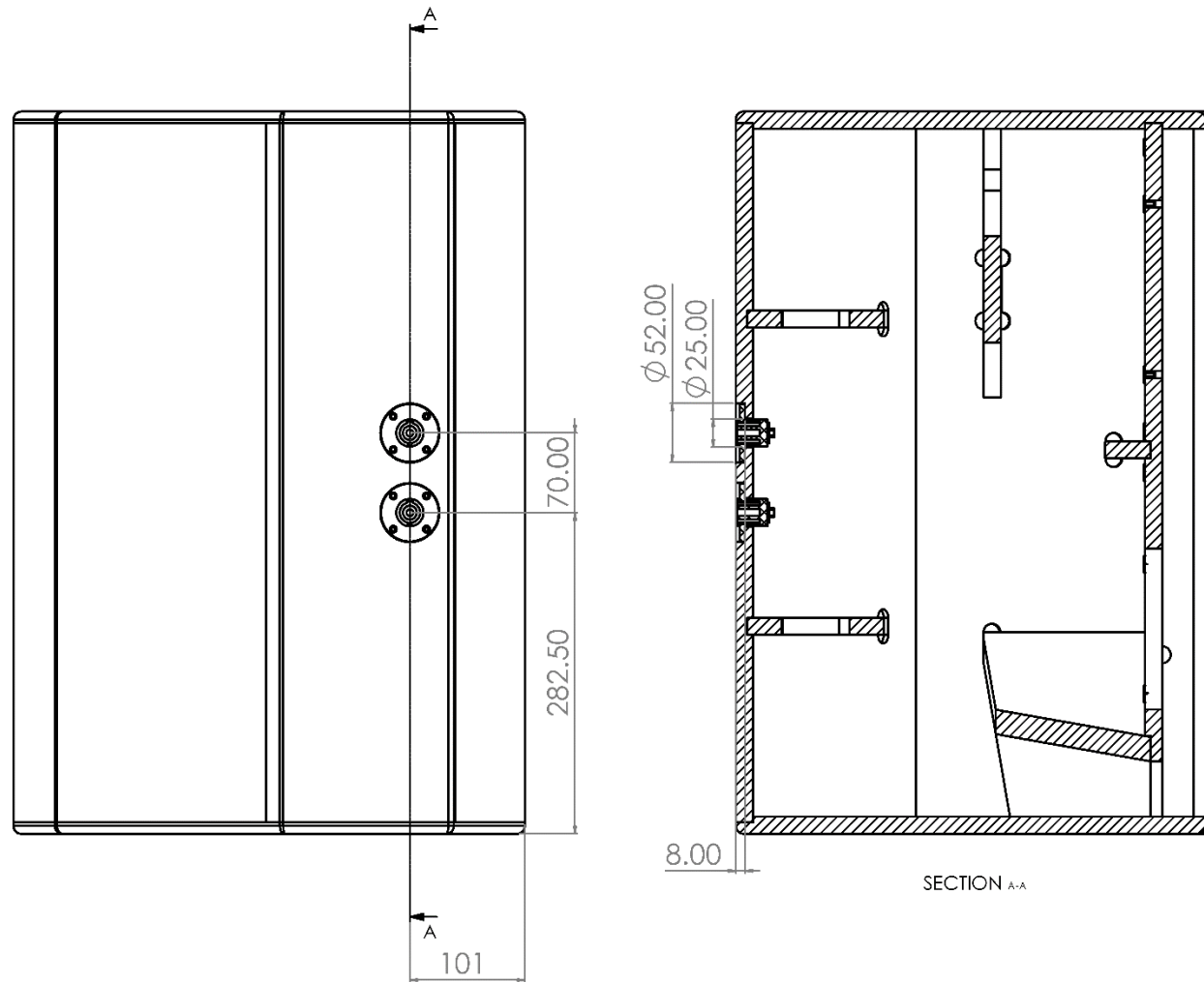
# ENCLOSURE DESIGN – TOP VIEW



# ENCLOSURE DESIGN – FRONT VIEW

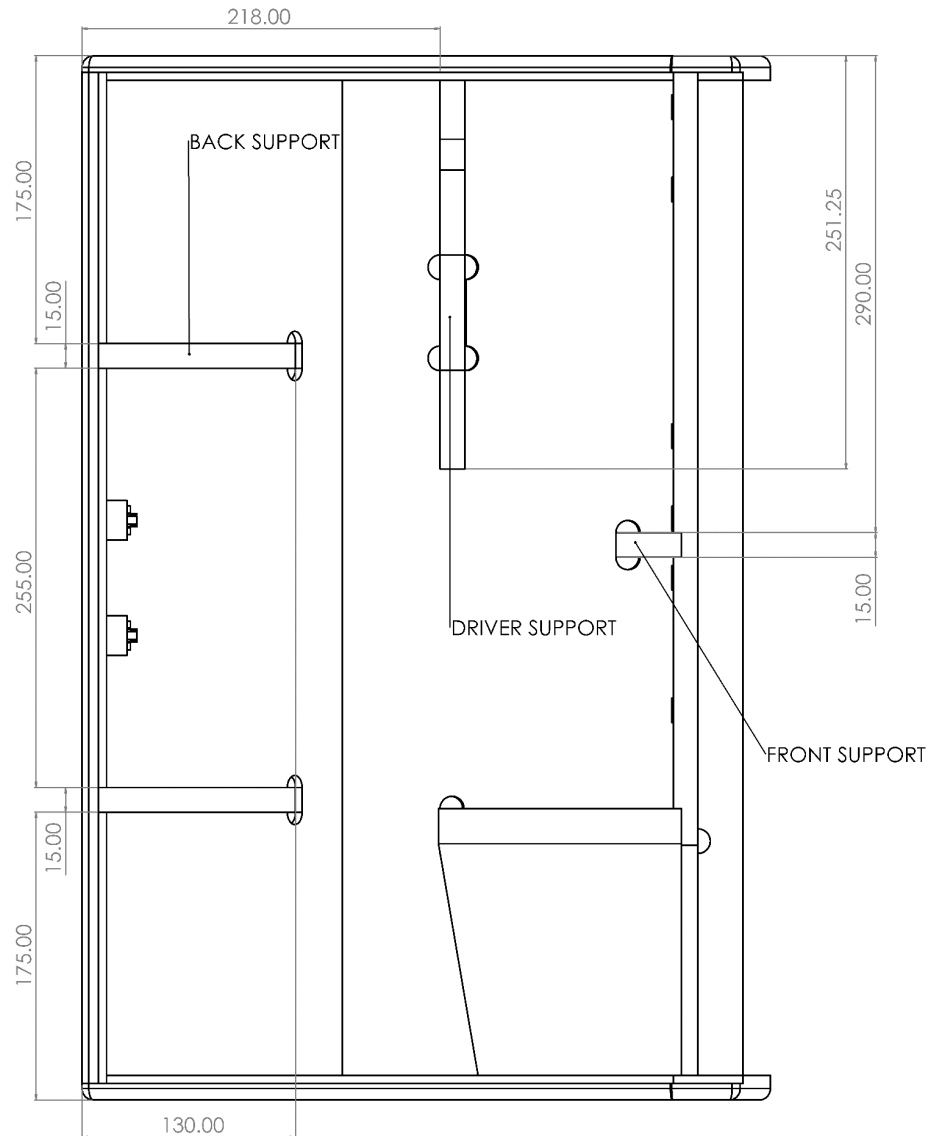


# ENCLOSURE DESIGN – BACK VIEW

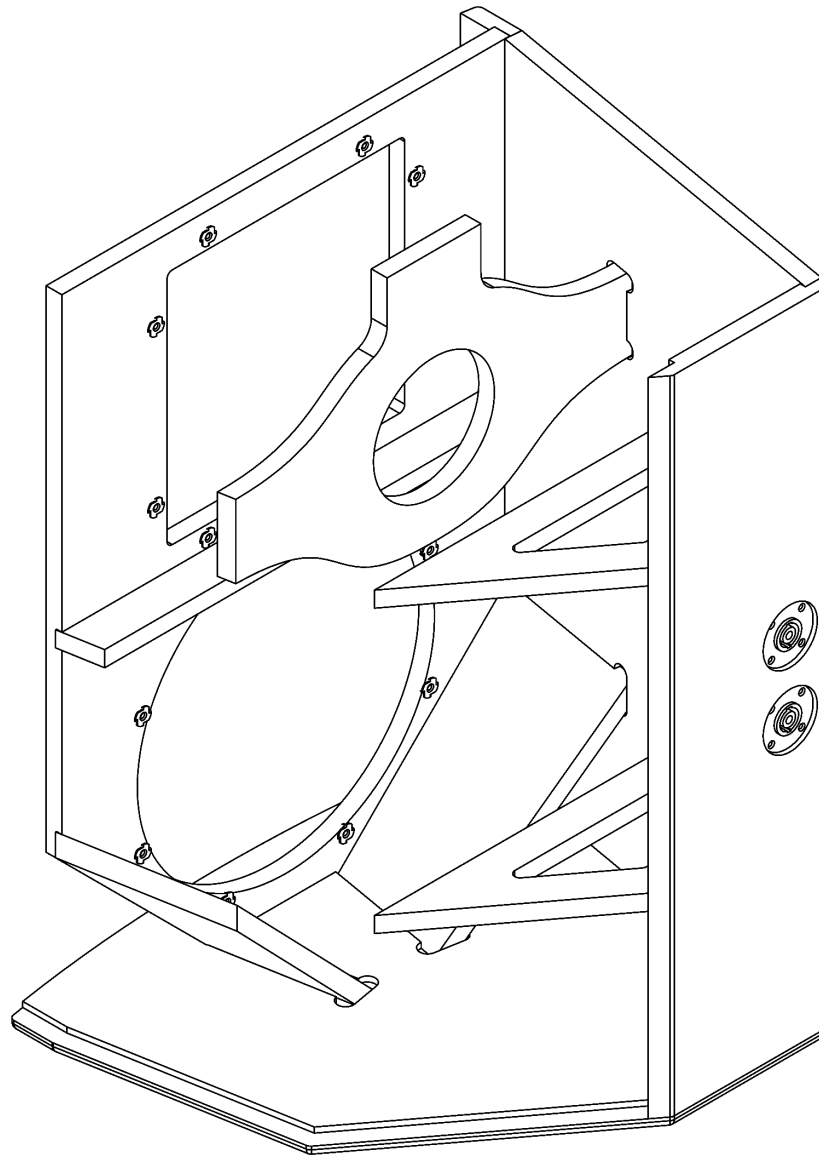


*Connectors position is MANDATORY*

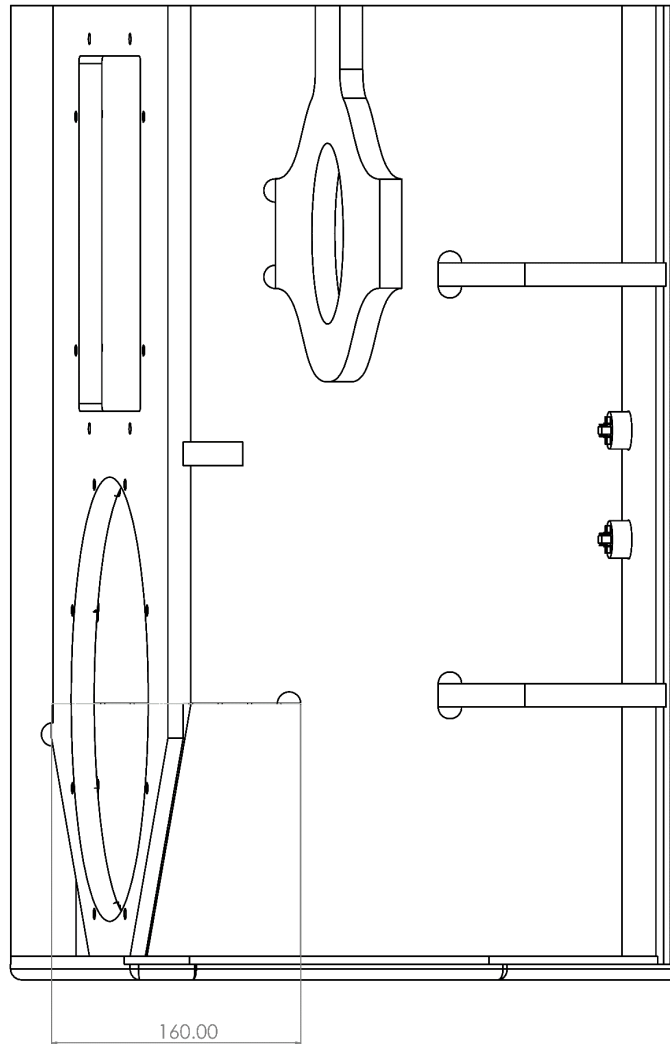
