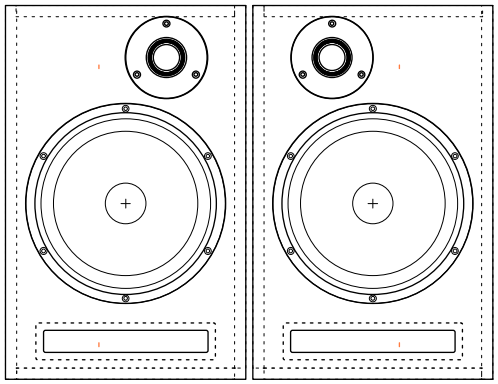
SEAS A26 ReViz

taking the A25/A26 to the next level

13-april-2021



Visualization here

The Dynaco A25 was a hugely poplular loudspeaker for a decade (1970-80). In 2006 Peter Comou resurrected it with the WD25, which was taken up by SEAS and it has became the A26. The box provided is very simplistic and does not extract the maximum performance from the drivers.

We present 4 boxes using 15/18mm material and differen tlevels of overkill. The simpliest is 15mm with an 18mm baffle. If built with quality plywood as specified, given the braces, this will be a usfully more robust than the specified no brace 19mm MDF. From there a double 15m. baffle is added (you should be able to get away with a single sheet of 15mm. Then an 18mm drawing and a double baffle variation. 18mm is more commonly available and i would consider both overkill (so good :^)

Dampig and the aperiodic vent are discussed. The XO is also very simplistic, we will look at suggested options.

With these better thought out boxes one should be able to extract the maximum from these drivers in a relatively compact box.

A quick look at other tops -- tweeters & midTweeter that have or could be used with the A26.

As a bonus, an initial misinterpretation of the draing lead to a full set of 35L boxes (A26S). These have a bit easier to deal with the peaked alignment and would be suggested if used as WAW (small FR as midTweeter with low XO), where a n enclosure would use up some or all of the extra 7 litres.

A large sealed Golden Ratio box(A26L) has also been done, this more optimal can be compared to see the size savings of the aperiodic box. F10 in the mid 20s, F6 low 30s anechoic. The sealed box can also be adated for (the few) drivers like the SEAS FA22 that like a biggish sealed box.

The A26L has been turned into a monster miniOnken, the CGR SEA-Ken

Drawings/Contents (provisional)

please email <david@planet10-hifi.com> with corrections & suggestions to improve this document

Notes on the design

read this!

13-april-2021

Unfinished

What's up with this box?

The SEAS A26 is their "app note" which is a 3rd generation variation on the Dynaco A25.

Dynaco introduced the A25 [AlNiCo 10" (250mm) bass driver XOed to a AlNiCo 38mm soft dome tweeter with a rudimentary capacitor and resistor XO] in 1970 and in 10 years sold near a million units (including A25XL). They were made by Scan at first and then by SEAS in Denmark. More info including drawing and XO here:

https://www.t-linespeakers.org/classics/dynaco.html

The A25 was aperidoic to help flatten out the bump at the bottom because of the small box. It is heavily damped with rock wool and has an aperiodic vent made from 2 pieces of plastic mesh sandwiching a piece of acoustic fiberglass (doesn't spew glass fibres).

ScanSpeak for some time sold a fixed density circular version of the Dynaco vent. It lacks the versatilty of variable damping in the vent that diy allows.

World Audio WD25 by PeterComeau in 2006 revised the design with the A26 and a SEAS 29mm tweeter. He had some good ideas on improvements which we poach for this revision.

The first published work on aperiodic enclosures was the Goodmans ARU, described by Ted Jordan in the Feb 1956 Wireless World.
http://p10hifi.net/TLS/downloads/TedJordanAperiodic.pdf

The PEARL PR-2 was a very well researched, tested, and developed aperiodic loudspeaker.
https://www.pearl-hifi.com/03_Prod_Serv/PR2/Refs/PR_2_Expanded_Info.pdf

The specified box sealed is 28 litre [a more appropriate sealed volume would be 70 litres and vented some 100-140 litres]. The response has a hump as can be seen in the sim. A slightly underdamped alignment.

SEAS document has the comment "optional aperiodic vent, stuff lightly".

Damping material: Lightly stuffed and evenly distributed - approx. 50g of damping material
Aperiodic port: 12g of damping material

No indication as to the kind or quality of damping.

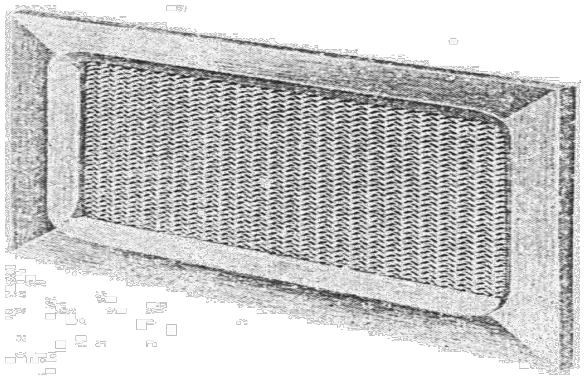
With the factory specified vent one needs a stiff grid (metal) tohold the damping material in place. Th event after Comou is more verstaile and wasy to tunr allowing higher densities.

The goal of the aperiodic vent is to damp the vent/add resistance so as to move the response toward s the red curve and flatten the impedance response.

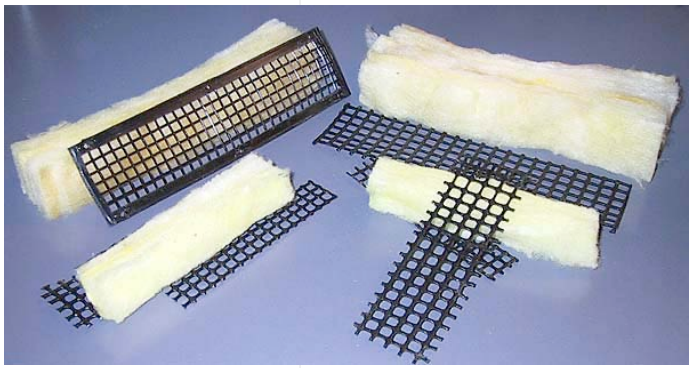
Dynaco used a piece of acoustic fiberglass insulation sandwiched between 2 plastic meshes. This works well, can be held in place with staples, start as specified as far as amount goes and play until the impedance is as flat as you can get it or use the clik test (see separate drawing).

While the goal is clear, specific damping for your taste, room and room placement to be determined in the field.

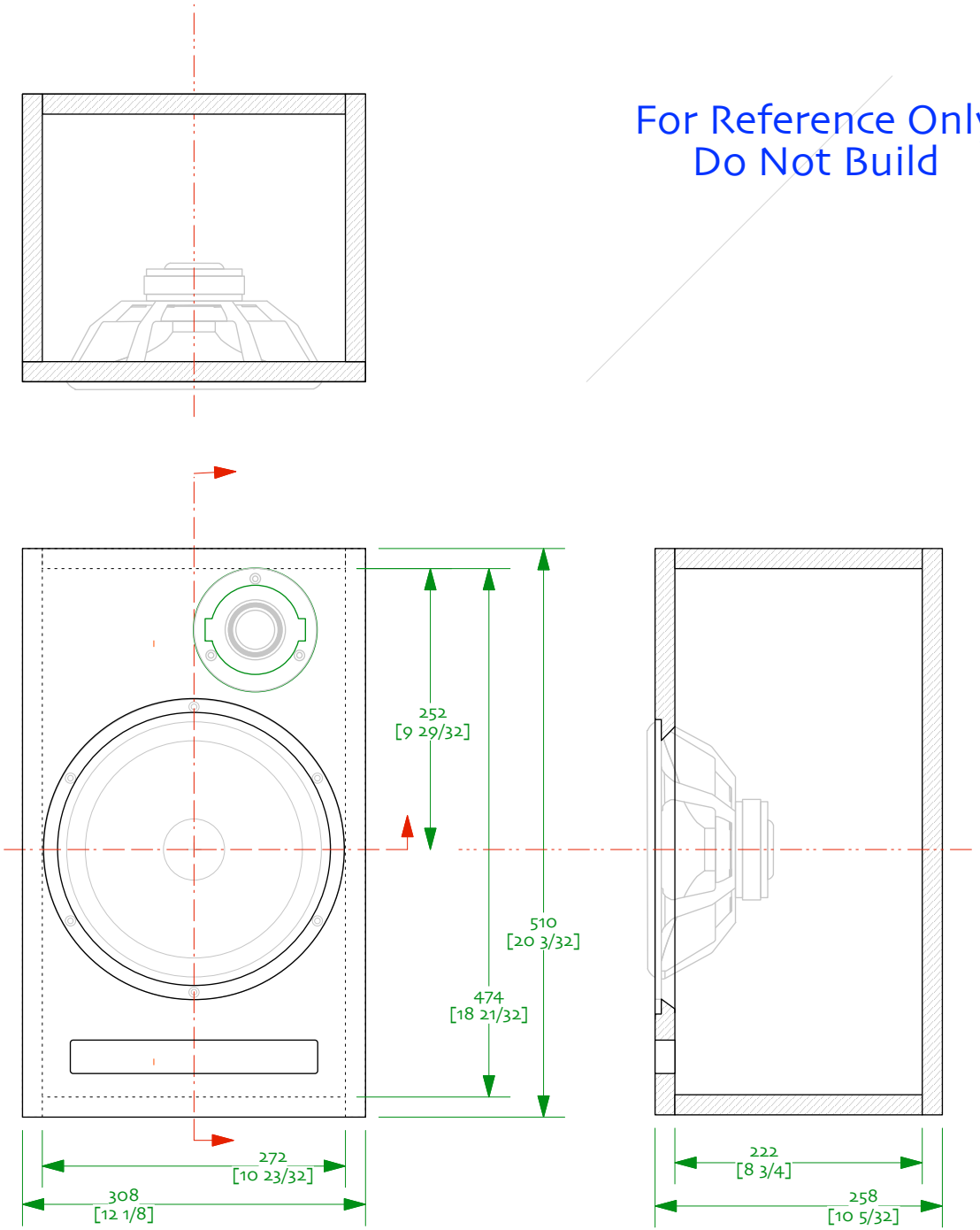
Goodmans/Jordan ARU (Acoustic Resitance Unit)



Dynaco Aperiodic Vents (2 x A25/A10)



A26 Enclosure Simulation



For Reference Only
Do Not Build

SEAS A26 basic ov87
sheet a26p18 | 18mm plan

26-march-2021 | tweaked & drawn by dld

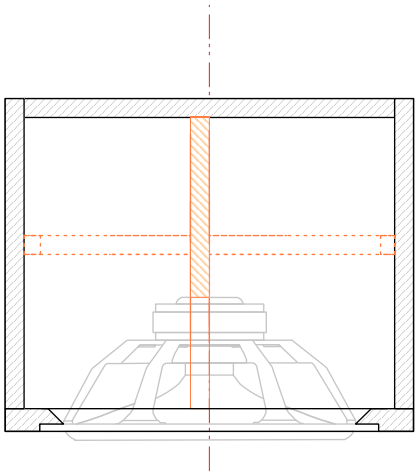
Notes:
0/ 18 mm material, high quality plywood recommended
1/ build mirrored imaged pairs.
2/ Aperiodic vent may also be placed on the rear of the cabinet
3/ 28 litres net volume

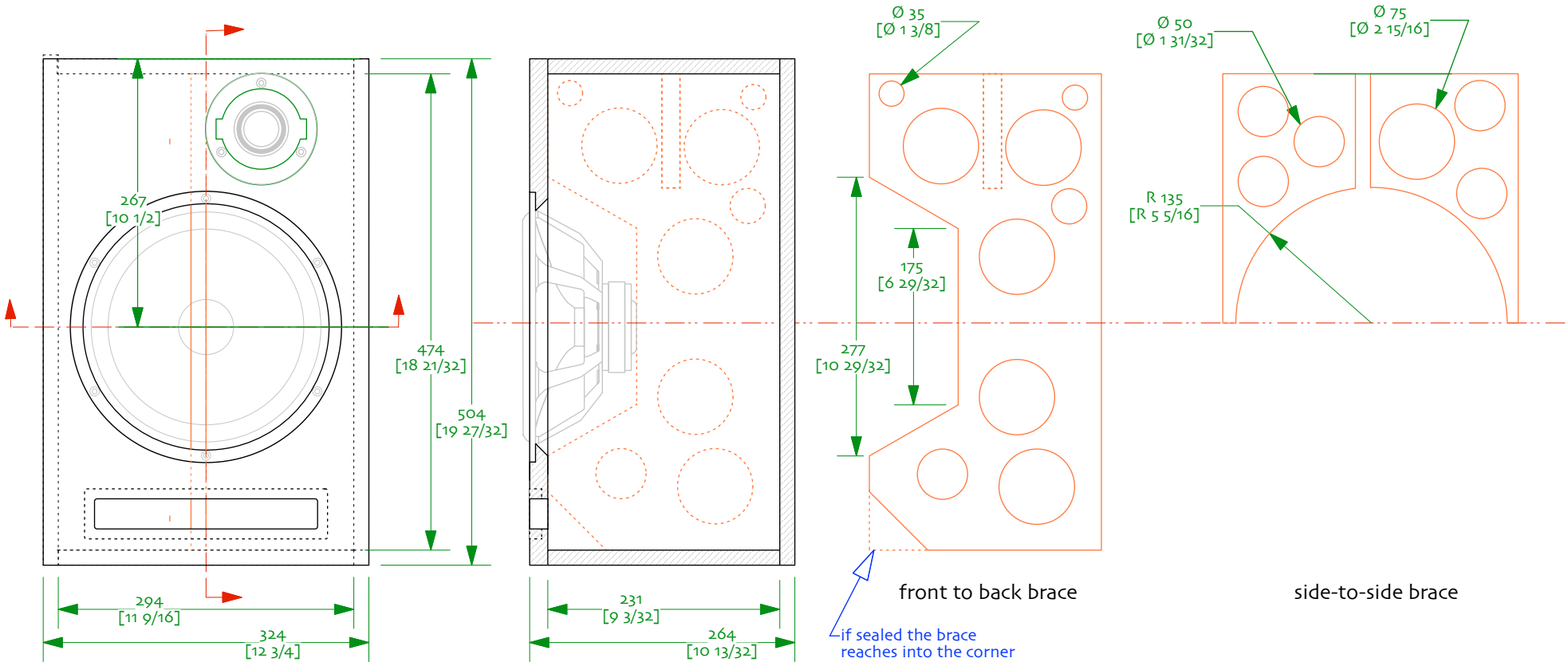
SEAS A26 ReViz ov88

sheet a26p15 | 15mm plan/18mm baffle

23-march-2021 | tweaked & drawn by dld

Notes:
0/ 18 mm material, high quality plywood recommended
1/ build mirrored imaged pairs.
2/ Aperiodic vent may also be placed on the rear of the cabinet



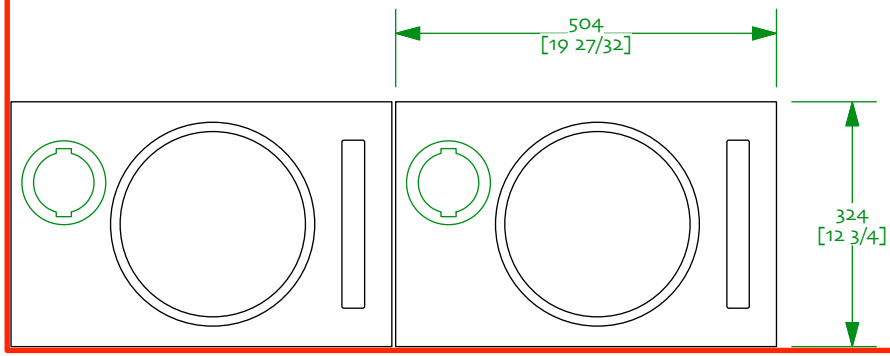


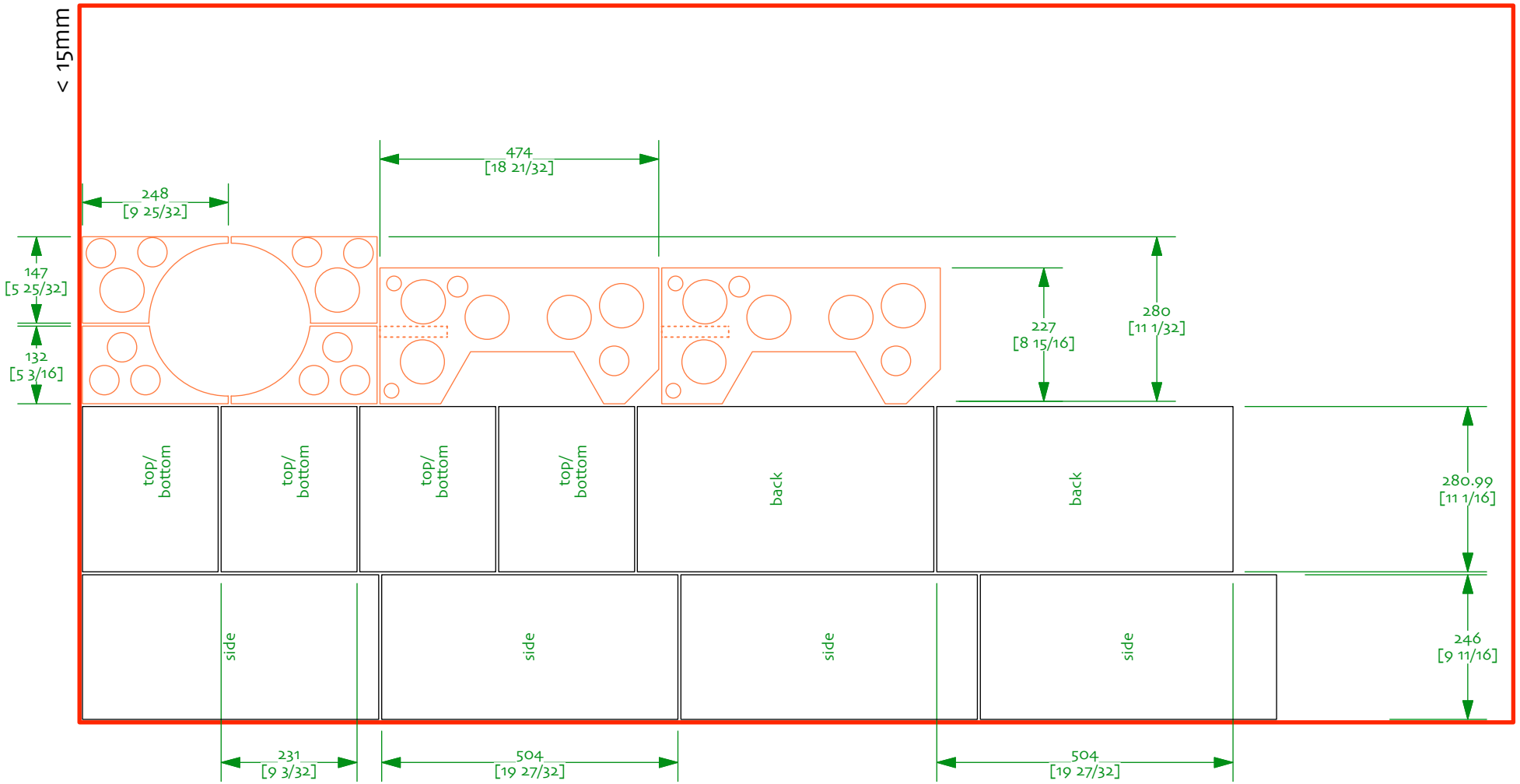
SEAS A26 reimagining ov88
sheet a26lc15-1 | 15mm 18mm baffle 4x8 cut

03-april-2021 | tweaked & drawn by dld
free for personal use

Notes:
0/ 15 mm material, 18mm baffle
1/ 5mm kerf and trim allowance

< 15mm | 18mm >

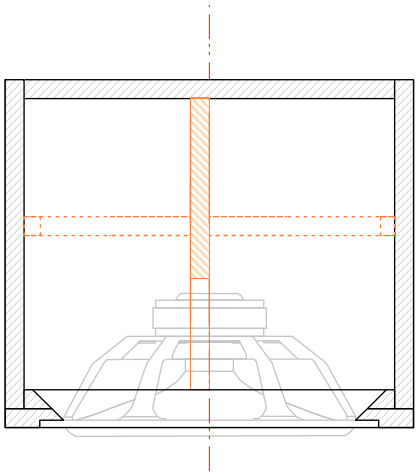


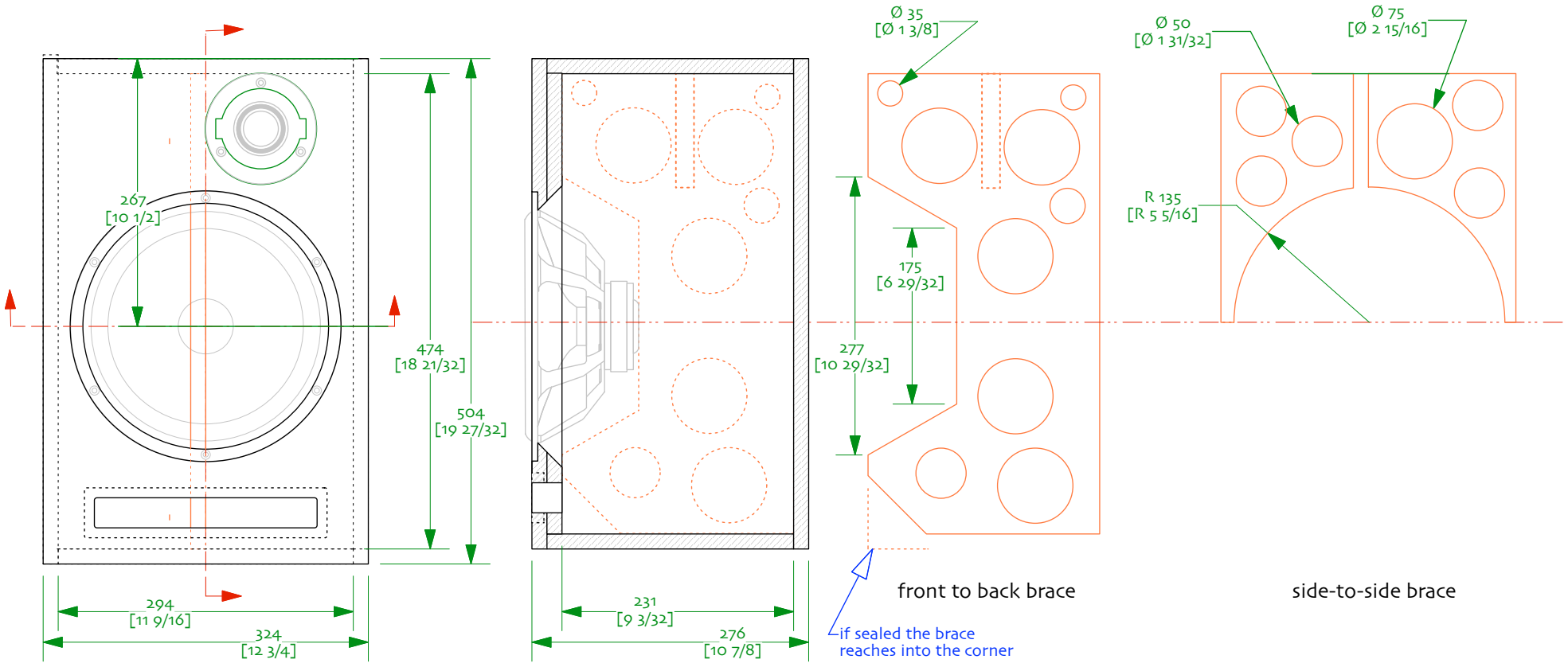


SEAS A26 ReViz ov89
sheet a26p15 | 15mm plan double baffle

04-april-2021 | tweaked & drawn by dld

Notes:
o/ 18 mm material, high quality plywood recommended
1/ build mirrored imaged pairs.
2/ Aperiodic vent may also be placed on the rear of the cabinet

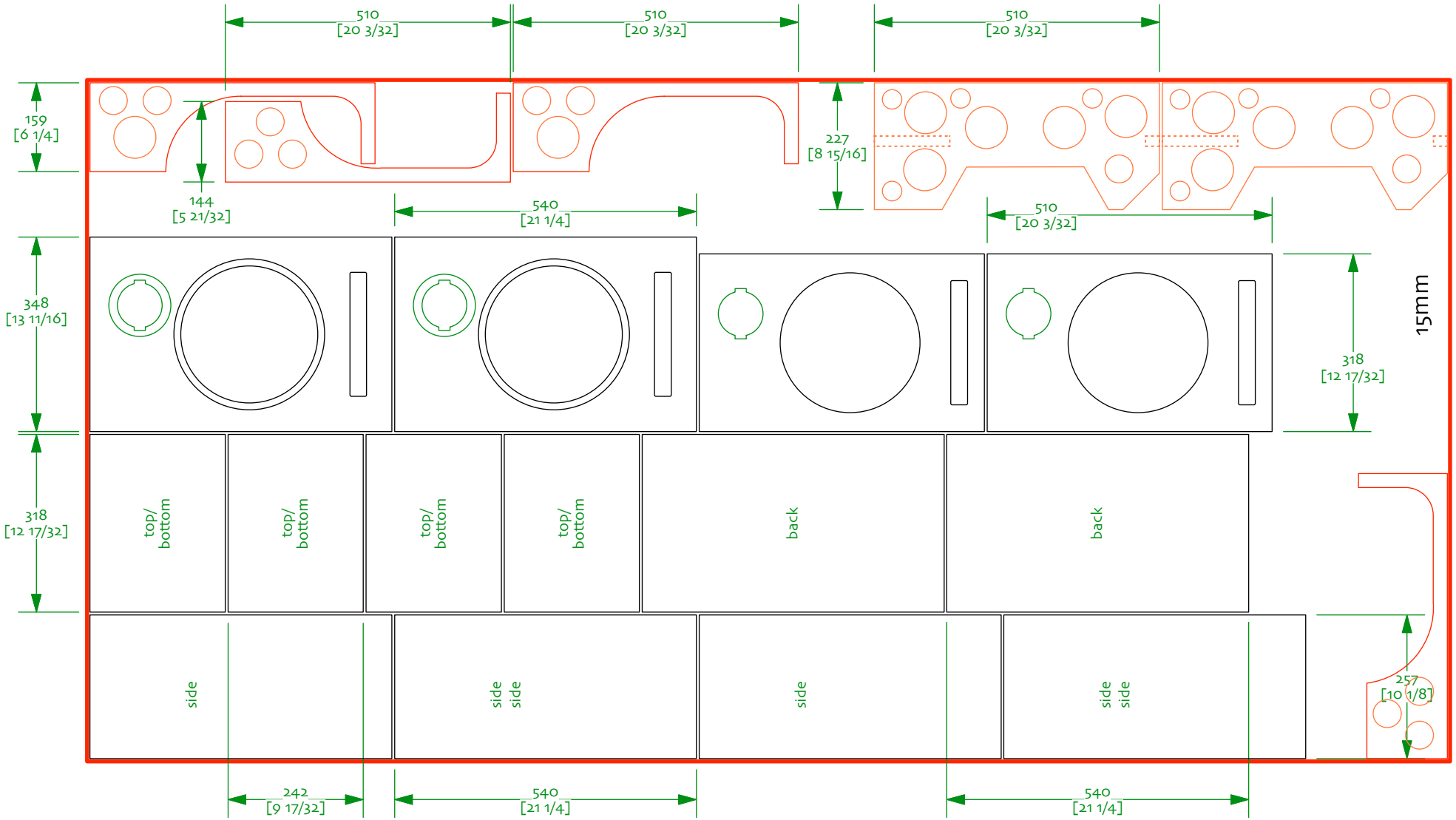


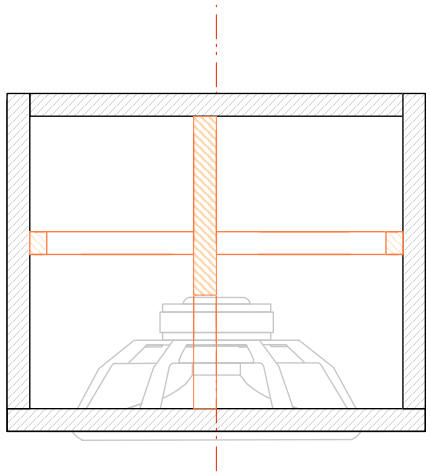


SEAS A26L reimagining ov88
sheet a26lc15-2 | 15mm dbl baffle 4x8 cut

03-april-2021 | tweaked & drawn by dld

Notes:
0/ 15 mm material
1/ 5mm kerf and trim allowance

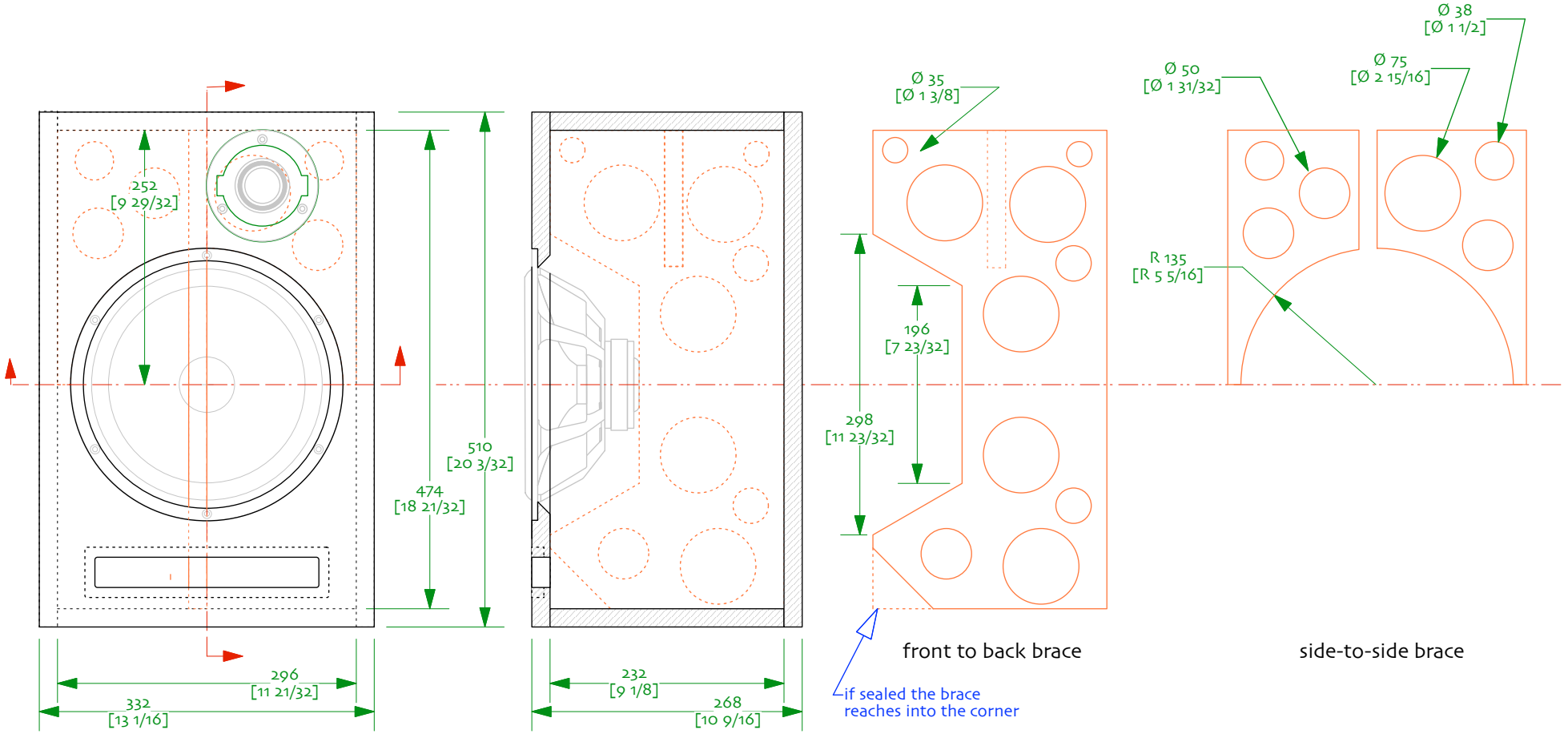




SEAS A26 ReViz ov88
sheet a26p18 | 18mm plan

24march-2021 | tweaked & drawn by dld

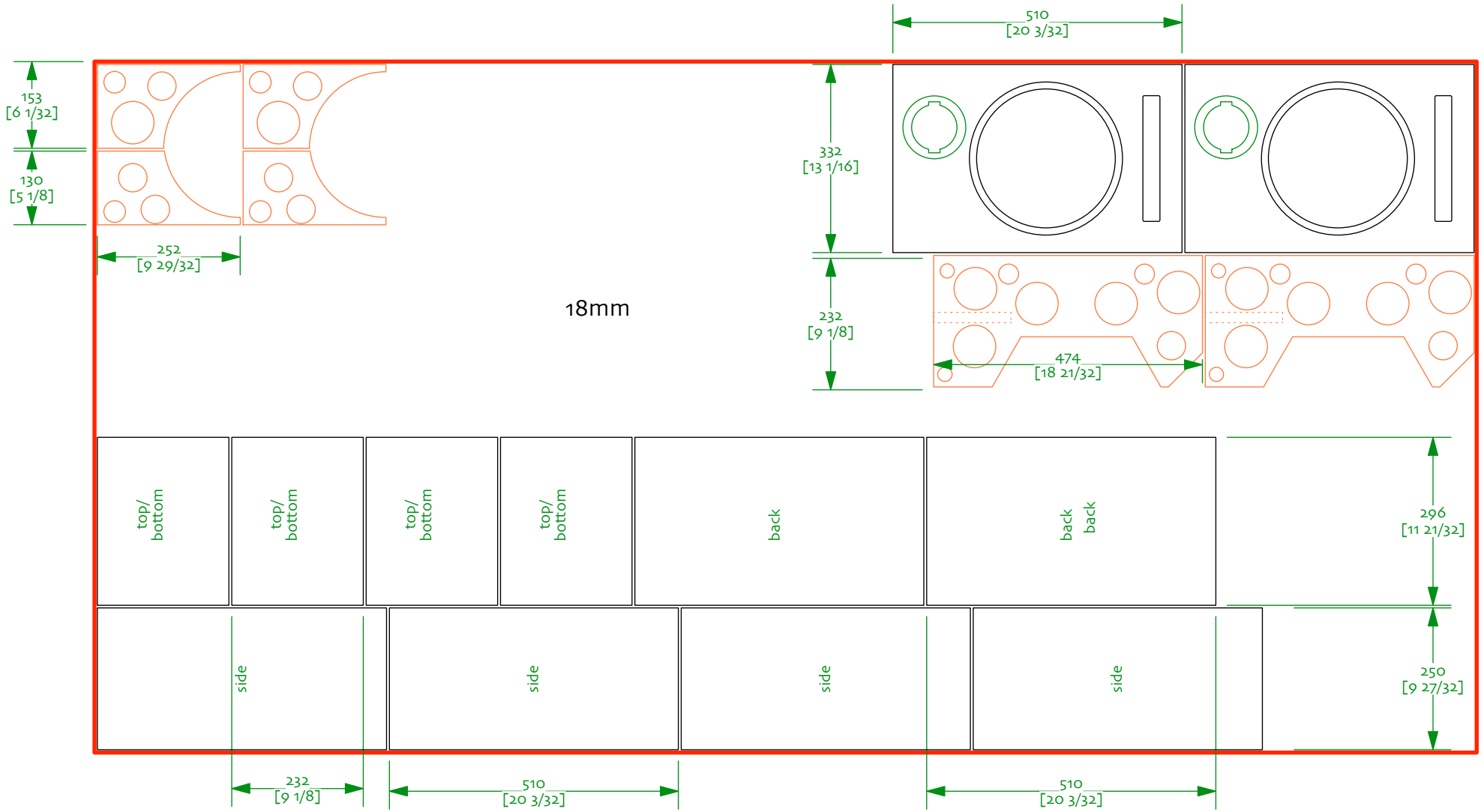
Notes:
o/ 18 mm material, high quality plywood recommended
1/ build mirrored imaged pairs.
2/ Aperiodic vent may also be placed on the rear of the cabinet