# ENCLOSURE DESIGN – SIDE VIEW



# ENCLOSURE DESIGN – INTERNAL VIEW

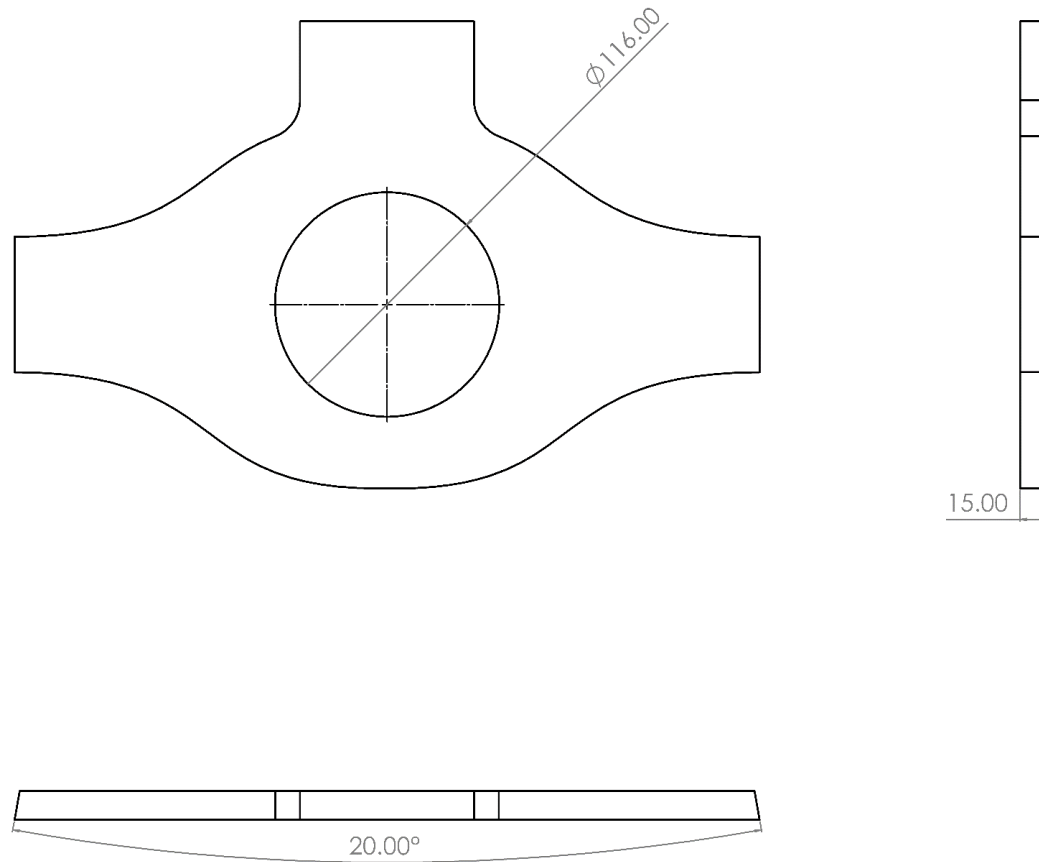


# ENCLOSURE DESIGN – PORTS



*View is perpendicular to left side panel*

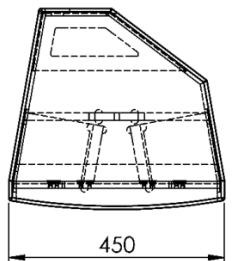
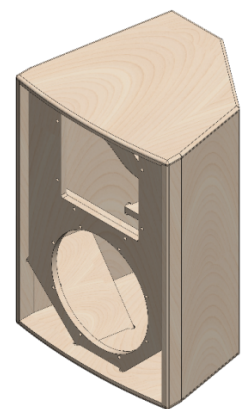
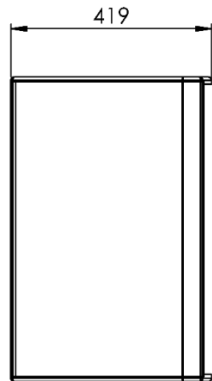
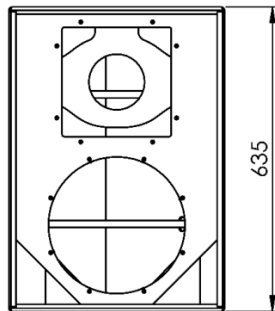
# ENCLOSURE DESIGN – DRIVER SUPPORT