Notes:
0/ 18 mm material
1/ 5mm kerf and trim allowance

SEAS A26 reimagining ov88
sheet a26c18-1 | 18mm 4x8 cut

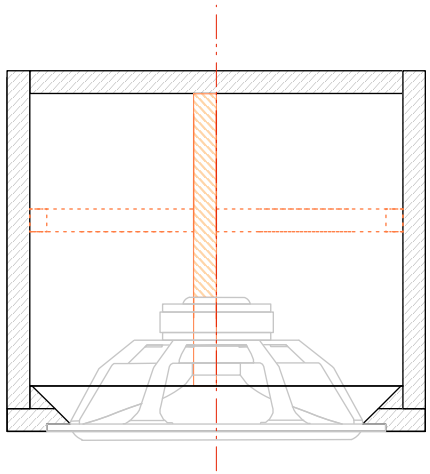
03-april-2021 | tweaked & drawn by dld

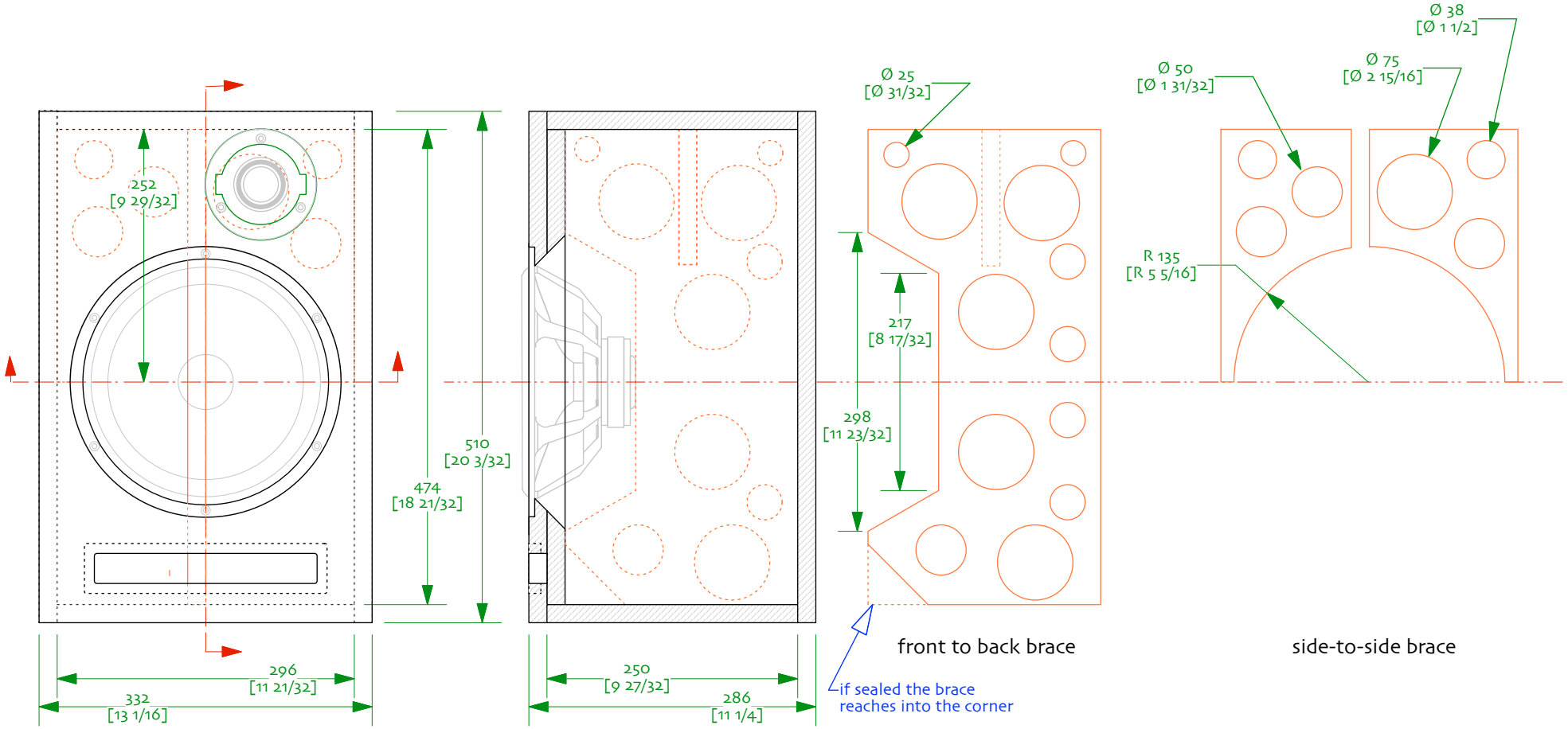


SEAS A26 ReViz ov88
sheet a26p18 | 18mm double baffle plan

24-march-2021 | tweaked & drawn by dld

Notes:
0/ 18 mm material, high quality plywood recommended
1/ build mirrored imaged pairs.
2/ Aperiodic vent may also be placed on the rear of the cabinet

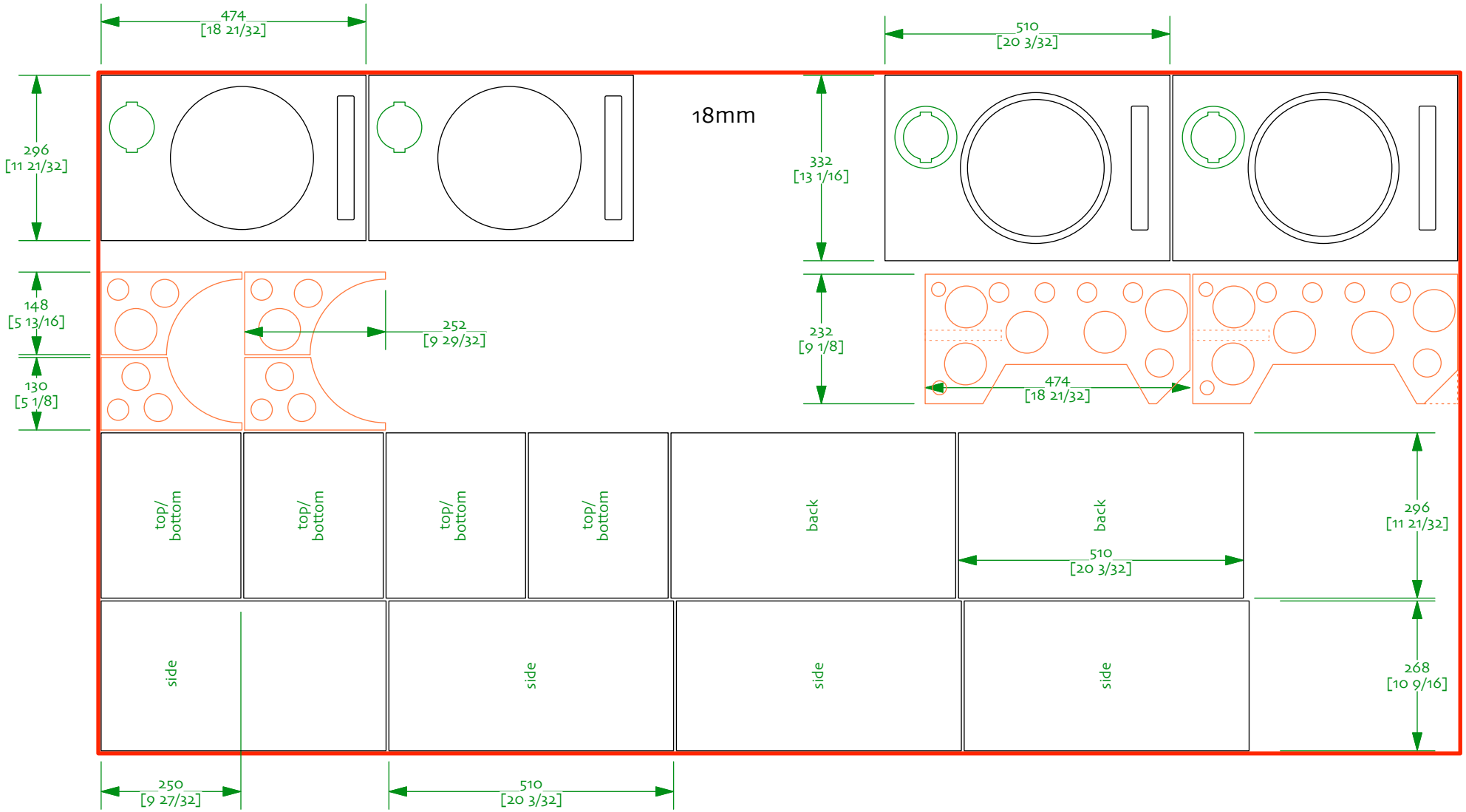




Notes:
0/ 18 mm material
1/ 5mm kerf and trim allowance

SEAS A26 reimagining ov88
sheet a26c18-2 | 18mm dbl baffle 4x8 cut

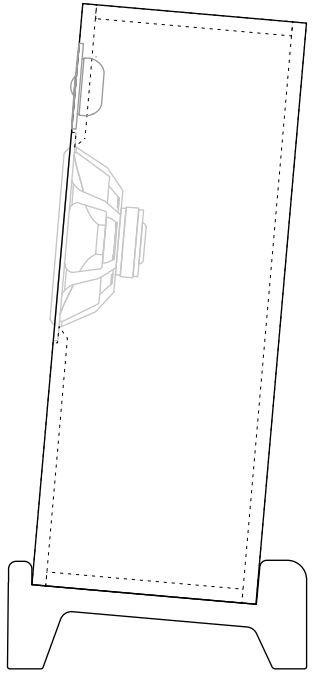
04-april-2021 | tweaked & drawn by dld



SEAS A26S, A26L & CGR SEA-Ken

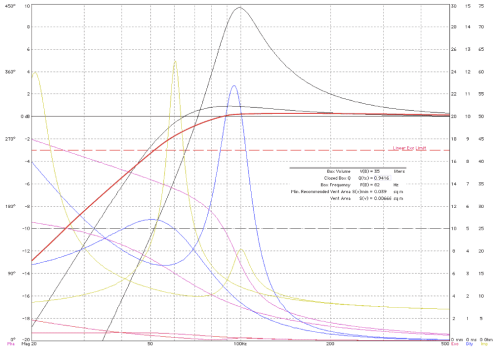
taking the A25/A26 to the next level with a larger box

13-april-2021



Visualization here

A26S/A26L/SEA-Ken Enclosure Simulations



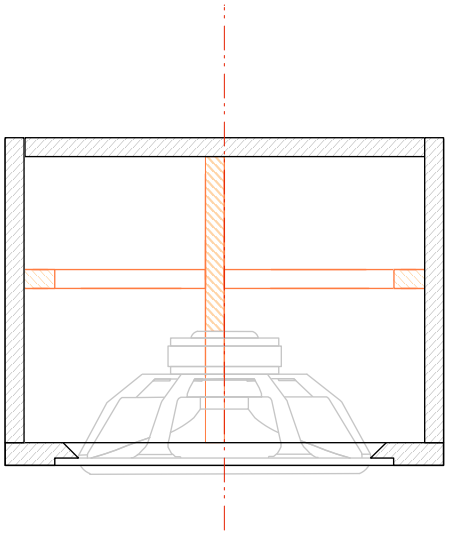
A bonus, an initial misinterpretation of the drawing led to a full set of 35L boxes. These make it a bit easier to deal with the peaked alignment and would be suggested if used as WAW (small FR as midTweeter with low XO), where an enclosure would use up some or all of the extra 7 litres.

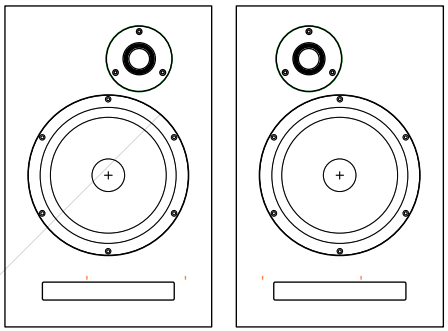
A large sealed 70 litre, butterworth alignment Golden Ratio box, this more optimal can be compared to see the size savings of the aperiodic box. F10 in the mid 20s, F6 low 30s anechoic.

diyAudio member fatmarley suggested a 60 litre vented alignment which turns out to be a good start for a monster miniOnken. The sealed box has had a slot vent added to the bottom, it becomes a 66 litre SEA-Ken. The highRatio, highR vent supplies some aperiodic damping to flatten the peak just before roll-off and give a bit more extention than shown in the sim. One gains about 5 Hz from the sealed, and the slot adds the option of adding aperiodixc damping to it.