*Driver Support is MANDATORY but can be made of the shape you prefer*

*BLUEPRINTS – From page 25 to page 40*

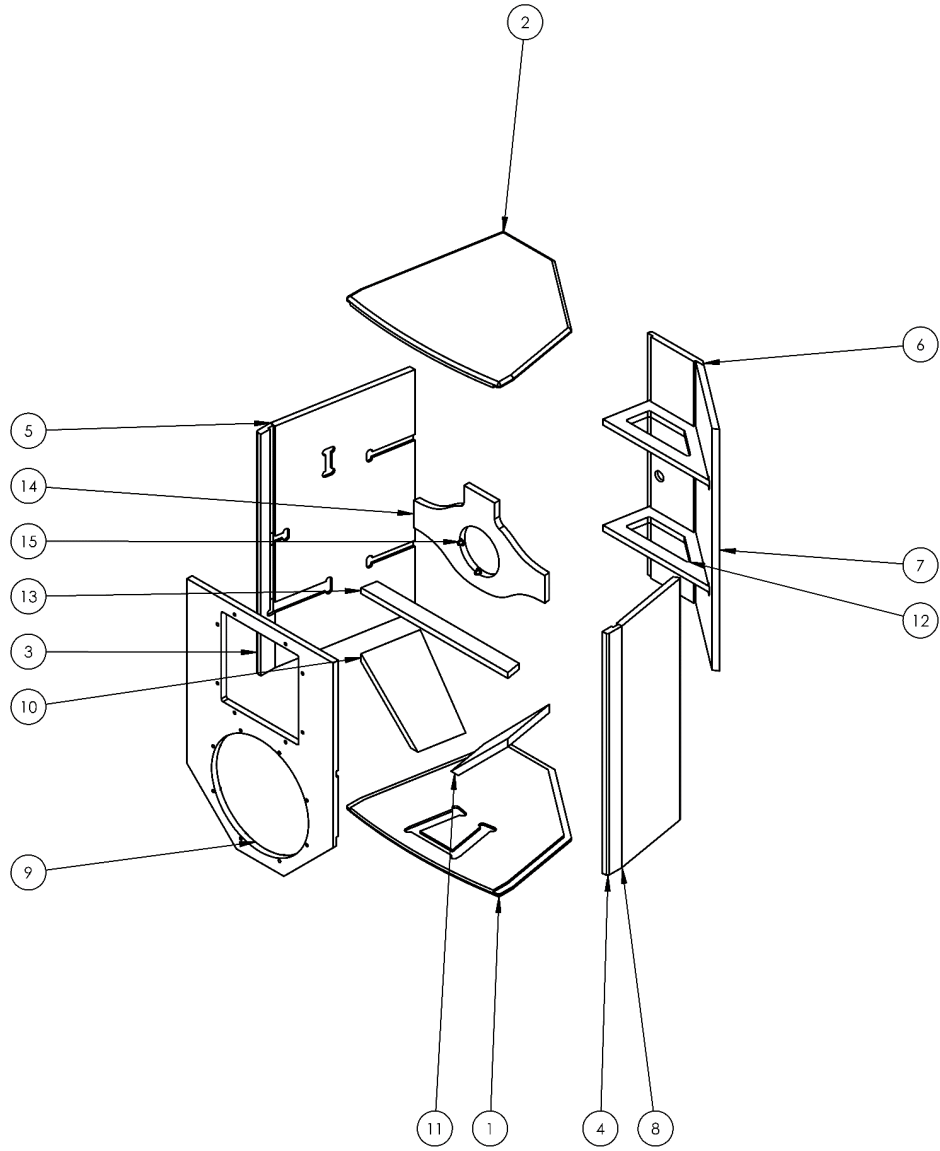




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<b>Project:</b> Utility12	<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:10	<b>Revision:</b> R.0
		<b>Weight (Kg):</b> 12.62		
Designed by Contrato-Audio s.r.l.				
<b>Tolerances (ISO 2768-mK)</b> <b>Holes + / Shaft - :</b> 0.2 <b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1] <b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°] <b>Linear:</b> <6 ±0.1    6-30 ±0.2    30-120 ±0.3    120-400 ±0.5    400-1000 ±0.8    1000-2000 ±1.2    2000-4000 ±2				
				<b>First Angle Proj.</b> 
				Page 2 of 17

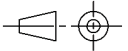
PRODUCTION COMPONENTS BOM			
ITEM NO.	PART NAME	Part description	QTY
1	U12_Base	Bottom Base	1
2	U12_Base	Top Base	1
3	U12_FSide	Front left side	1
4	U12_FSide	Front right side	1
5	U12_LSide	Left panel	1
6	U12_Back	Back panel	1
7	U12_TSide	Monitor panel	1
8	U12_RSide	Right panel	1
9	U12_Baffle	Baffle	1
10	U12_Reflex	Left port	1
11	U12_Reflex	Right port	1
12	U12_Back-Reinf	Back reinf.	2
13	U12_Front-Reinf	Front reinf.	1
14	U12_Driver-Support	Driver support	1
15	M5 T-Nuts		16

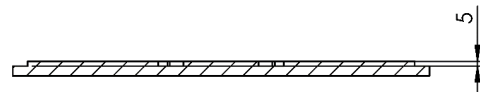
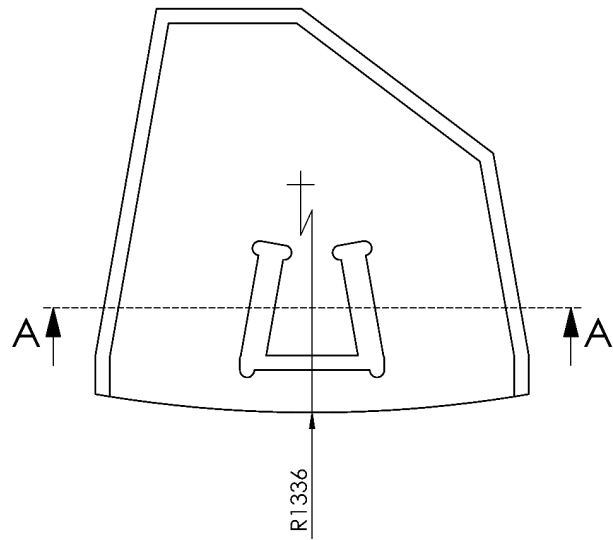
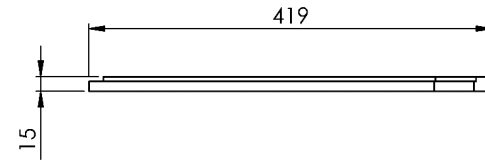
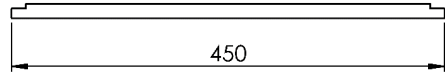


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<b>Project:</b> Utility12	<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:10	<b>Revision:</b> R.0
		<b>Weight (Kg):</b> 12.62		
<small>Designed by Contratto-Audio s.r.l.</small>				

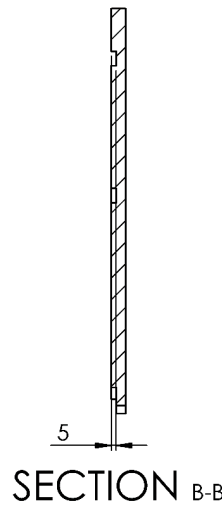
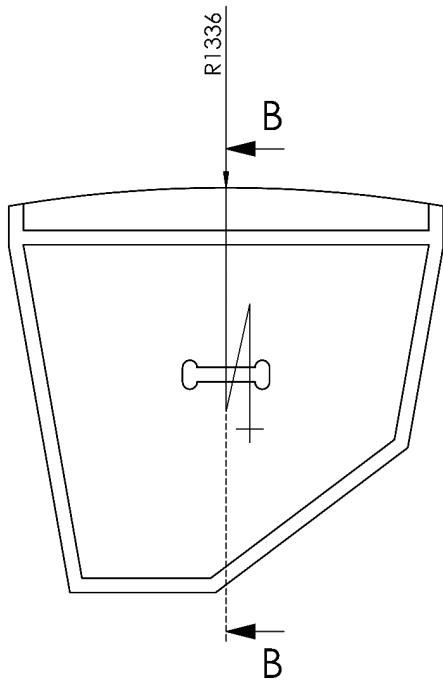
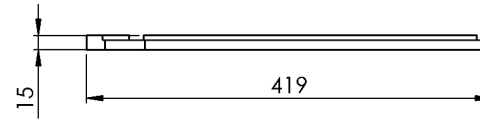
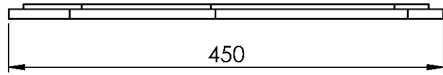
**Tolerances (ISO 2768-mK)**  
 Holes + / Shaft - : 0.2  
 Chamfer/Fillet/Round: [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]  
 Angle: [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]  
 Linear: <6 ±0.1    6-30 ±0.2    30-120 ±0.3    120-400 ±0.5    400-1000 ±0.8    1000-2000 ±1.2    2000-4000 ±2

First Angle Proj.  
  