Drawings/Contents (provisional)

please email <david@planet10-hifi.com> with corrections & suggestions to improve this document

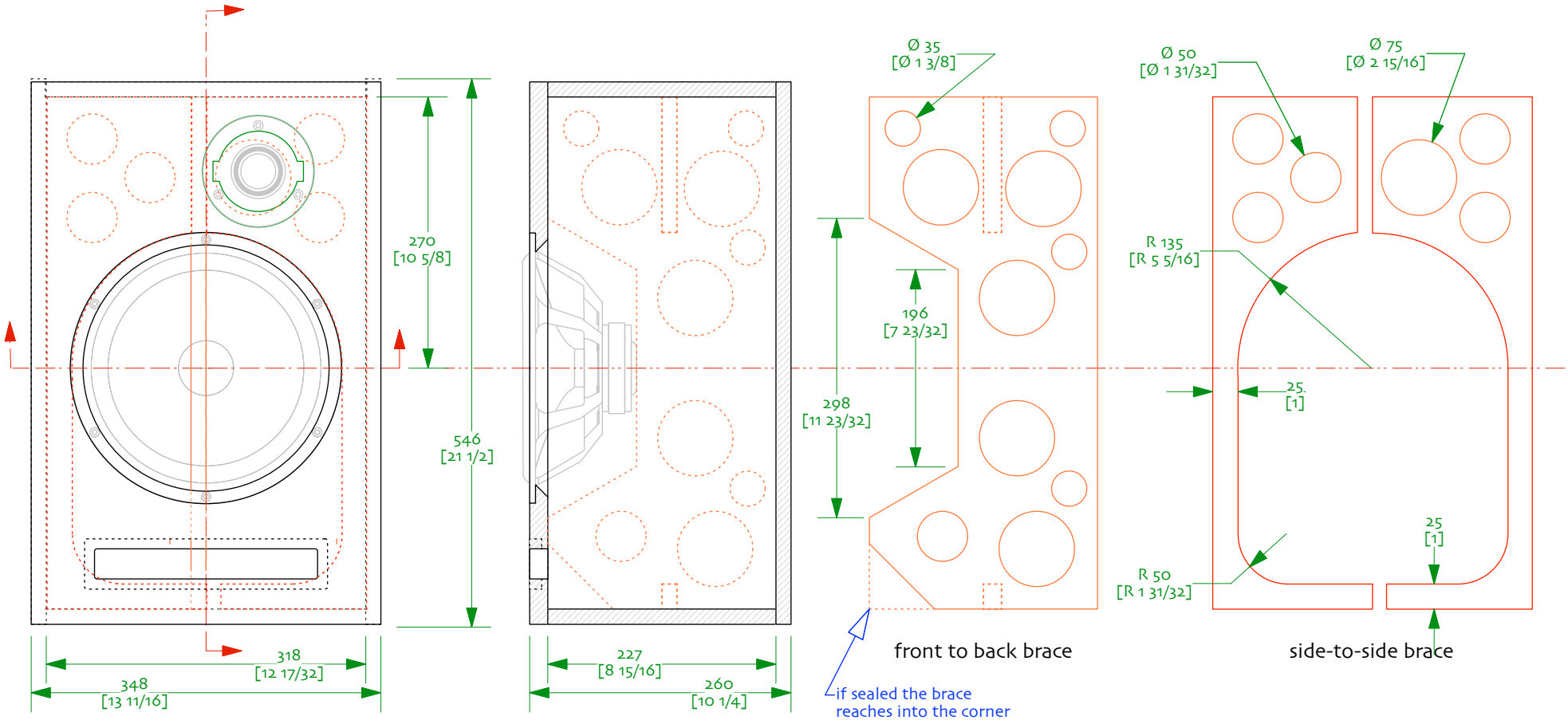




SEAS A26L ReViz ov88
sheet a26lp15-1 | 15mm plan 18mm baffle

03-april-2021 | tweaked & drawn by dld

Notes:
o/ 15 mm material, 18 mm baffle, high quality plywood recommended
1/ build mirrored imaged pairs
2/ Aperiodic vent may also be placed on the rear of the cabinet

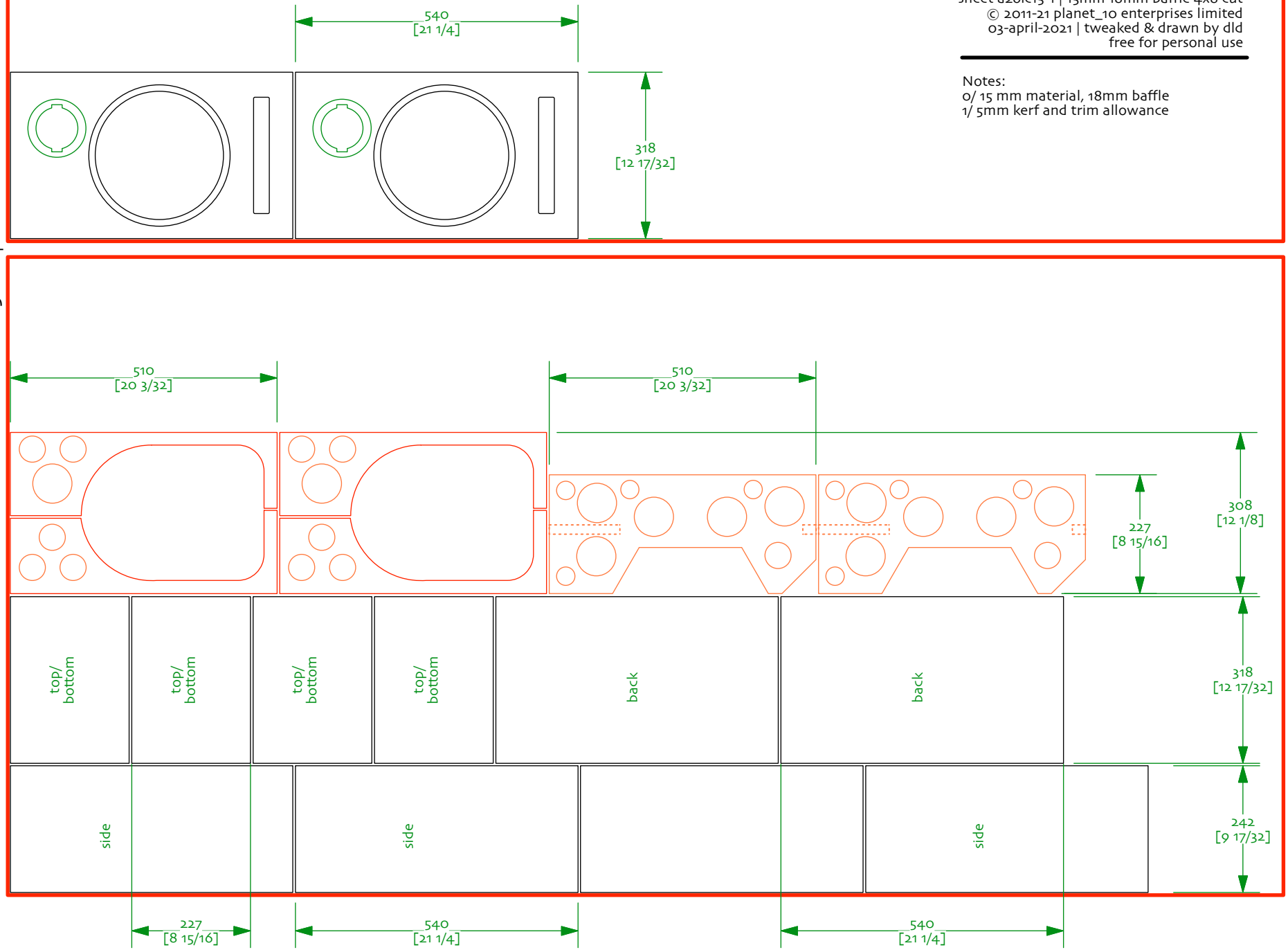


SEAS A26L reimagining ov88
sheet a26lc15-1 | 15mm 18mm baffle 4x8 cut

03-april-2021 | tweaked & drawn by dld
free for personal use

Notes:
0/ 15 mm material, 18mm baffle
1/ 5mm kerf and trim allowance

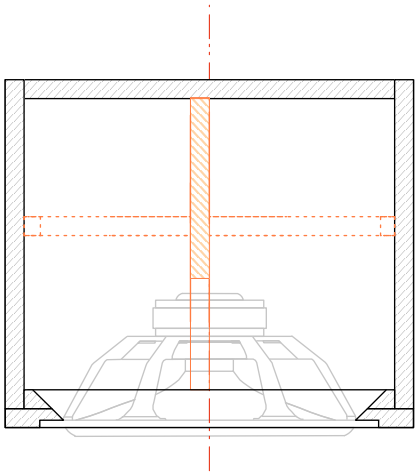
< 15mm | 18mm >

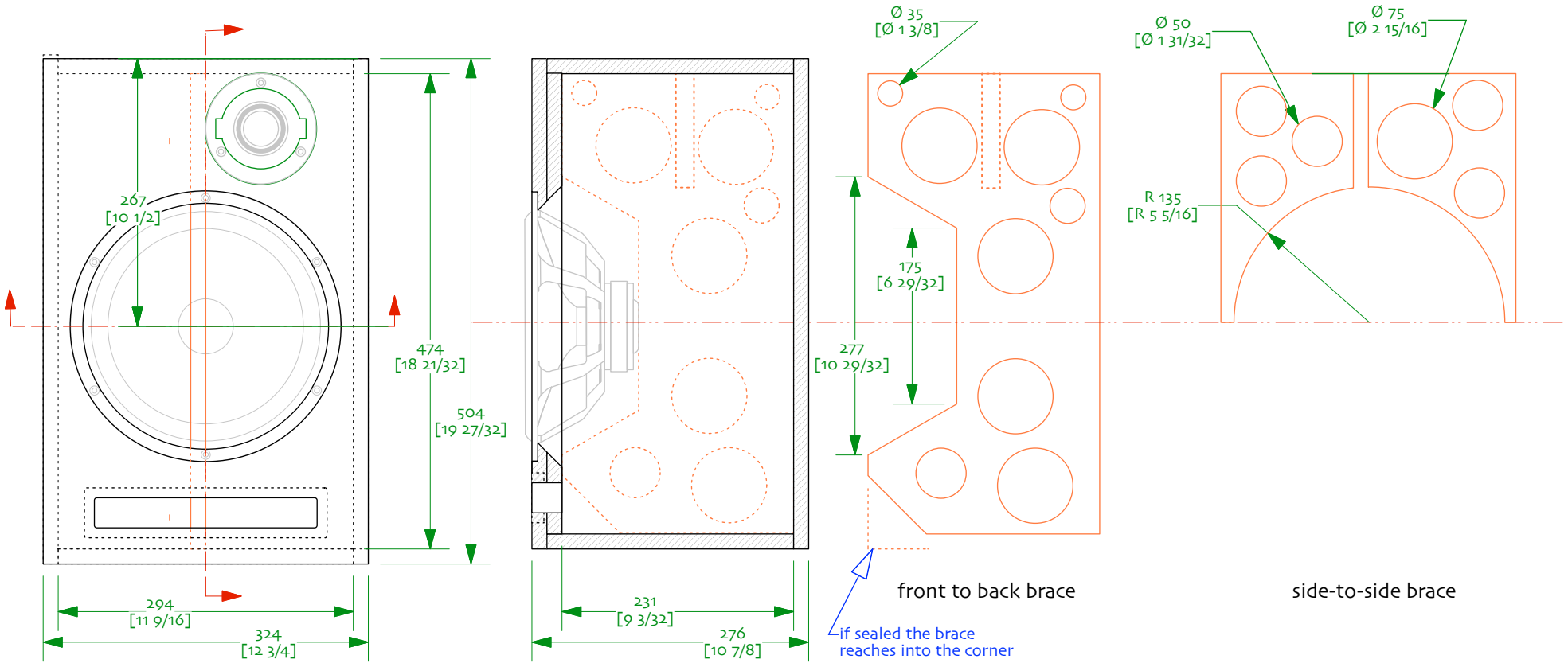


SEAS A26 ReViz ov89
sheet a26p15 | 15mm plan double baffle

04-april-2021 | tweaked & drawn by dld

Notes:
o/ 18 mm material, high quality plywood recommended
1/ build mirrored imaged pairs.
2/ Aperiodic vent may also be placed on the rear of the cabinet

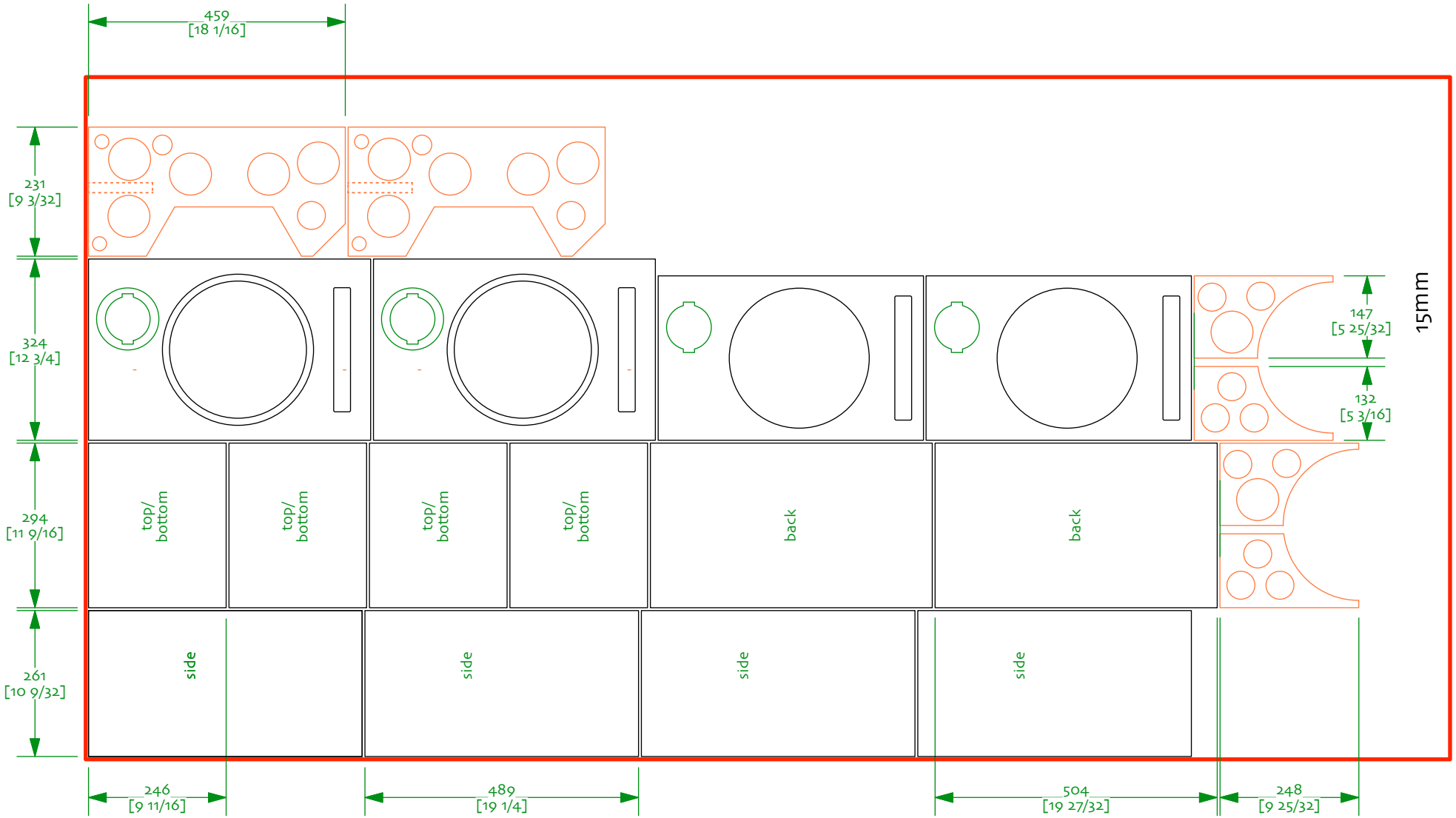




SEAS A26 reimagining ov88
sheet a26c15-2 | 15mm dbl baffle 4x8 cut

04-april-2021 | tweaked & drawn by dld

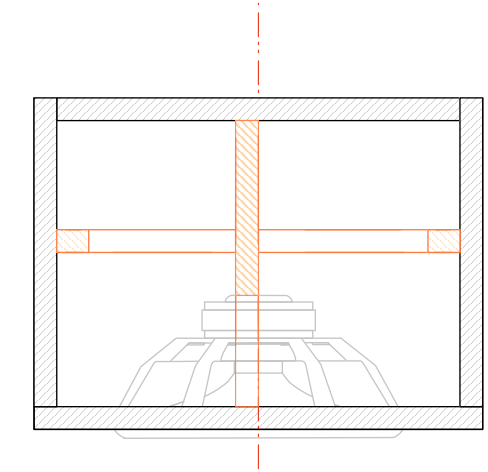
Notes:
0/ 15 mm material
1/ 5mm kerf and trim allowance

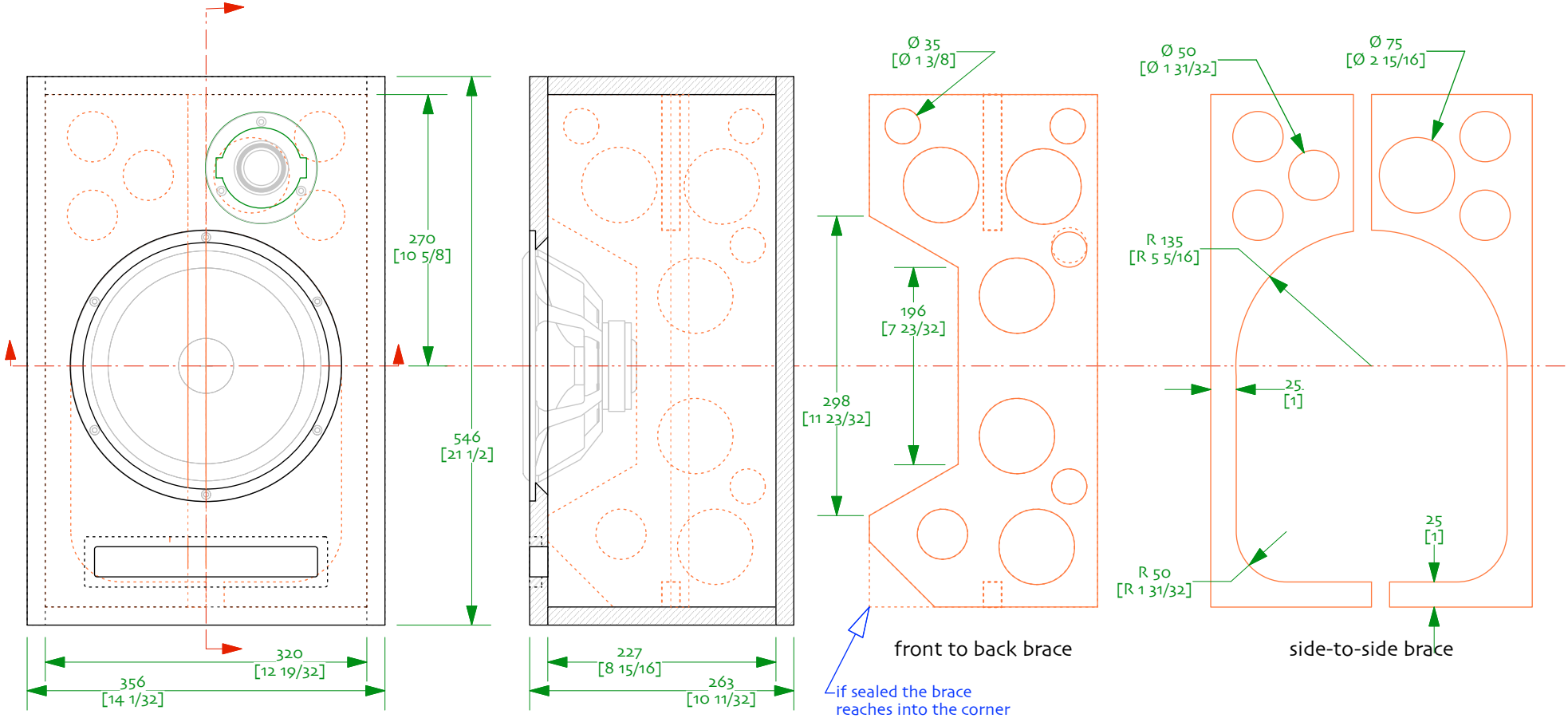


SEAS A26L reimagining ov88
sheet a26lp18 | 18mm plan

03-april-2021 | tweaked & drawn by dld

Notes:
0/ 18 mm material, high quality plywood recommended
1/ build mirrored imaged pairs.
2/ Aperiodic vent may also be placed on the rear of the cabinet