 Page 3 of 17

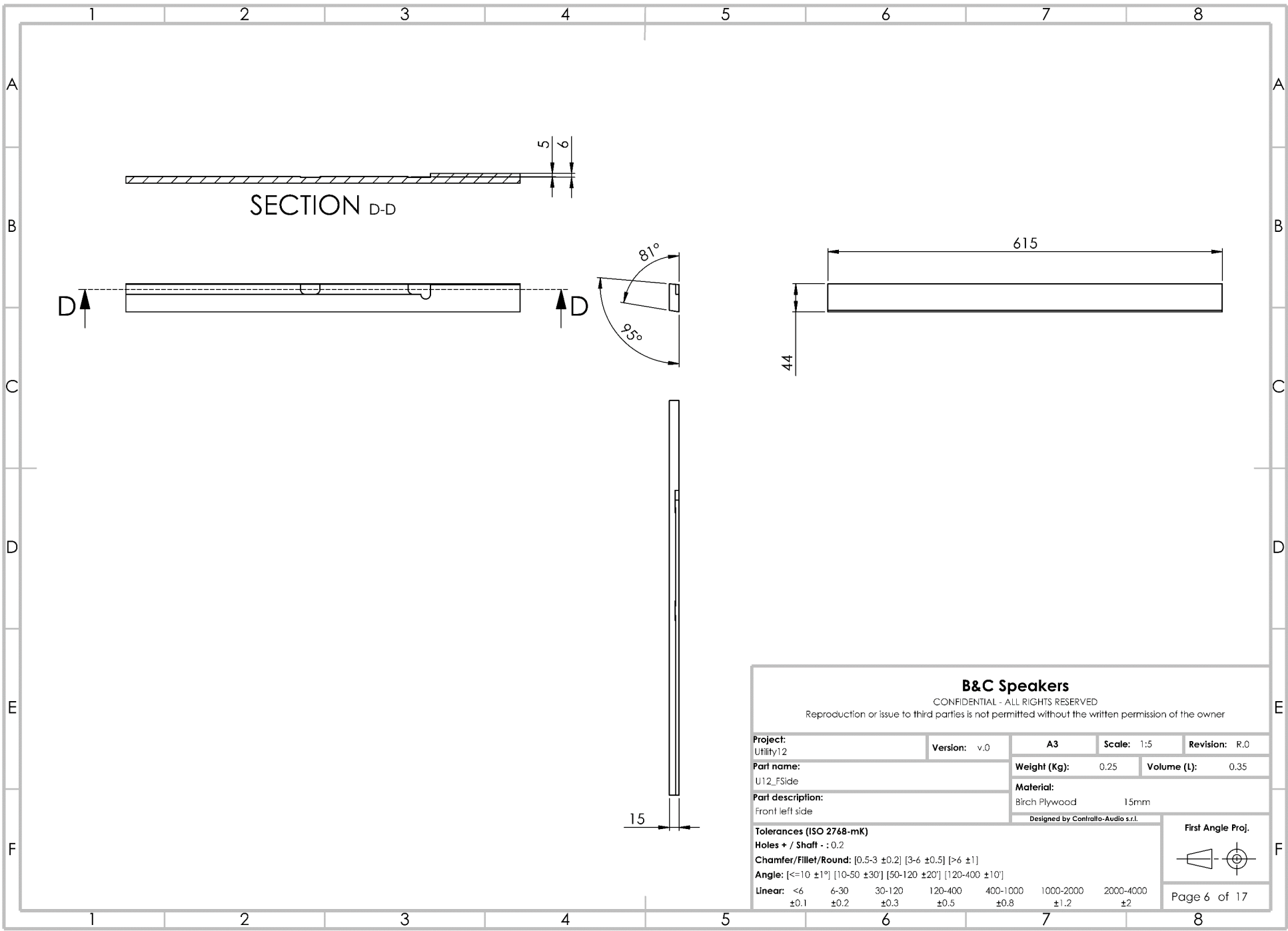


SECTION A-A

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Project: Utility12	Version: v.0	A3	Scale: 1:5	Revision: R.0			
Part name: U12_Base		Weight (Kg):	1.51	Volume (L):	2.13		
Part description: Bottom Base		Material:	Birch Plywood 15mm				
		Designed by Controllo-Audio s.r.l.					
Tolerances (ISO 2768-mK)							
Holes + / Shaft - : 0.2							
Chamfer/Fillet/Round: [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]							
Angle: [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]							
Linear:	<6 ±0.1	6-30 ±0.2	30-120 ±0.3	120-400 ±0.5	400-1000 ±0.8	1000-2000 ±1.2	2000-4000 ±2
							First Angle Proj.
							Page 4 of 17



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<b>Project:</b> Utility12	<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:5	<b>Revision:</b> R.0		
<b>Part name:</b> U12_Base		<b>Weight (Kg):</b>	1.52	<b>Volume (L):</b>	2.13	
<b>Part description:</b> Top Base		<b>Material:</b> Birch Plywood 15mm		<b>Designed by</b> Contralto-Audio s.r.l.		
<b>Tolerances (ISO 2768-mK)</b>						
<b>Holes + / Shaft - :</b> 0.2						
<b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]						
<b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]						
<b>Linear:</b>	<6 ±0.1	6-30 ±0.2	30-120 ±0.3	120-400 ±0.5	400-1000 ±0.8	1000-2000 ±1.2
					2000-4000 ±2	
				<b>First Angle Proj.</b>		
						Page 5 of 17

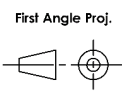


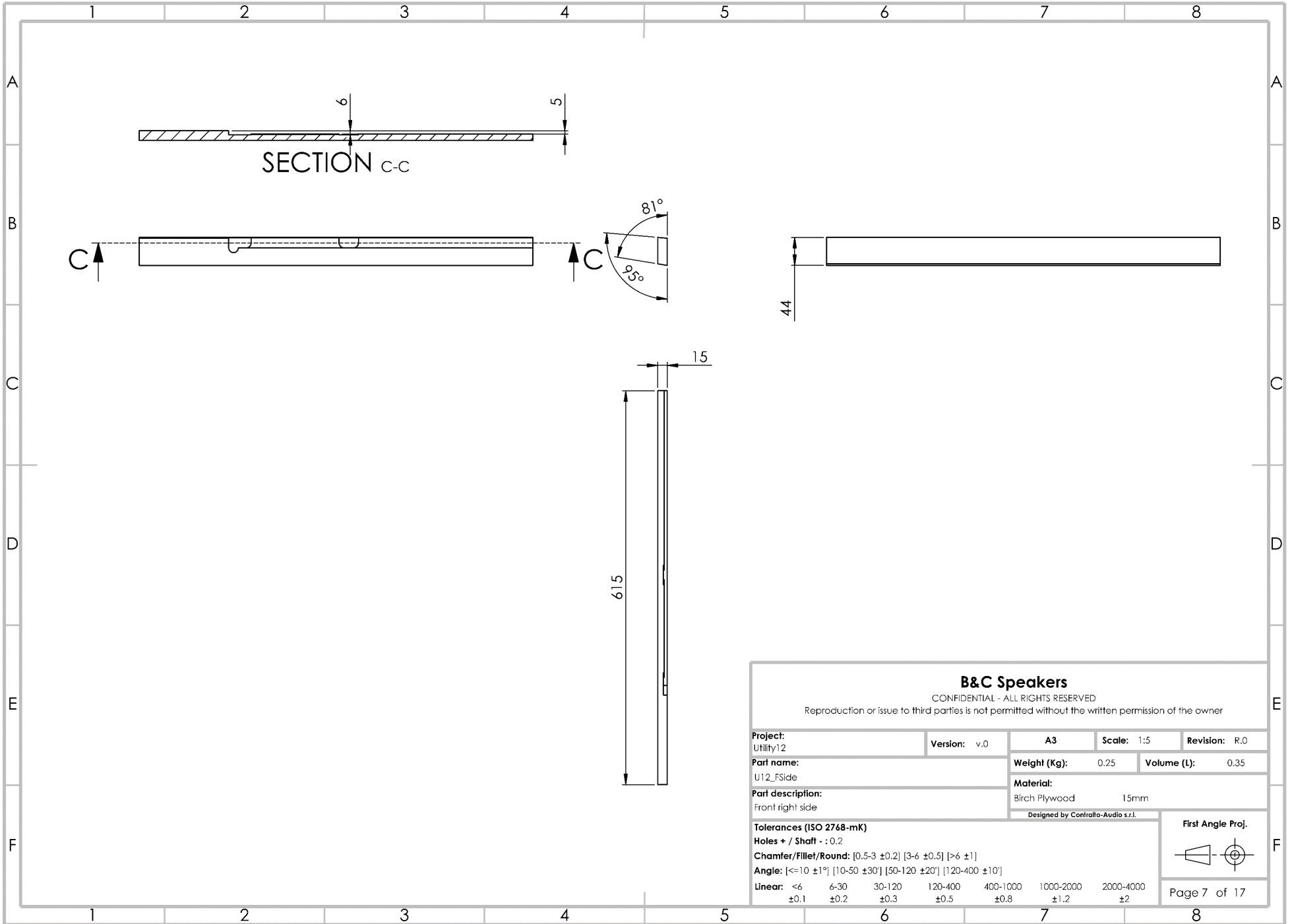
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<b>Project:</b> Utility12		<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:5	<b>Revision:</b> R.0
<b>Part name:</b> U12_FSide		<b>Weight (Kg):</b> 0.25	<b>Volume (L):</b> 0.35		
<b>Part description:</b> Front left side		<b>Material:</b> Birch Plywood 15mm			
		Designed by Controllo-Audio s.r.l.			
<b>Tolerances (ISO 2768-mK)</b>					
<b>Holes + / Shaft - : 0.2</b>					
<b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]					
<b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]					
<b>Linear:</b>	<6 ±0.1	6-30 ±0.2	30-120 ±0.3	120-400 ±0.5	400-1000 ±0.8
				1000-2000 ±1.2	2000-4000 ±2