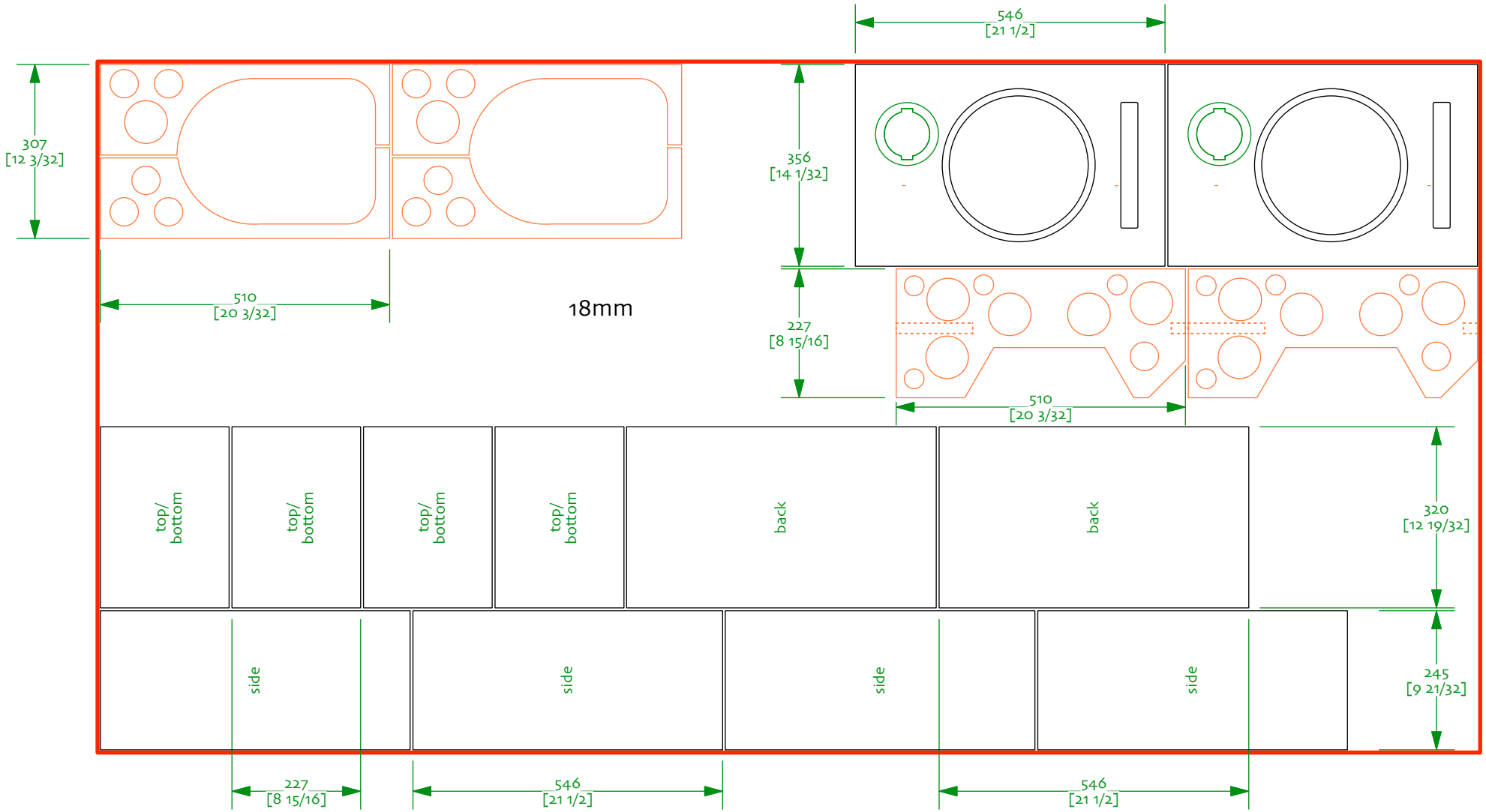




Notes:
0/ 18 mm material
1/ 5mm kerf and trim allowance

SEAS A26L reimagining ov88
sheet a26lc18-1 | 18mm 4x8 cut

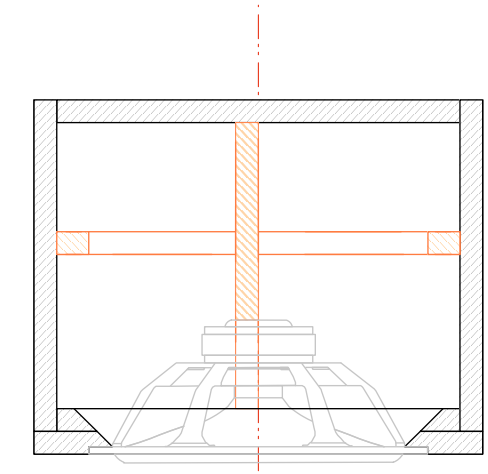
04-april-2021 | tweaked & drawn by dld

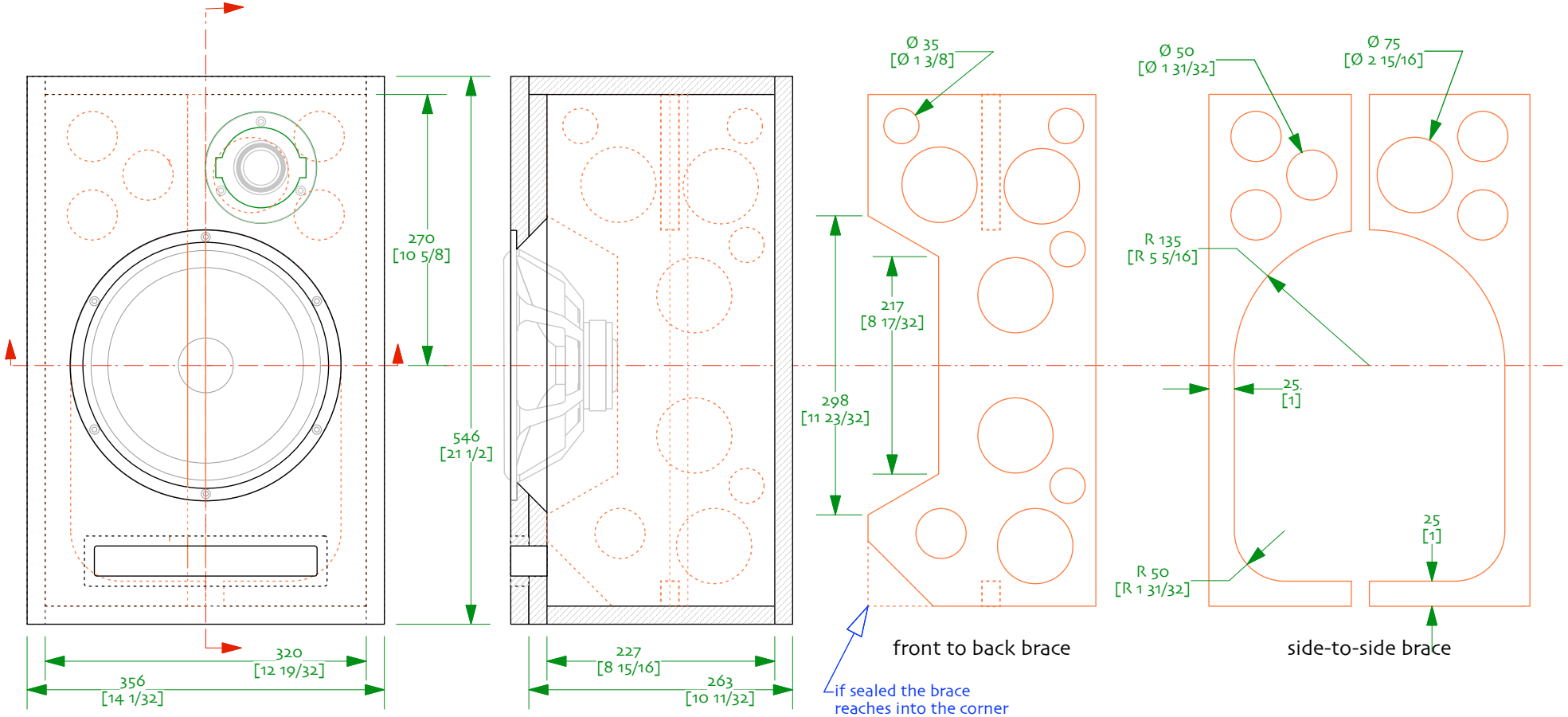


SEAS A26L ReViz ov89
sheet a26lp18 | 18mm plan double baffle

04-april-2021 | tweaked & drawn by dld

Notes:
o/ 18 mm material, high quality plywood recommended
1/ build mirrored imaged pairs
2/ Aperiodic vent may also be placed on the rear of the cabinet
3/ this variation is overkill, some will want that :^)

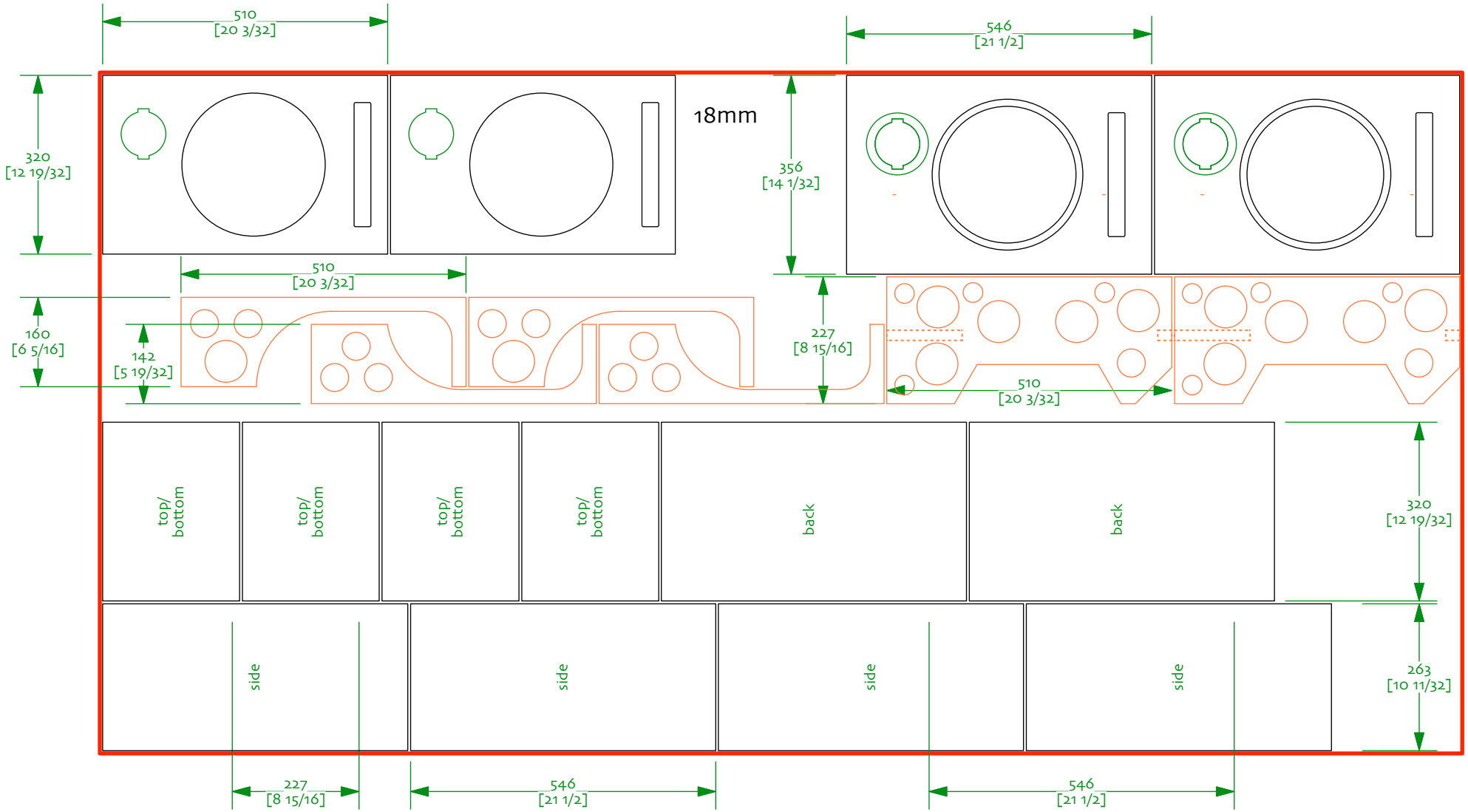




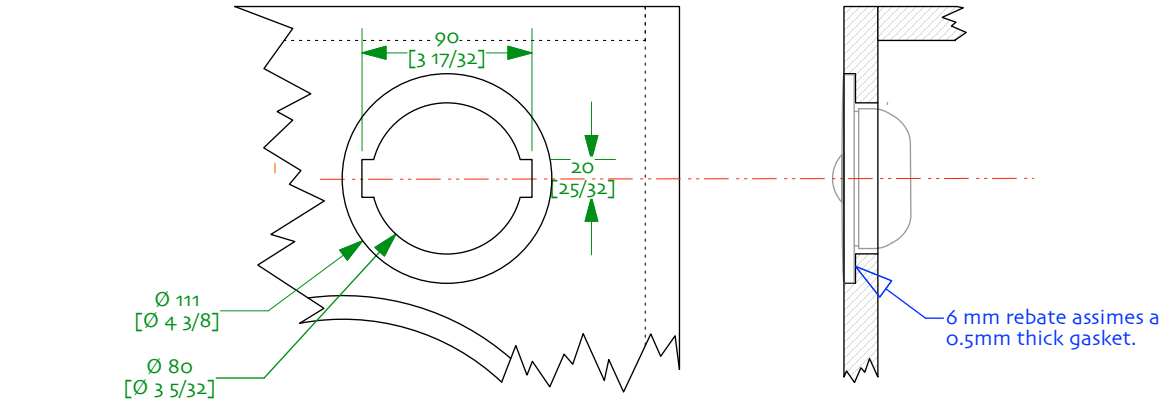
Notes:
0/ 18 mm material
1/ 5mm kerf and trim allowance

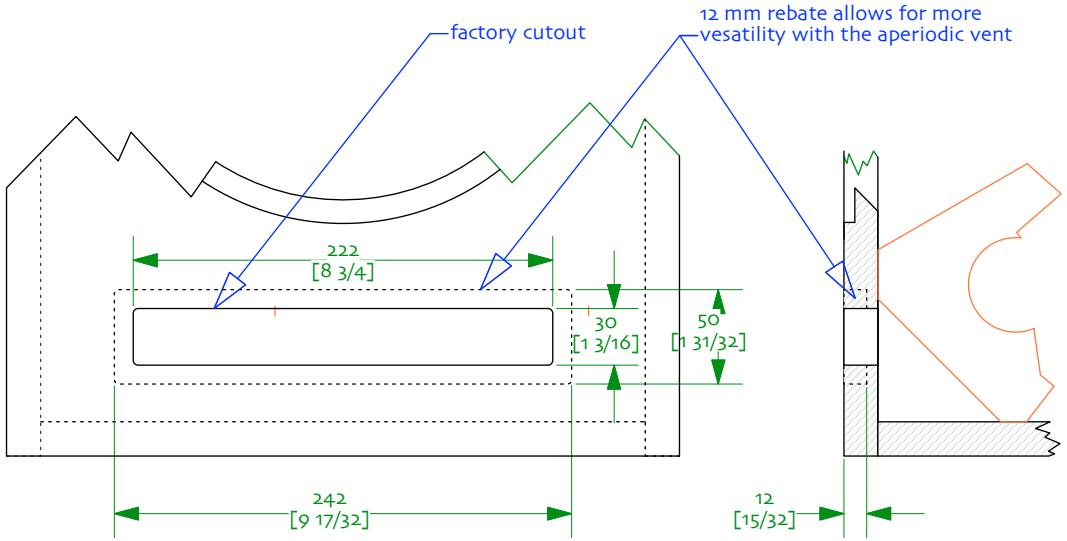
SEAS A26L reimagining ov88
sheet a26lc18-2 | 18mm dbl baffle 4x8 cut

04-april-2021 | tweaked & drawn by dld



Notes:
o/ 18 mm material, high quality plywood recommended

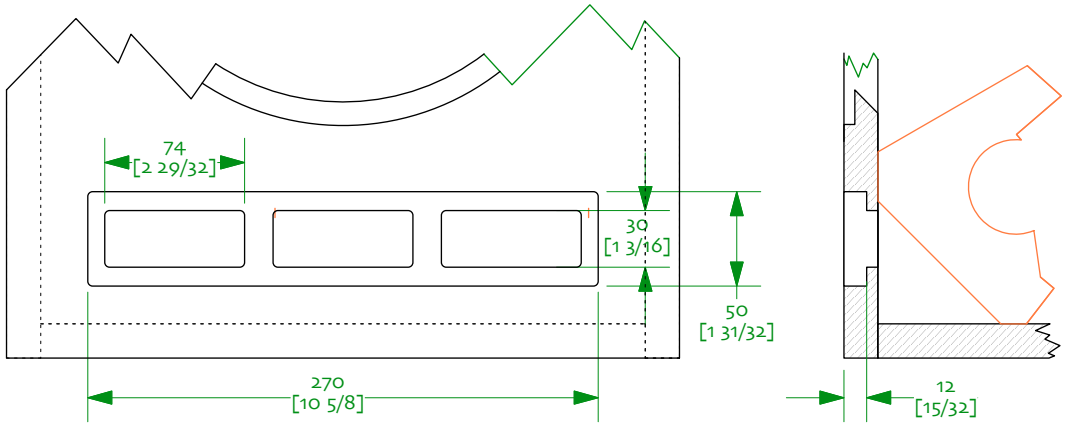




Commentary on aperiodic vent tuning and damping

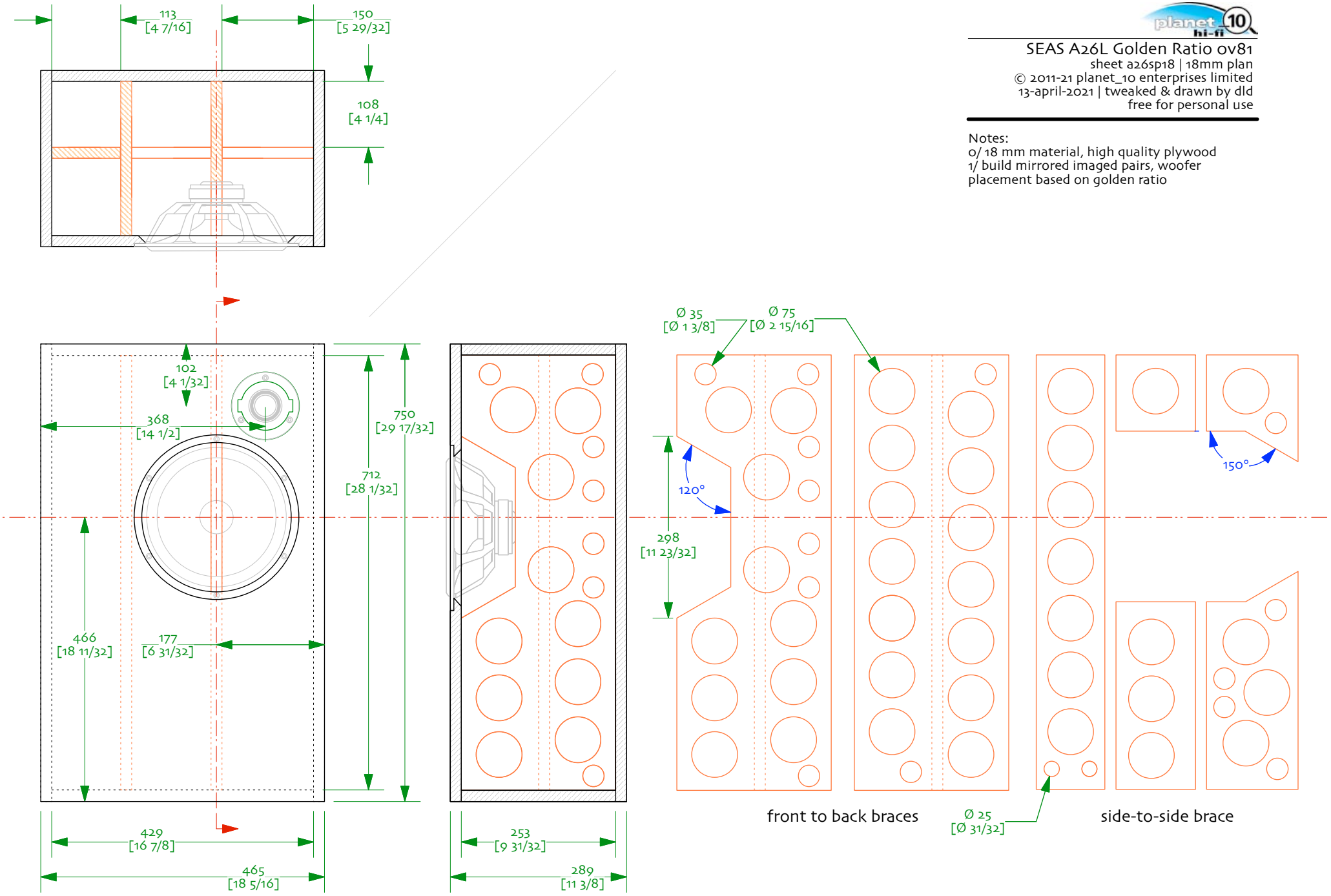
gutter mesh, fiberglass, Dyna A25, rockwool, vent recess, A26/SEAS take

180% x 2/3



This is a more versatile variation on the cutout for the aperiodic vent

about 200% the are, 2/3 the depth

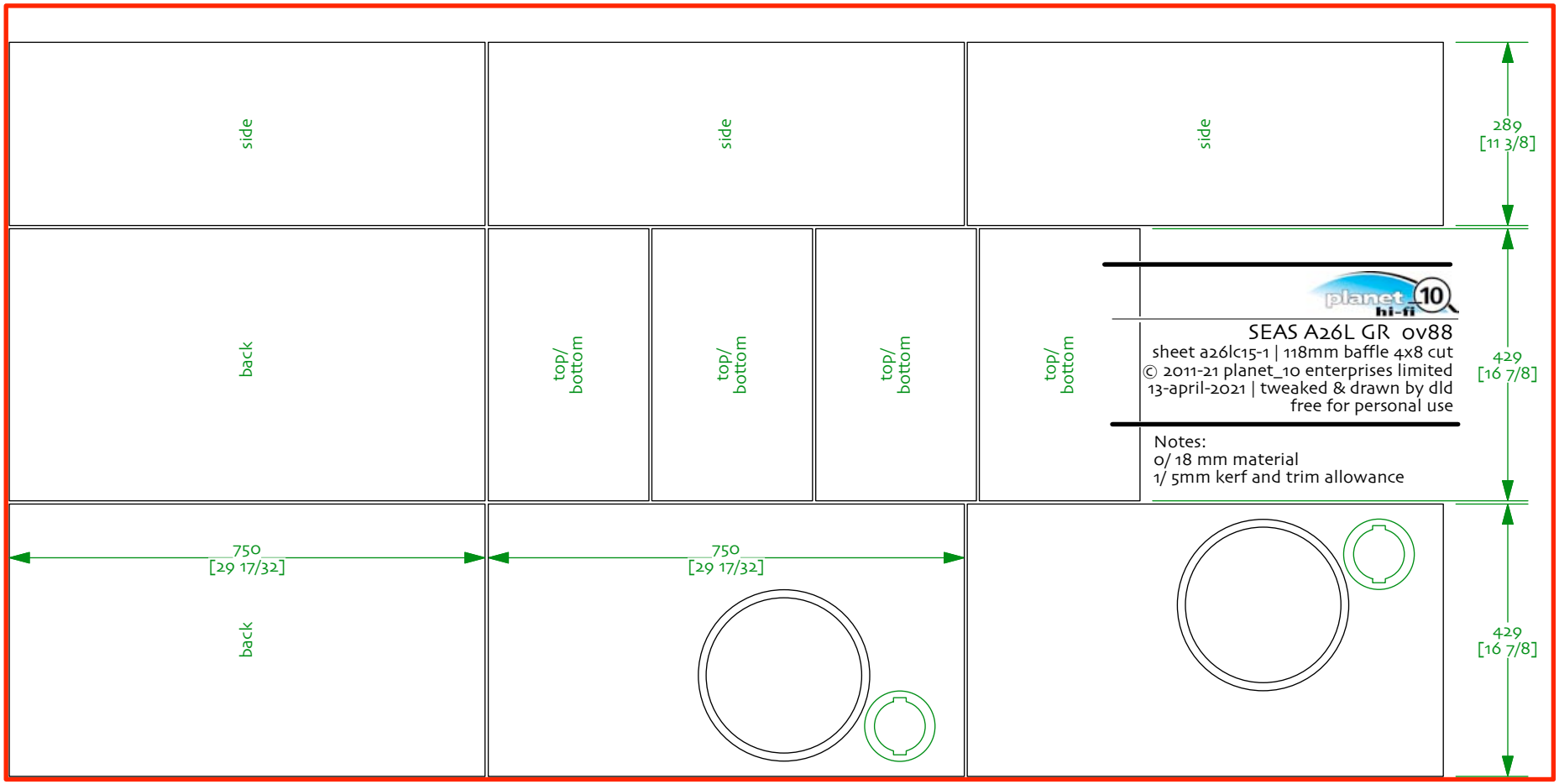


SEAS A26L Golden Ratio ov81

sheet a26sp18 | 18mm plan

13-april-2021 | tweaked & drawn by dld

Notes:
o/ 18 mm material, high quality plywood
1/ build mirrored imaged pairs, woofer placement based on golden ratio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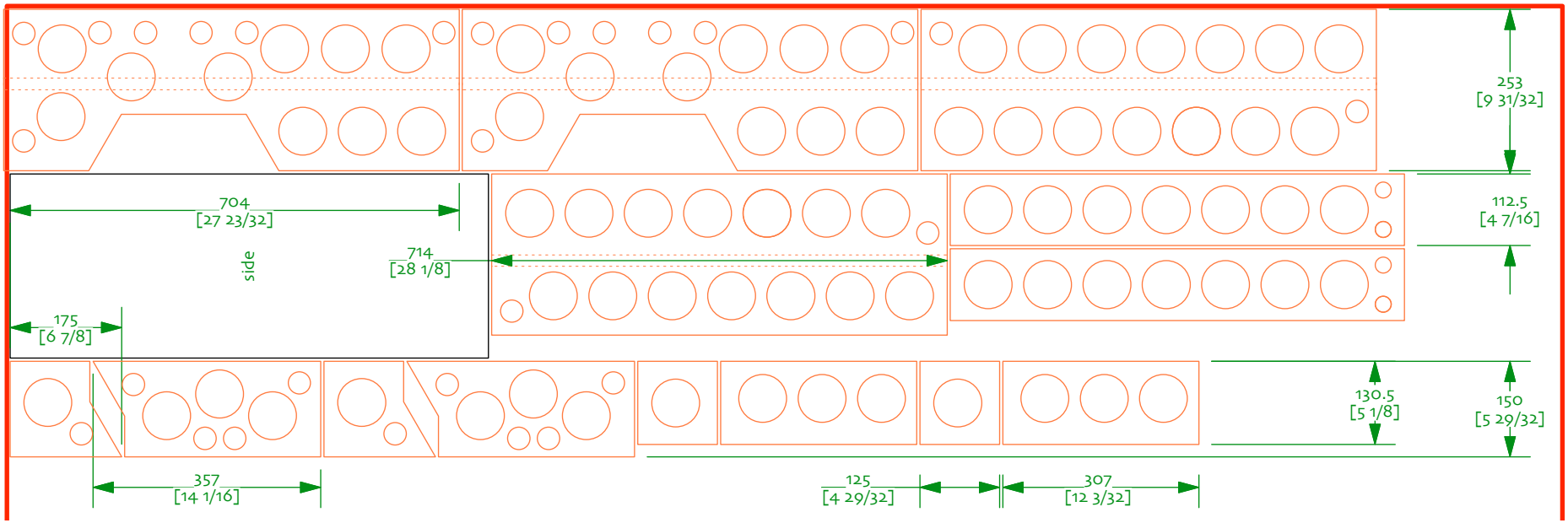
289
[11 3/8]
429
[16 7/8]
SEAS A26L GR ov88
sheet a26lc15-1 | 118mm baffle 4x8 cut
© 2011-21 planet_10 enterprises limited
13-april-2021 | tweaked & drawn by dld
free for personal use
Notes:
0/ 18 mm material
1/ 5mm kerf and trim allowance
750
[29 17/32]
750
[29 17/32]
back
429
[16 7/8]

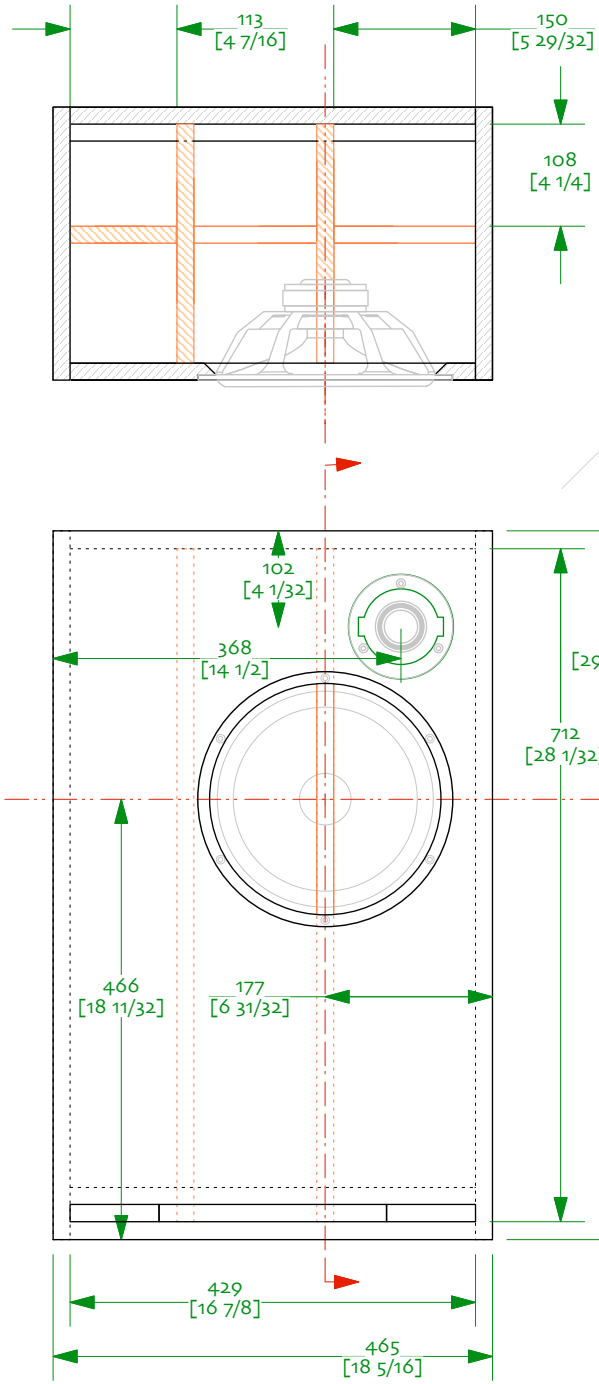

253
[9 31/32]
704
[27 23/32]
side
714
[28 1/8]
112.5
[4 7/16]
175
[6 7/8]
130.5
[5 1/8]
150
[5 29/32]
357
[14 1/16]
125
[4 29/32]
307
[12 3/32]