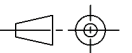
### B&C Speakers

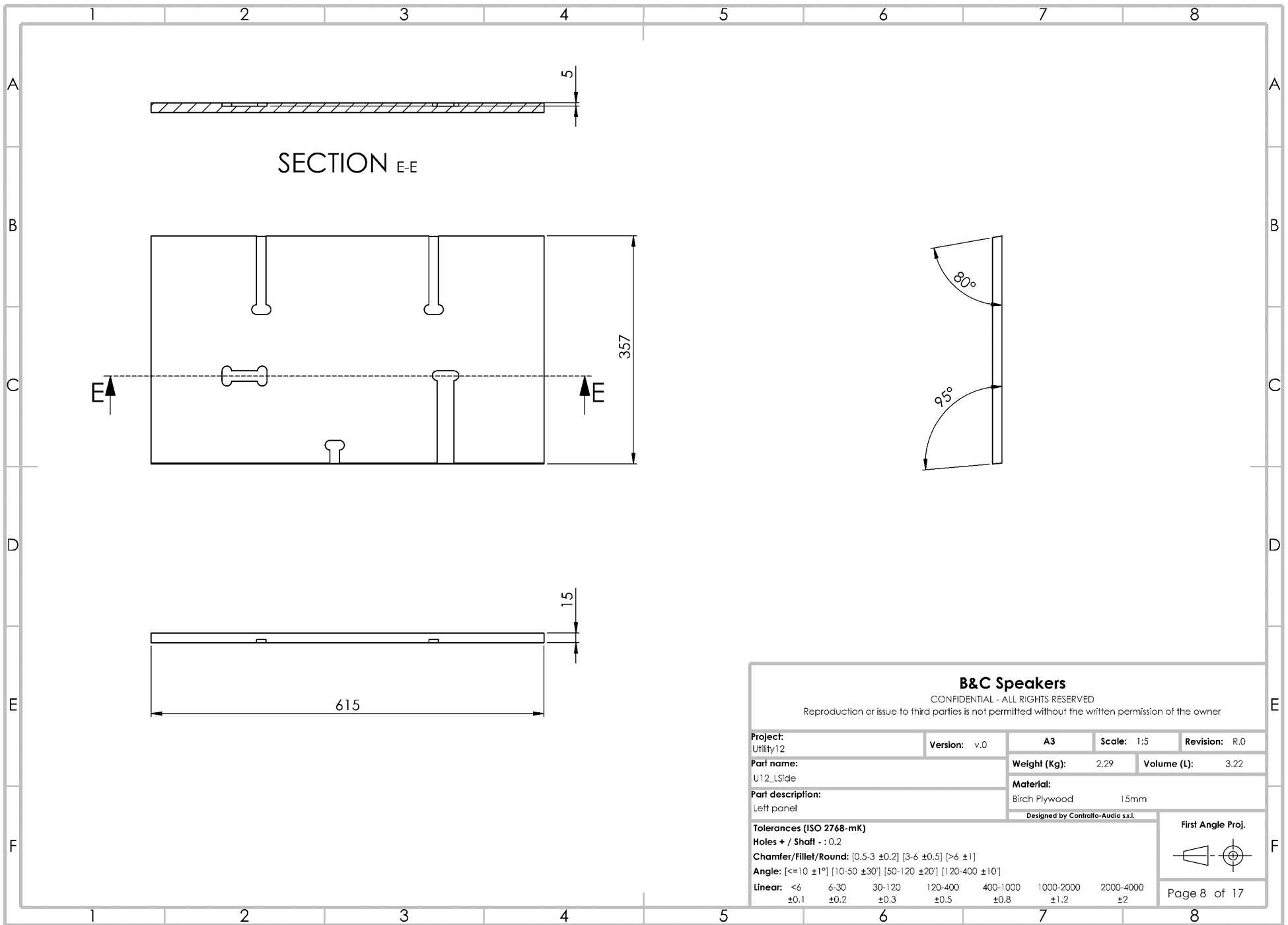
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<b>Project:</b> Utility12		<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:5	<b>Revision:</b> R.0
<b>Part name:</b> U12_FSide		<b>Weight (Kg):</b> 0.25	<b>Volume (L):</b> 0.35		
<b>Part description:</b> Front right side		<b>Material:</b> Birch Plywood 15mm			
<small>Designed by Contralto-Audio s.r.l.</small>					
<b>Tolerances (ISO 2768-mK)</b>					
<b>Holes + / Shaft - :</b> 0.2					
<b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]					
<b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]					
<b>Linear:</b>					
<6	6-30	30-120	120-400	400-1000	1000-2000
±0.1	±0.2	±0.3	±0.5	±0.8	±1.2
					2000-4000
					±2

First Angle Proj.



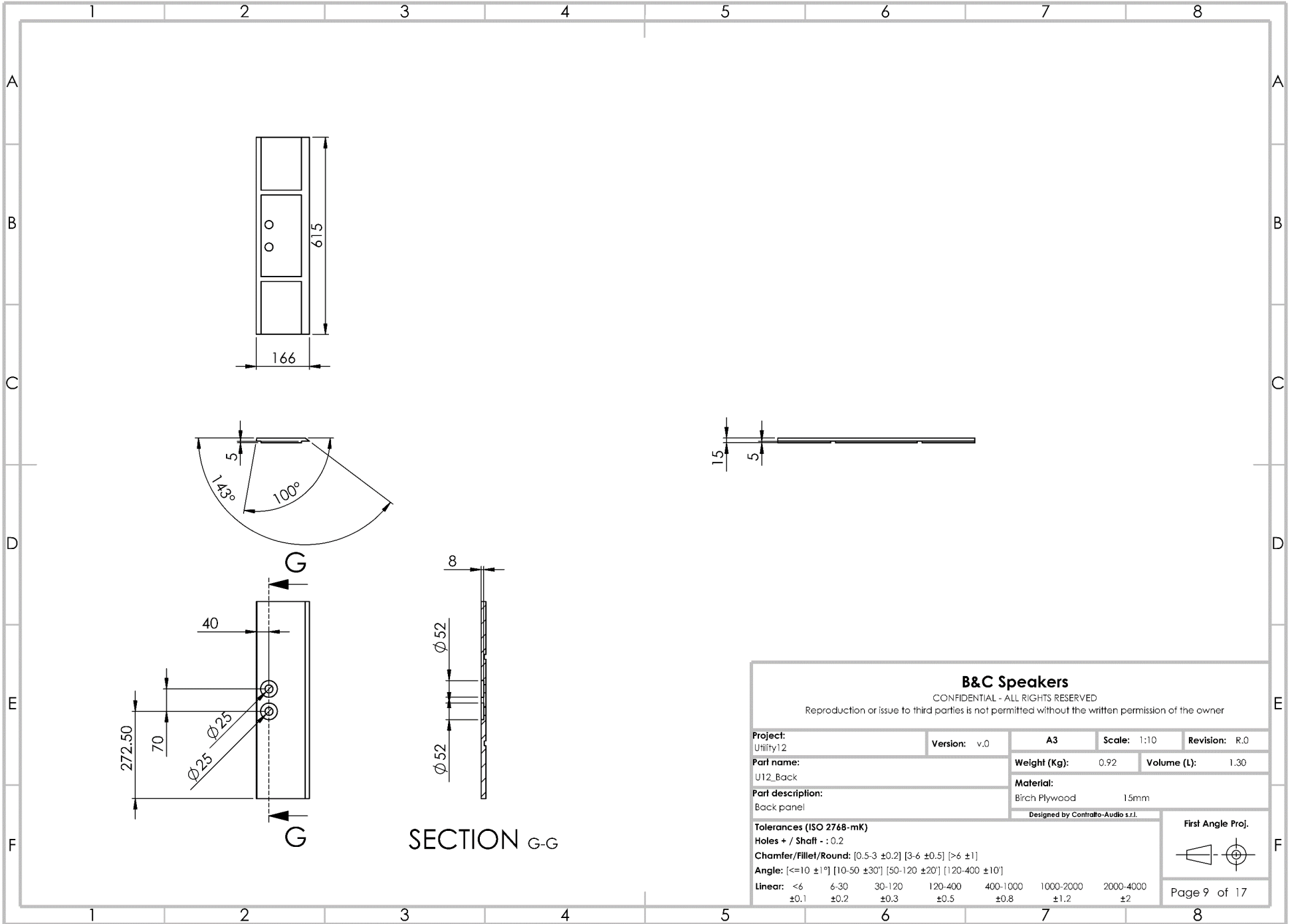


### B&C Speakers

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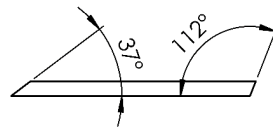
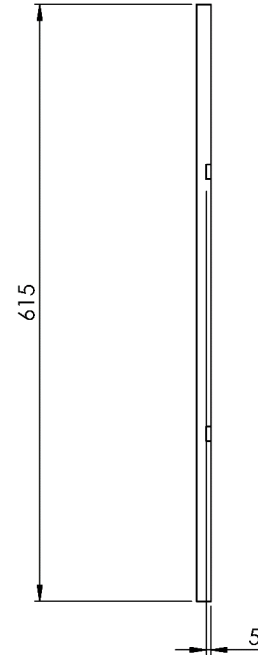
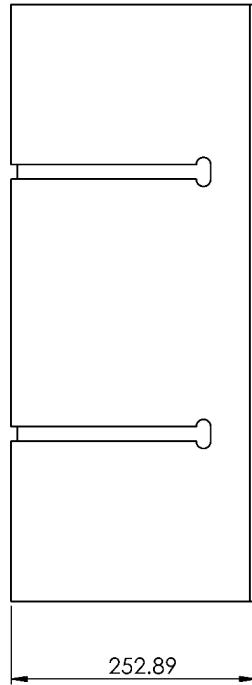
<b>Project:</b> Utility12		<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:5	<b>Revision:</b> R.0	
<b>Part name:</b> U12_LSide		<b>Weight (Kg):</b> 2.29	<b>Volume (L):</b> 3.22			
<b>Part description:</b> Left panel		<b>Material:</b> Birch Plywood 15mm				
<small>Designed by Contralto-Audio s.r.l.</small>						
<b>Tolerances (ISO 2768-mK)</b>					<b>First Angle Proj.</b> 	
<b>Holes + / Shaft - :</b> 0.2						
<b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]						
<b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]						
<b>Linear:</b> <6	6-30	30-120	120-400	400-1000	1000-2000	2000-4000
±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2



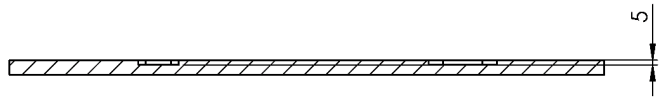
SECTION G-G

<b>B&amp;C Speakers</b> CONFIDENTIAL - ALL RIGHTS RESERVED Reproduction or issue to third parties is not permitted without the written permission of the owner					
<b>Project:</b> Utility12	<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:10	<b>Revision:</b> R.0	
<b>Part name:</b> U12_Back		<b>Weight (Kg):</b> 0.92	<b>Volume (L):</b> 1.30		
<b>Part description:</b> Back panel		<b>Material:</b> Birch Plywood 15mm			
<small>Designed by Contralto-Audio s.r.l.</small>					
<b>Tolerances (ISO 2768-mK)</b>					
<b>Holes + / Shaft - : 0.2</b>					
<b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]					
<b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]					
<b>Linear:</b> <6 ±0.1	6-30 ±0.2	30-120 ±0.3	120-400 ±0.5	400-1000 ±0.8	1000-2000 ±1.2
					2000-4000 ±2
					<b>First Angle Proj.</b> 
					Page 9 of 17

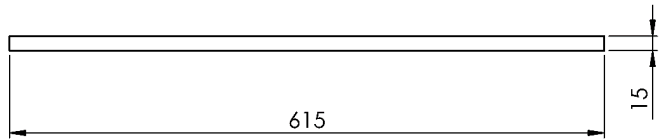
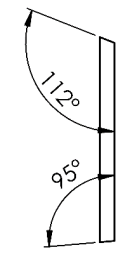
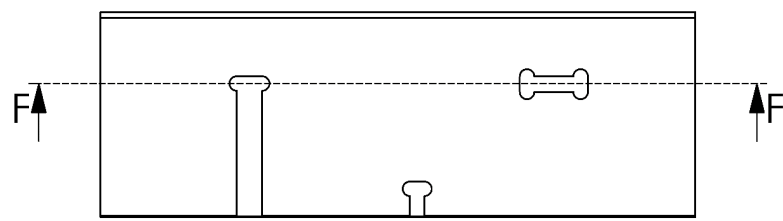




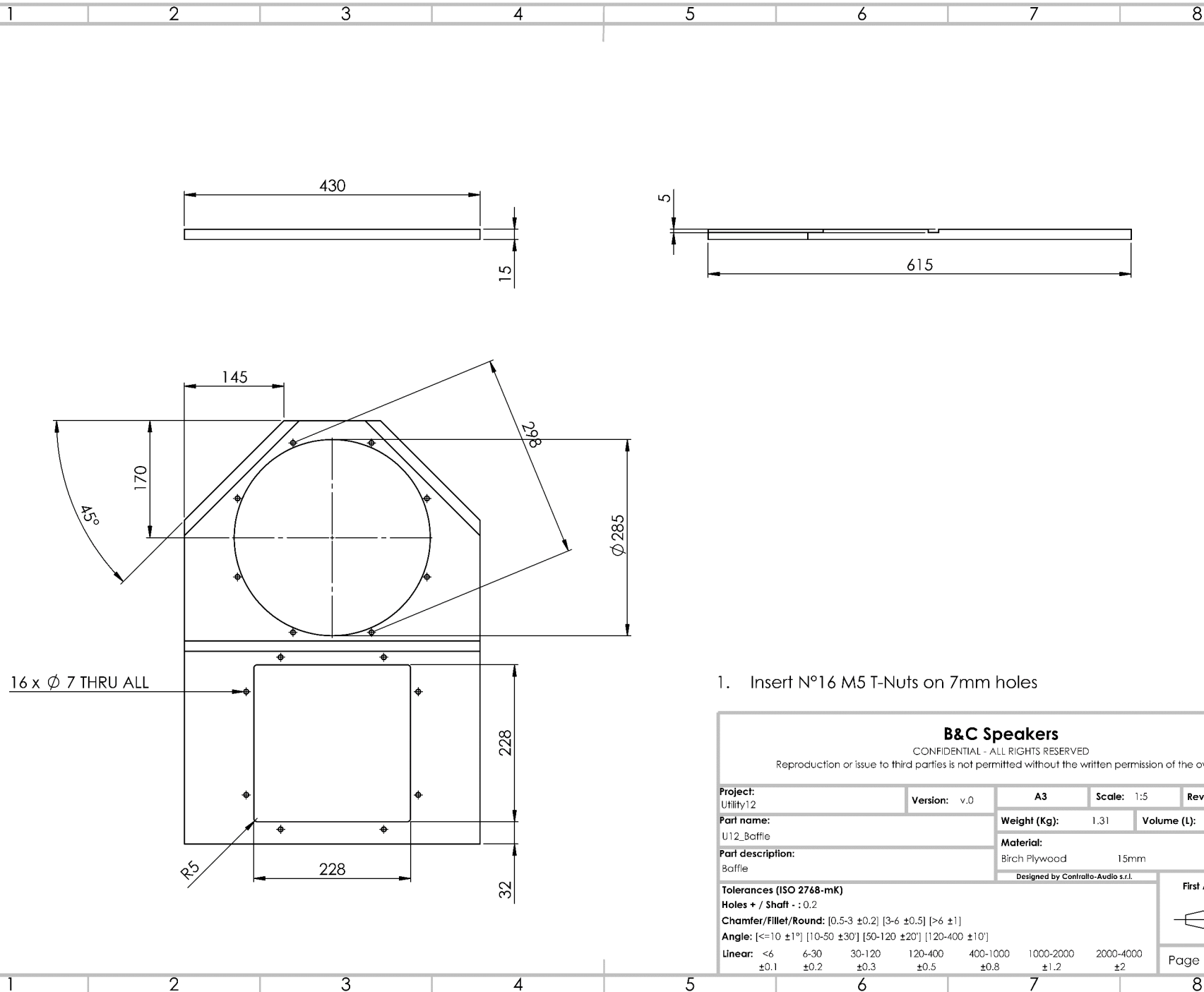
B&C Speakers						
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<b>Project:</b> Utility12	<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:5	<b>Revision:</b> R.0		
<b>Part name:</b> U12_TSide		<b>Weight (Kg):</b> 1.55	<b>Volume (L):</b> 2.18			
<b>Part description:</b> Monitor panel		<b>Material:</b> Birch Plywood 15mm		Designed by Controllo-Audio s.r.l.		
<b>Tolerances (ISO 2768-mK)</b>						
<b>Holes + / Shaft - :</b> 0.2						
<b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]						
<b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]						
<b>Linear:</b>	<6 ±0.1	6-30 ±0.2	30-120 ±0.3	120-400 ±0.5	400-1000 ±0.8	1000-2000 ±1.2
						2000-4000 ±2
						<b>First Angle Proj.</b> 
						Page 10 of 17



SECTION F-F

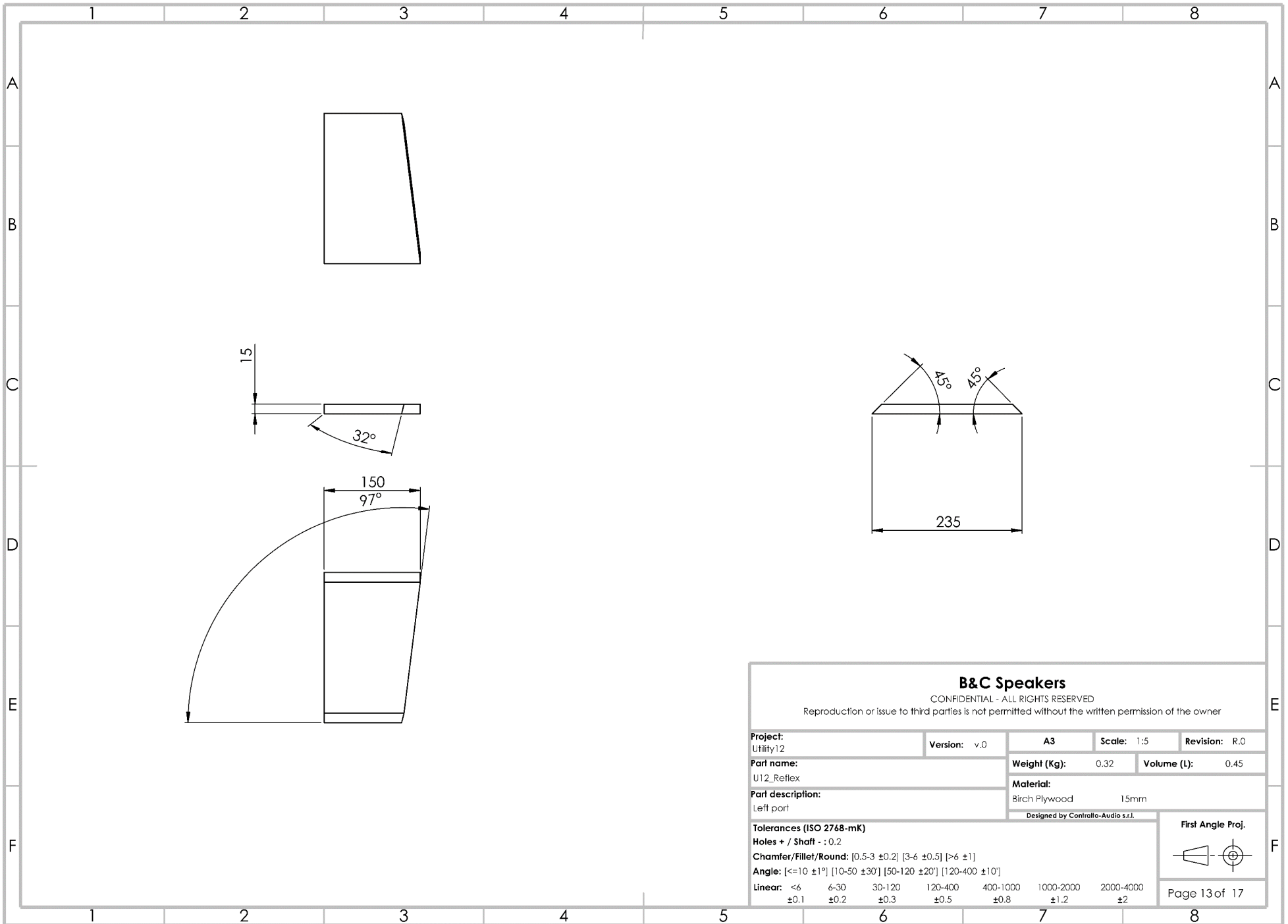


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<b>Project:</b> Utility12	<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:5	<b>Revision:</b> R.0		
<b>Part name:</b> U12_RSide		<b>Weight (Kg):</b>	1.34	<b>Volume (L):</b>	1.89	
<b>Part description:</b> Right panel		<b>Material:</b> Birch Plywood 15mm		Designed by Contralco-Audio s.r.l.		
<b>Tolerances (ISO 2768-mK)</b>						
<b>Holes + / Shaft - :</b> 0.2						
<b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]						
<b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]						
<b>Linear:</b>	<6 ±0.1	6-30 ±0.2	30-120 ±0.3	120-400 ±0.5	400-1000 ±0.8	1000-2000 ±1.2
					2000-4000 ±2	
				<b>First Angle Proj.</b> 		
						Page 11 of 17