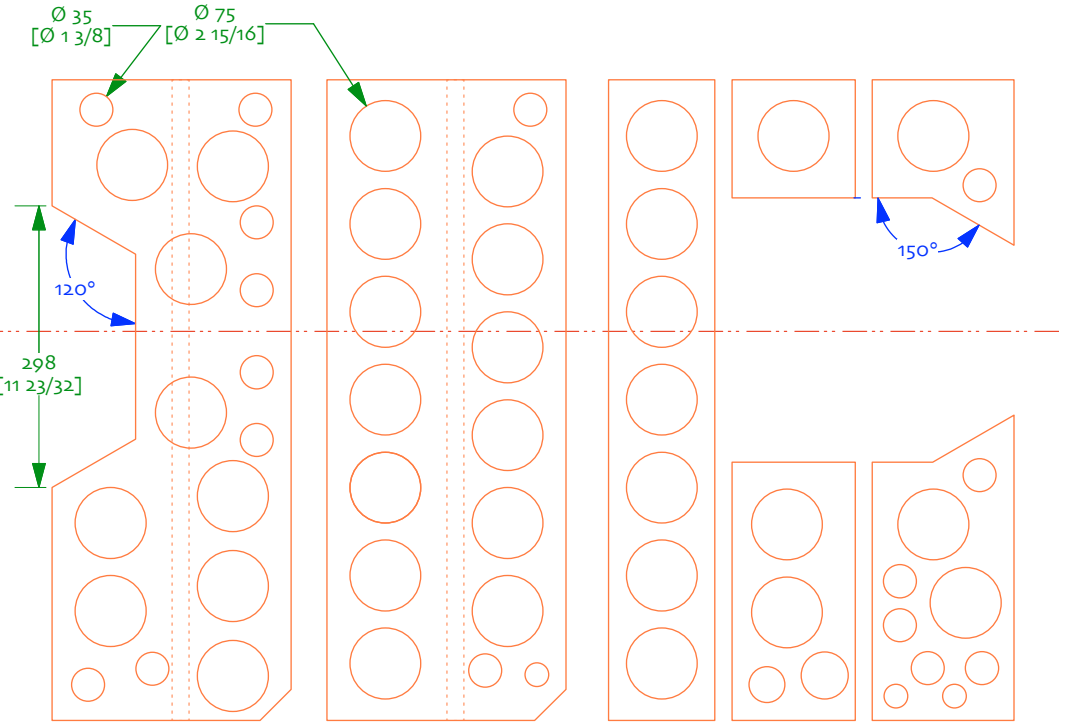
Classic Golden Ratio SEA-Ken ov8o

sheet a26skp18 | 18mm plan

06-april-2021 | tweaked & drawn by dld

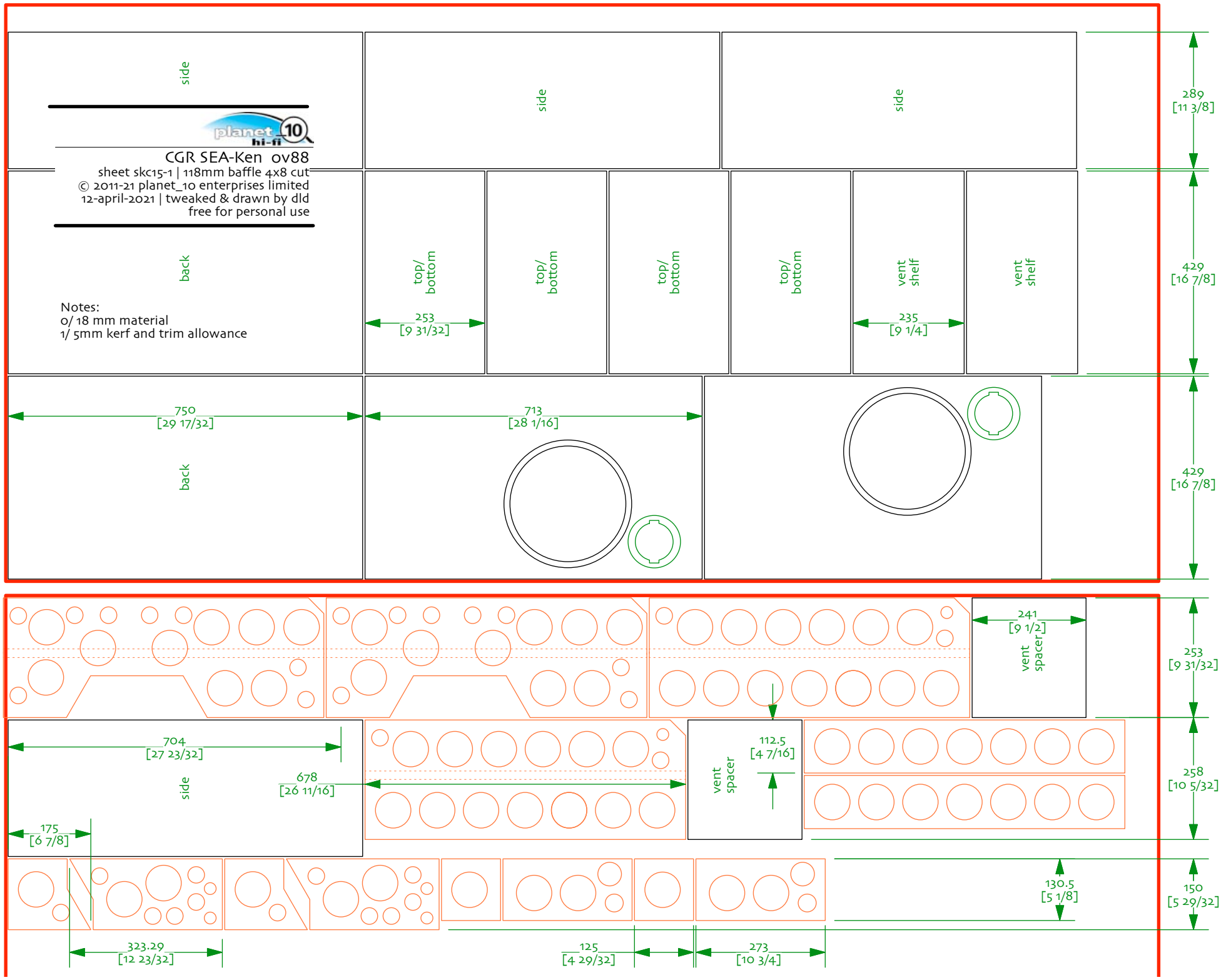
Notes:
0/ 18 mm material, high quality plywood
1/ build mirrored imaged pairs, woofer placement based on golden ratio





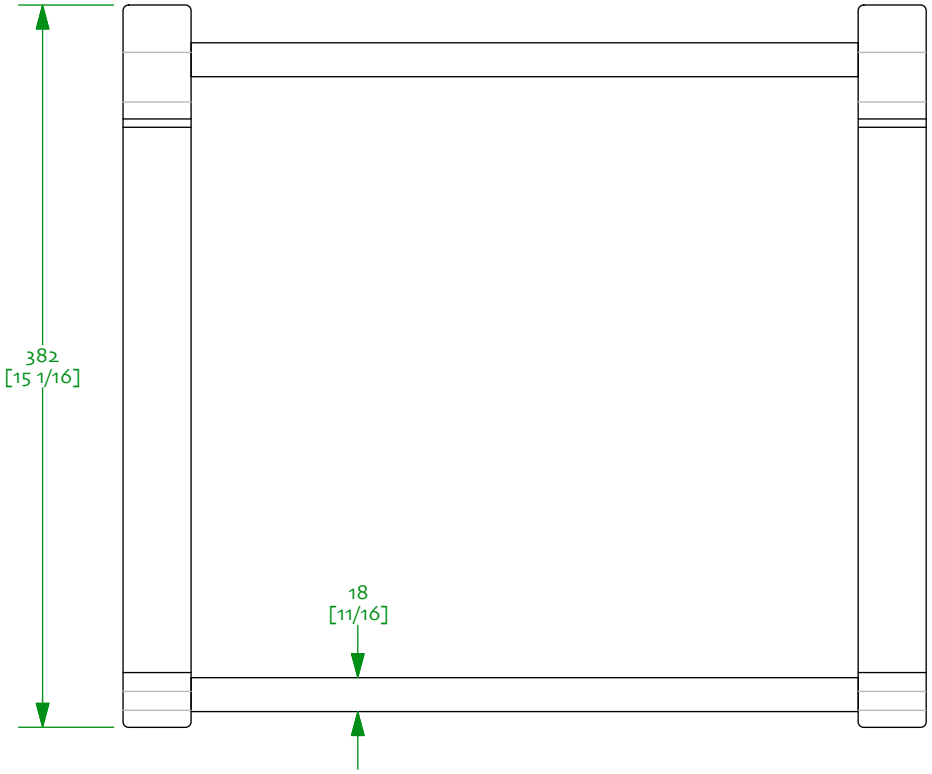
front to back braces

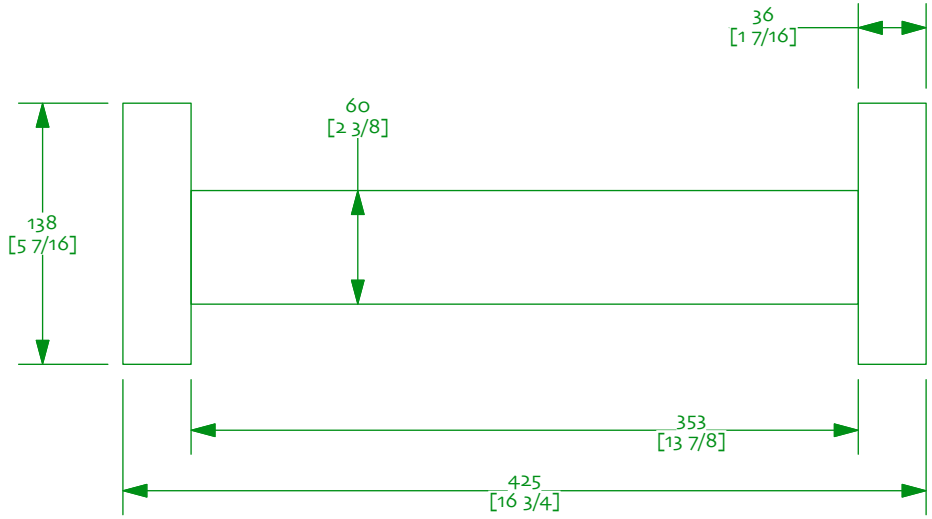
side-to-side brace

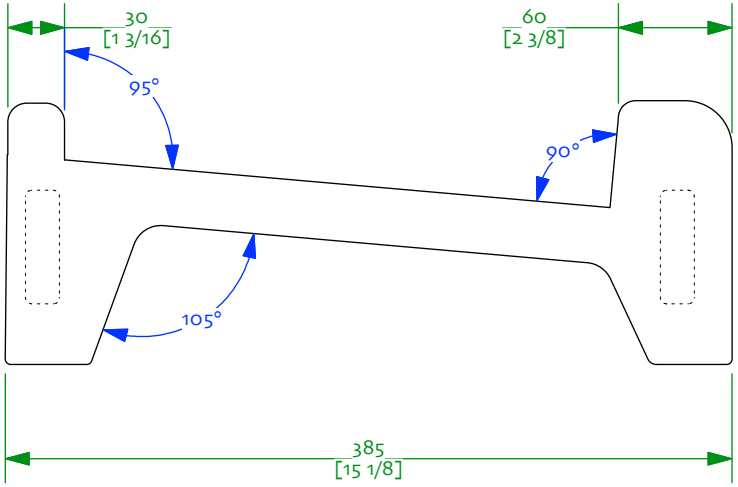


CGR SEA-Ken ov88
sheet skc15-1 | 118mm baffle 4x8 cut

12-april-2021 | tweaked & drawn by dld







SEAS A26 Sealed GR Stand ov81

sheet a26bp18 | 18mm plan

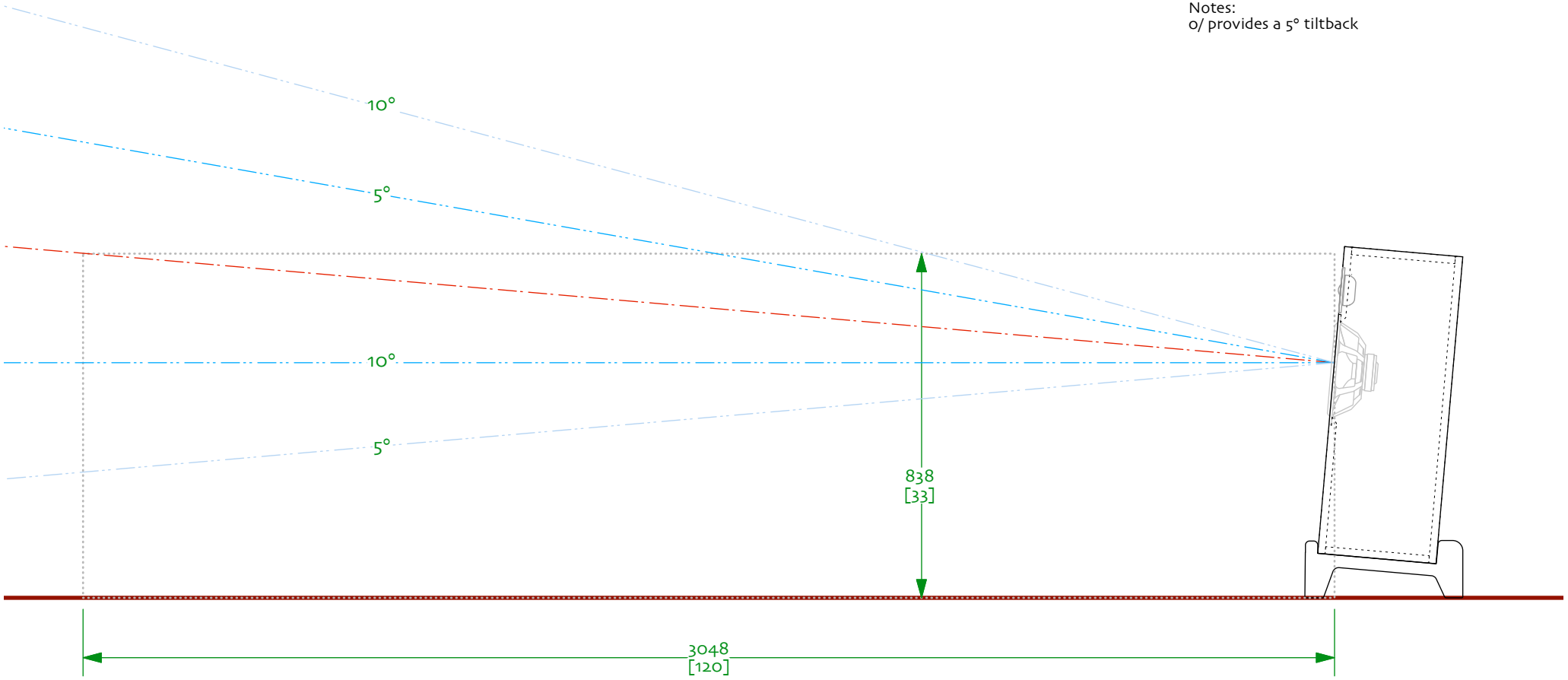
15-march-2021 | tweaked & drawn by dld

Notes:
0/ drawn with 18 mm material
1/ provides a 5° tiltback

SEAS A26 Sealed GR Aim ov81
sheet a26aimp18 | 18mm plan

15-march-2021 | tweaked & drawn by dld

Notes:
o/ provides a 5° tiltback



SEAS A26R3E4 Top options

looking at other options for covering the high frequencies

27-march-2021

Visualization here

The A26RE4 is a versatile woofer with a nice smooth roll-off. There is no reason other tweeters cannot be used and here we present 3 examples with SEAS 29TFF/W, SEAS T29CF01, and Morel CAT 378.

The XOs used for these can be an helpfuk in designing an XO for other tweeters.

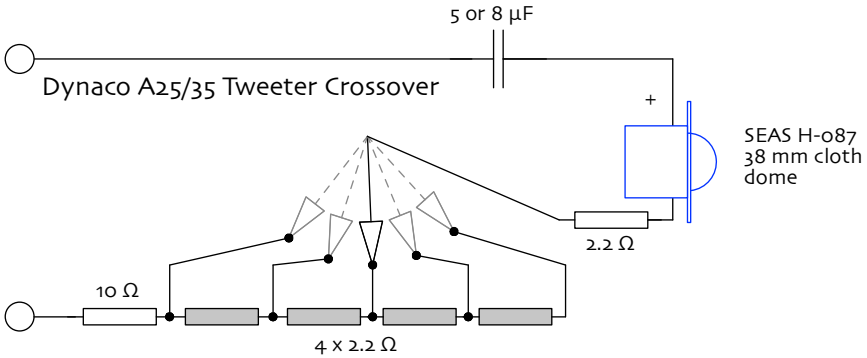
We will also consider using a midTweeter (ie small full-range) instead of a tweeter with a very low XO, bringing the seemlessness of no XO thru the mid-top, the ability to get the driver's physical spacing within the magic quarter-wavelength (effectively making the drivers coincident), and allowing for the XO point and the driver levels to be used for any needed Baffle Step Compensation.