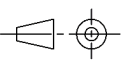
1. Insert N°16 M5 T-Nuts on 7mm holes

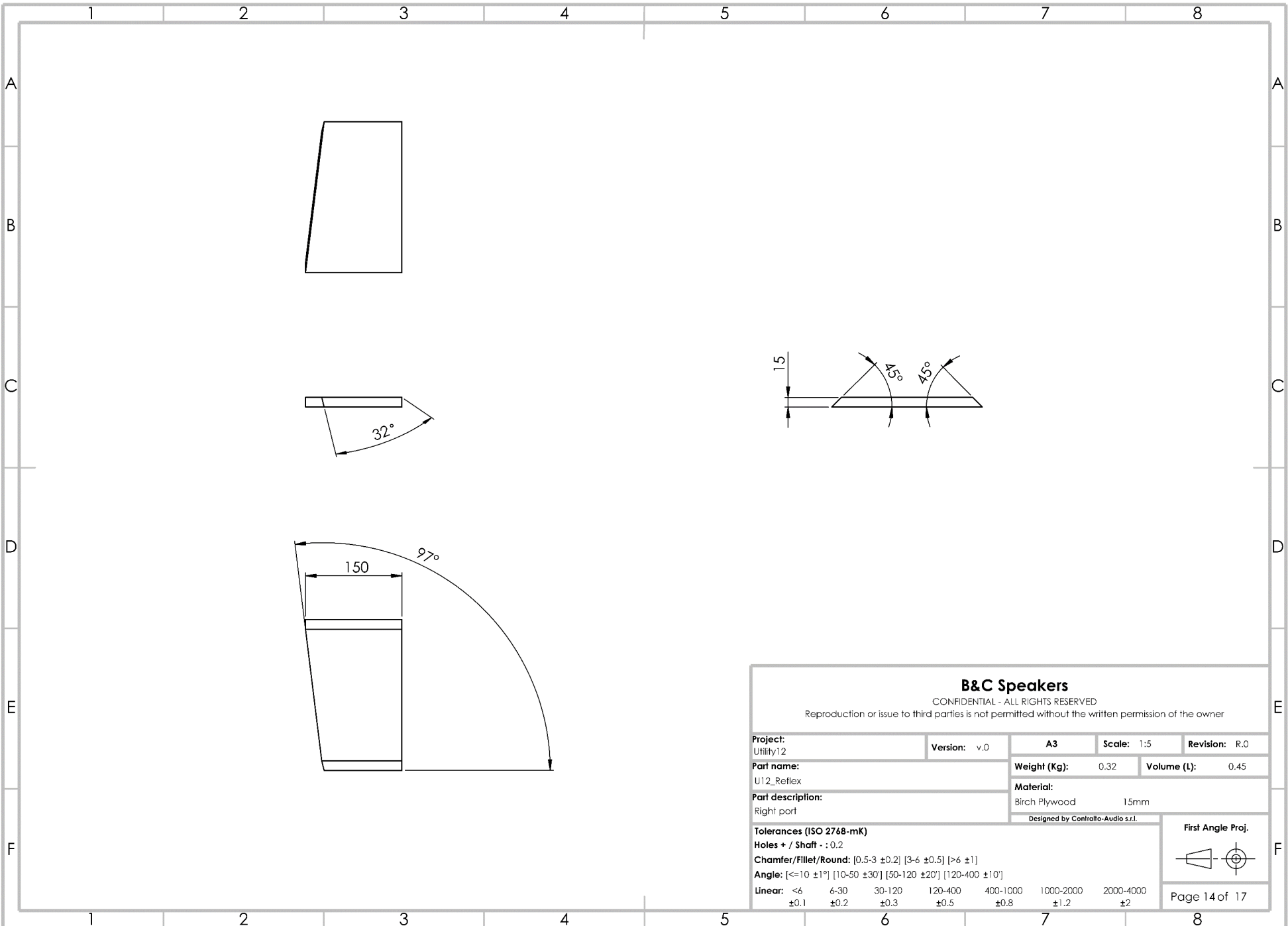
<b>B&amp;C Speakers</b>					
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Project: Utility12	Version: v.0	A3	Scale: 1:5	Revision: R.0	
Part name: U12_Baffle		Weight (Kg):	1.31	Volume (L):	1.84
Part description: Baffle		Material: Birch Plywood 15mm		Designed by Contralfo-Audio s.r.l.	
Tolerances (ISO 2768-mK)					
Holes + / Shaft - : 0.2					
Chamfer/Fillet/Round: [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]					
Angle: [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]					
Linear:	<6 ±0.1	6-30 ±0.2	30-120 ±0.3	120-400 ±0.5	400-1000 ±0.8
				1000-2000 ±1.2	2000-4000 ±2
					First Angle Proj. 
					Page 12 of 17



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<b>Project:</b> Utility12	<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:5	<b>Revision:</b> R.0
<b>Part name:</b> U12_Reflex		<b>Weight (Kg):</b> 0.32	<b>Volume (L):</b> 0.45	
<b>Part description:</b> Left part		<b>Material:</b> Birch Plywood 15mm		
<b>Tolerances (ISO 2768-mK)</b>				<b>First Angle Proj.</b>  Page 13 of 17
<b>Holes + / Shaft - :</b> 0.2				
<b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]				
<b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]				
<b>Linear:</b>	<6 ±0.1	6-30 ±0.2	30-120 ±0.3	120-400 ±0.5
			400-1000 ±0.8	1000-2000 ±1.2
				2000-4000 ±2

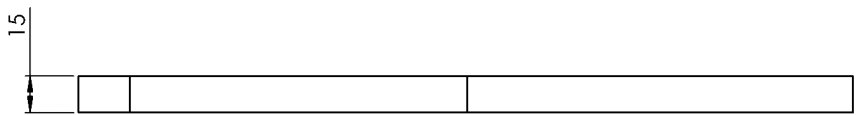
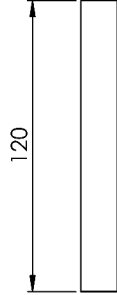
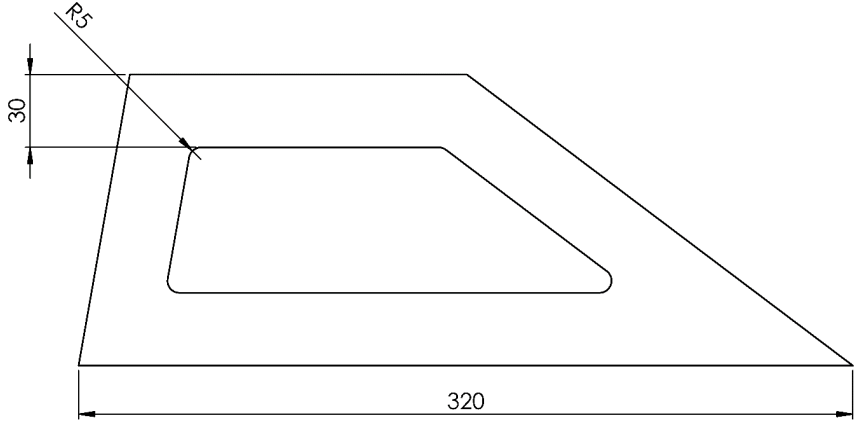


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<b>Project:</b> Utility12		<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:5	<b>Revision:</b> R.0
<b>Part name:</b> U12_Reflex		<b>Weight (Kg):</b> 0.32		<b>Volume (L):</b> 0.45	
<b>Part description:</b> Right port		<b>Material:</b> Birch Plywood 15mm		Designed by Contralto-Audio s.r.l.	
<b>Tolerances (ISO 2768-mK)</b>					
<b>Holes + / Shaft</b> - : 0.2					
<b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]					
<b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]					
<b>Linear:</b>					
<6	6-30	30-120	120-400	400-1000	1000-2000
±0.1	±0.2	±0.3	±0.5	±0.8	±1.2
					<b>First Angle Proj.</b> 
					Page 14 of 17

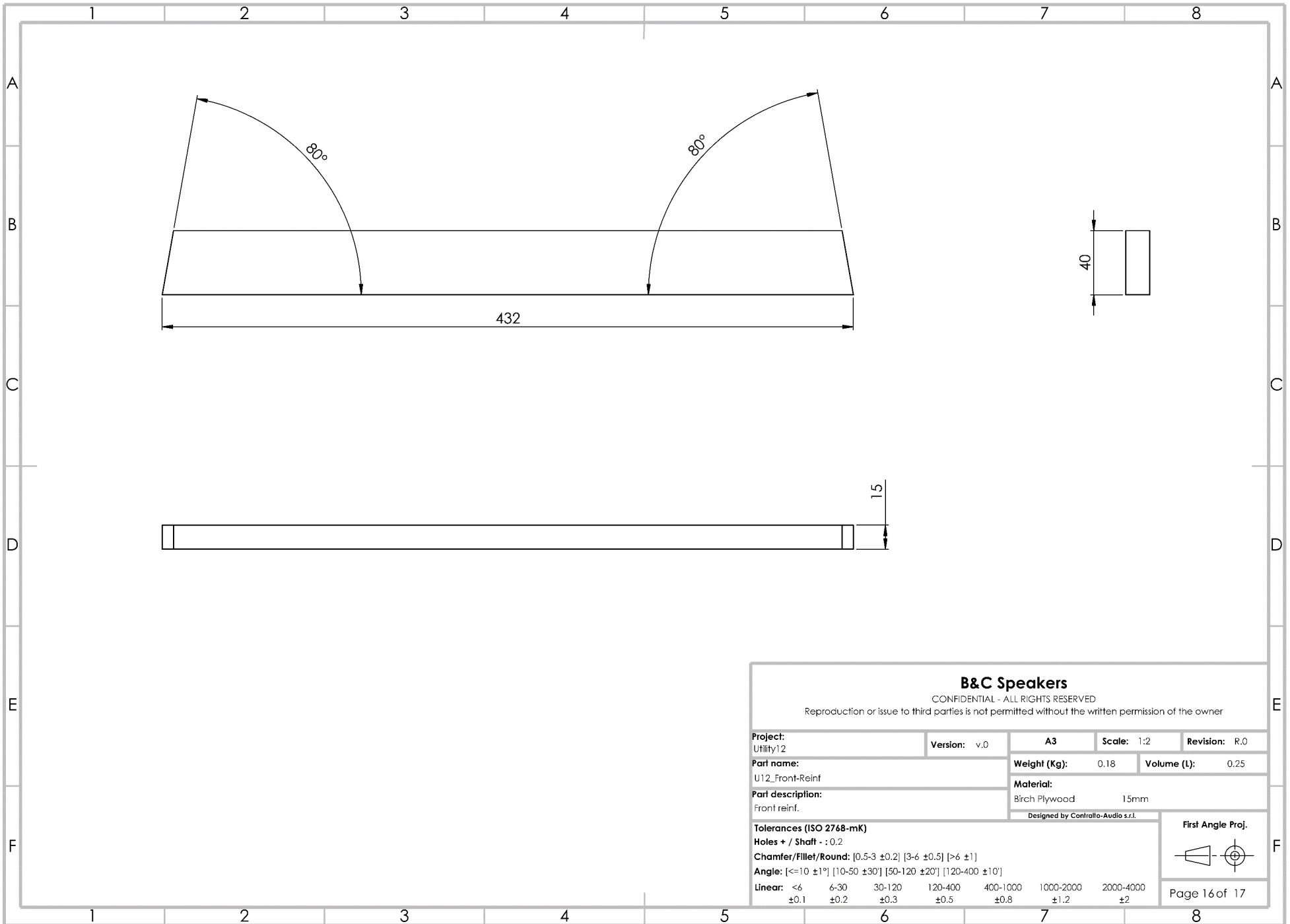


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<b>Project:</b> Utility12	<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:2	<b>Revision:</b> R.0
<b>Part name:</b> U12_Back-Reinf		<b>Weight (Kg):</b> 0.20	<b>Volume (L):</b> 0.28	
<b>Part description:</b> Back reinf.		<b>Material:</b> Birch Plywood 15mm		
<small>Designed by Contralto-Audio s.r.l.</small>				
<b>Tolerances (ISO 2768-mK)</b>				
<b>Holes + / Shaft - :</b> 0.2				
<b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]				
<b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]				
<b>Linear:</b> <6 ±0.1	6-30 ±0.2	30-120 ±0.3	120-400 ±0.5	400-1000 ±0.8
			1000-2000 ±1.2	2000-4000 ±2

**First Angle Proj.**

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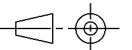
### B&C Speakers

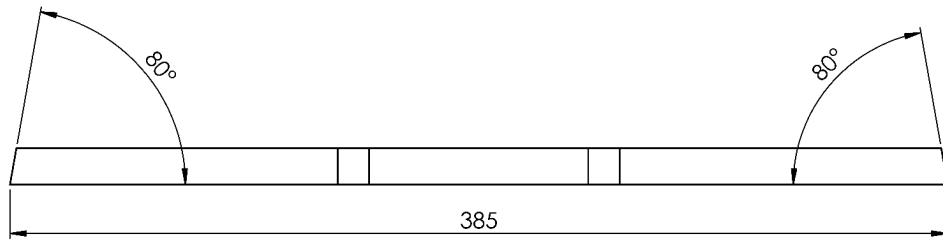
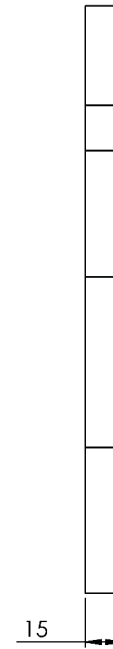
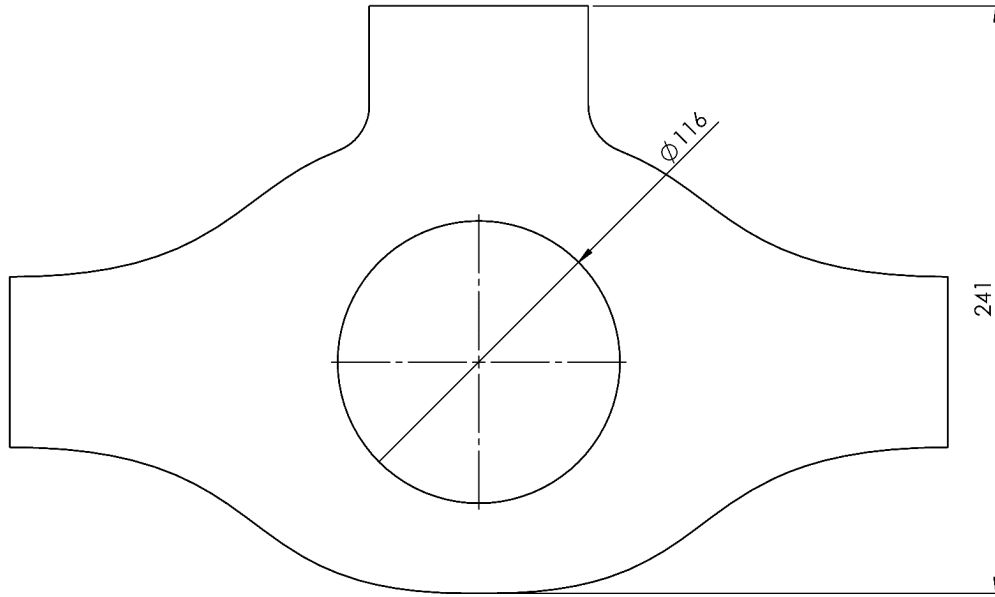
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<b>Project:</b> Utility12	<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:2	<b>Revision:</b> R.0
<b>Part name:</b> U12_Front-Reinf		<b>Weight (Kg):</b> 0.18	<b>Volume (L):</b> 0.25	
<b>Part description:</b> Front reinf.		<b>Material:</b> Birch Plywood 15mm		
<small>Designed by Contralto-Audio s.r.l.</small>				
<b>Tolerances (ISO 2768-mK)</b>				
<b>Holes + / Shaft - :</b> 0.2				
<b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]				
<b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]				
<b>Linear:</b> <6 ±0.1	6-30 ±0.2	30-120 ±0.3	120-400 ±0.5	400-1000 ±0.8
			1000-2000 ±1.2	2000-4000 ±2

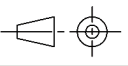
First Angle Proj.





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<b>Project:</b> Utility12	<b>Version:</b> v.0	<b>A3</b>	<b>Scale:</b> 1:2	<b>Revision:</b> R.0
<b>Part name:</b> U12_Driver-Support		<b>Weight (Kg):</b> 0.47	<b>Volume (L):</b> 0.66	
<b>Part description:</b> Driver support		<b>Material:</b> Birch Plywood 15mm		
<small>Designed by Contralto-Audio s.r.l.</small>				
<b>Tolerances (ISO 2768-mK)</b>				
<b>Holes + / Shaft</b> : ±0.2				
<b>Chamfer/Fillet/Round:</b> [0.5-3 ±0.2] [3-6 ±0.5] [>6 ±1]				
<b>Angle:</b> [<=10 ±1°] [10-50 ±30°] [50-120 ±20°] [120-400 ±10°]				
<b>Linear:</b>	<6 ±0.1	6-30 ±0.2	30-120 ±0.3	120-400 ±0.5
			400-1000 ±0.8	1000-2000 ±1.2
				2000-4000 ±2

**First Angle Proj.**  


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