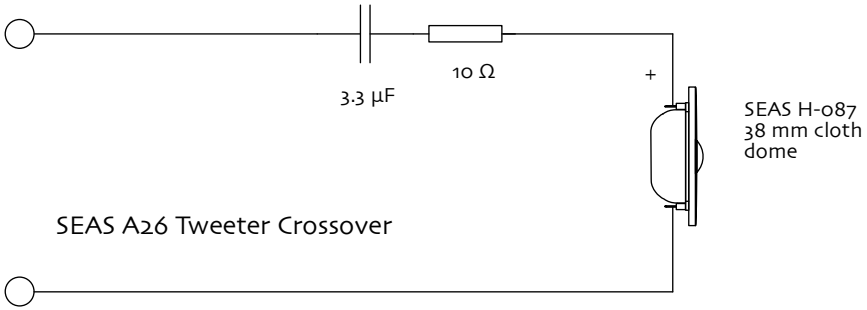
Drawings/Contents (provisional)

Title
Tweeter, Crossover options
midTweeter options, subenclosure
suggested XO start
impedance tuning

SEAS A26RE4/ driver dimensions

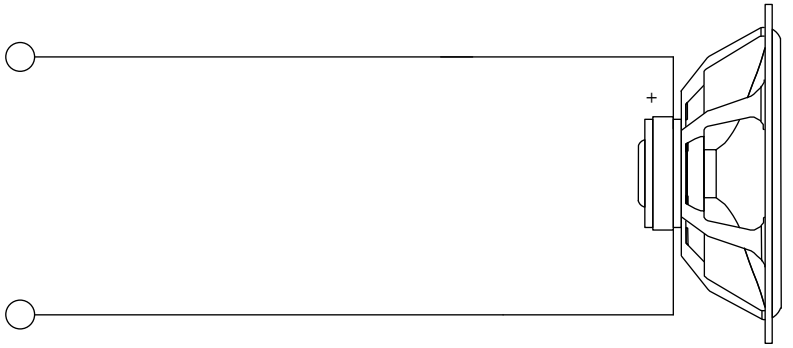
please email <david@planet10-hifi.com> with corrections & suggestions to improve this document





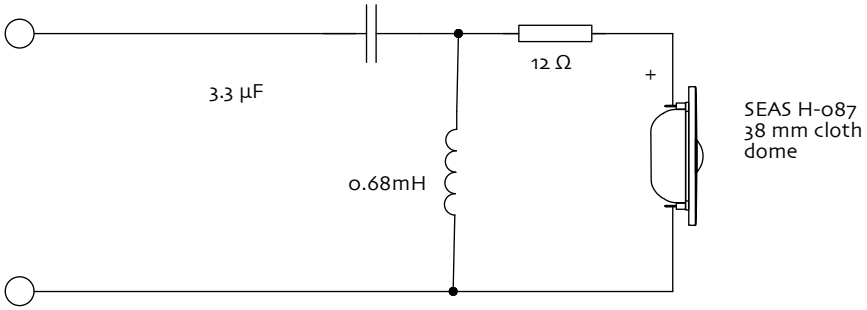
SEAS A26 ReViz ov88
sheet a26xo-1 | crossover

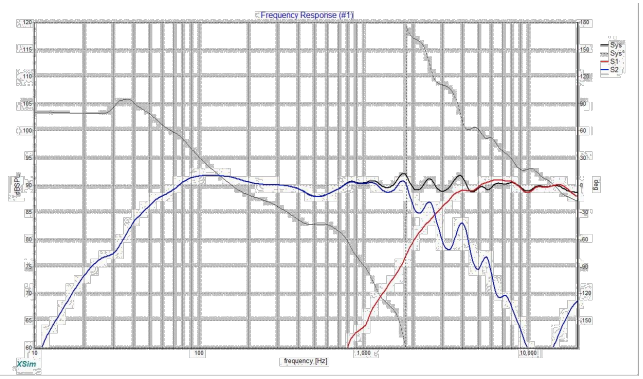
27-march-2021 | tweaked & drawn by dld

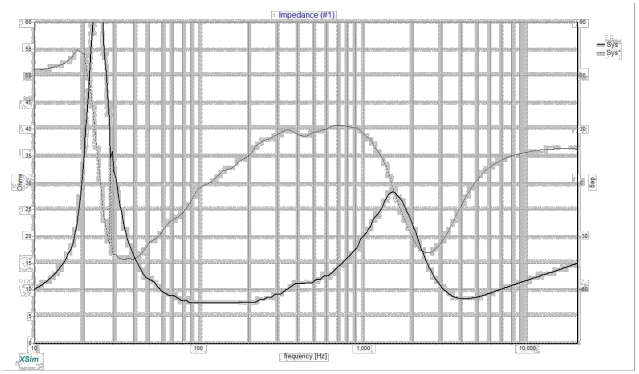


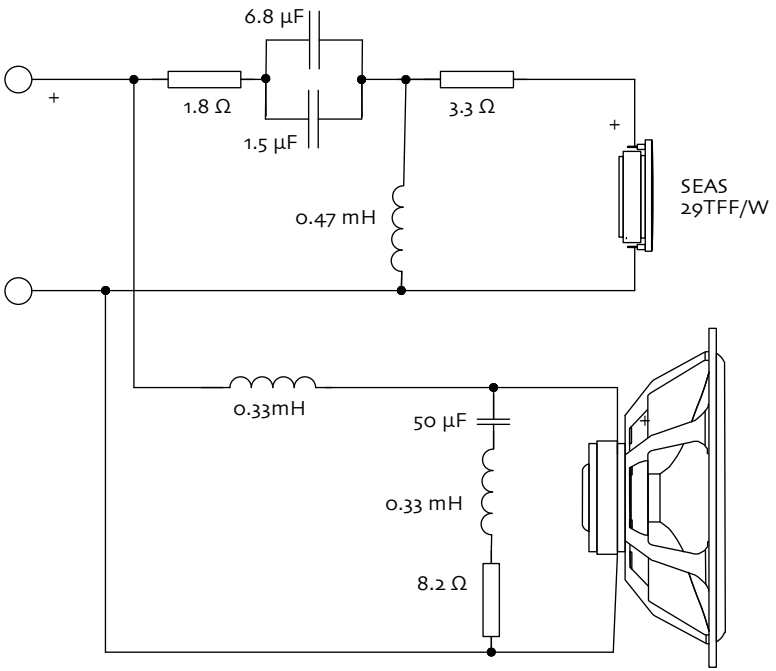
Suggested 2nd Order Tweeter Crossover by Lozek on diyAudio.com

A 2nd order filter on the tweeter will greatly improce its power handling, and the natural, roll-off will more closely resemble the roll-off of th ewoofer.

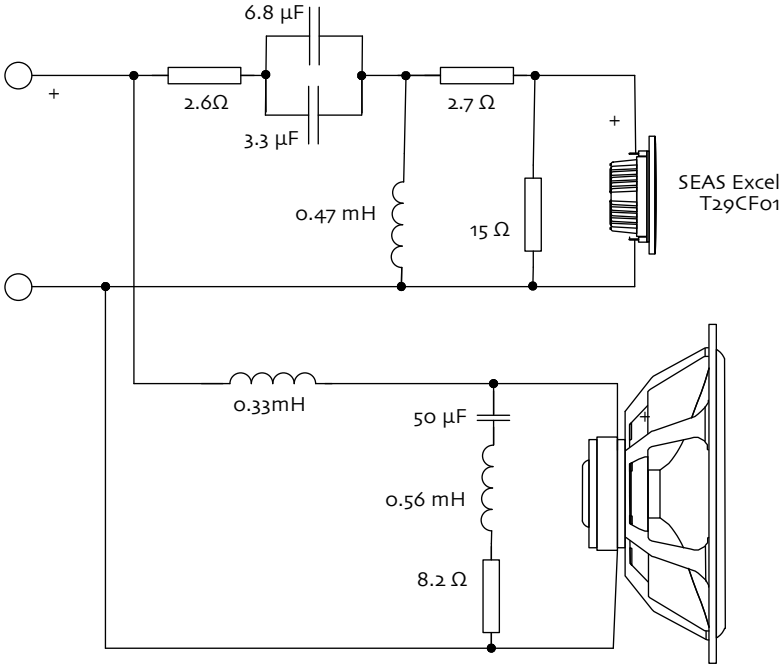








World Design WD25 Alternatives



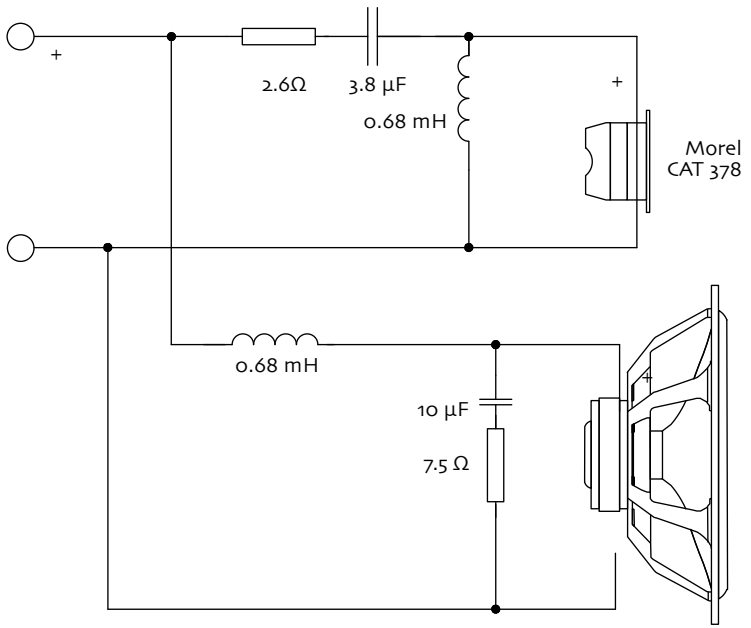
SEAS A26RE4 ov88

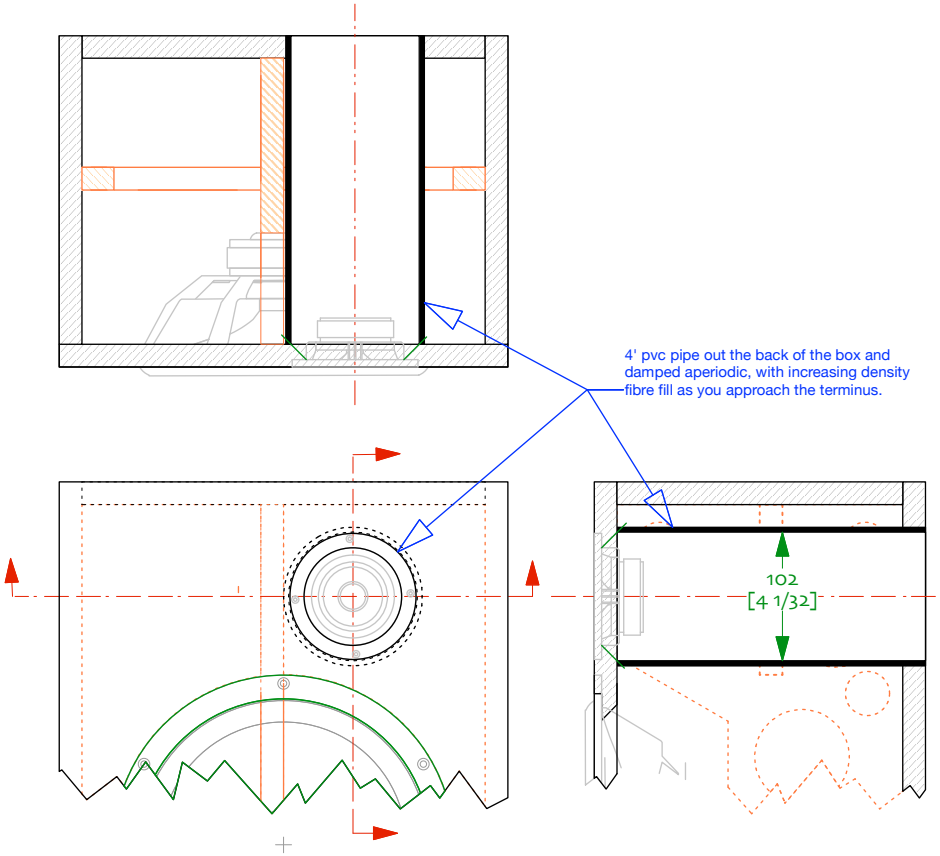
sheet a26XO2-1 | alternate tweeters & XOs

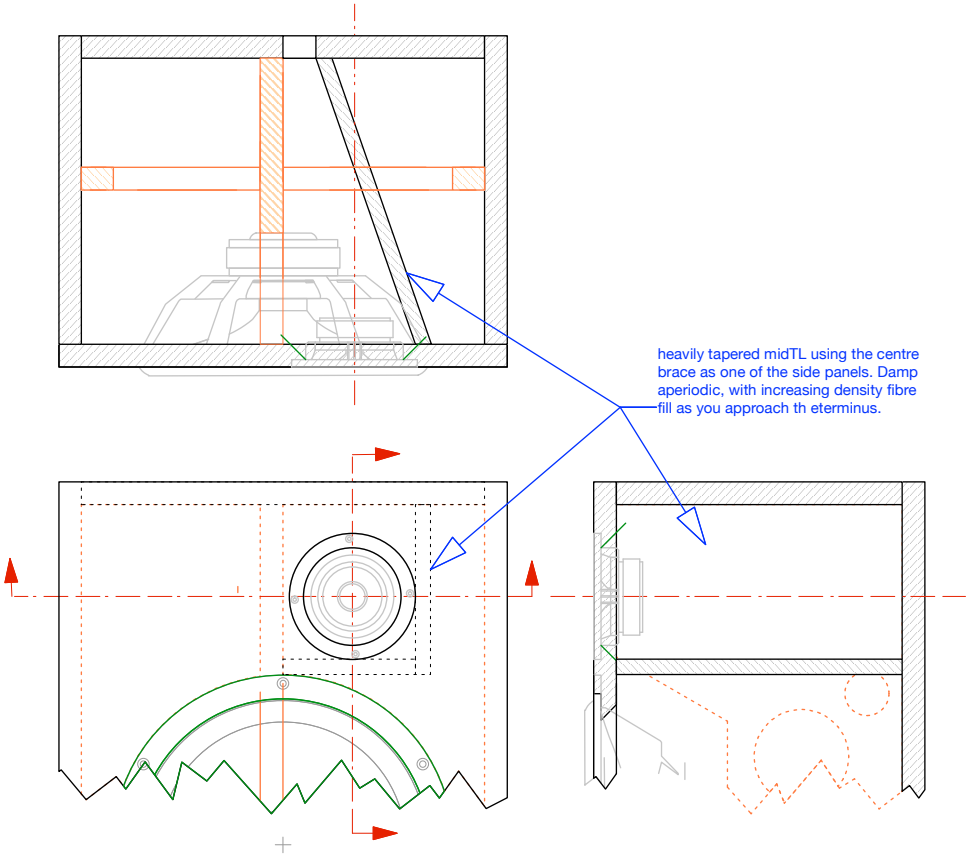
27-march-2021 | tweaked & drawn by dld

The tweeter supplied with the A26 kit is not the only one. Here we look at published solutions with other tweeters used.

In the next drawing we will consdier substituting a midTweteer with a very low XO to create a Woofer Assisted Wideband. This, really only suitable for the 2 larger enclosures to accomodate the volume of the midTweter subenclosure.





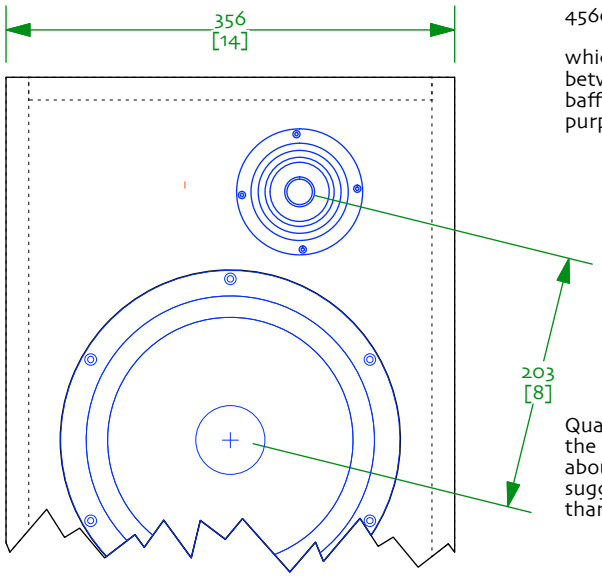


A26RE4 sensitivity is 89 dB, so if one wants to work out a passive XO then 85-87 dB to get apropriaet BSC (with no padding), if you bi-amp then any good 3" driver would be suitable. Th edrawings use a Mark Audio Alpair 5.2/3 which i would suggest along with Fostex FF85wk or Faital Pro 3FExx (you should be able to find the sensitivity youneed amoungst the various versions).

SEAS A26 reimagining ov88

sheet a26mt | midTL options

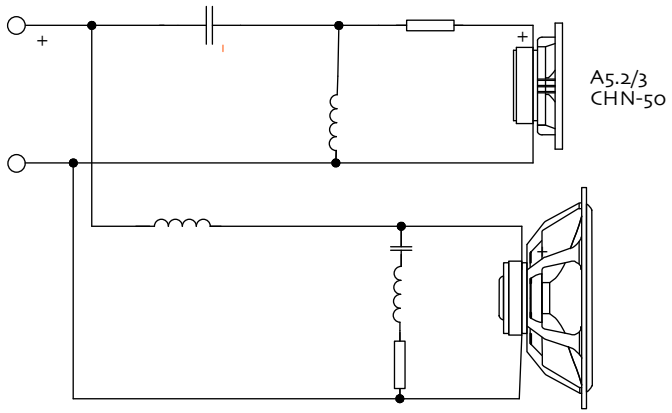
28-march-2021 | tweaked & drawn by dld

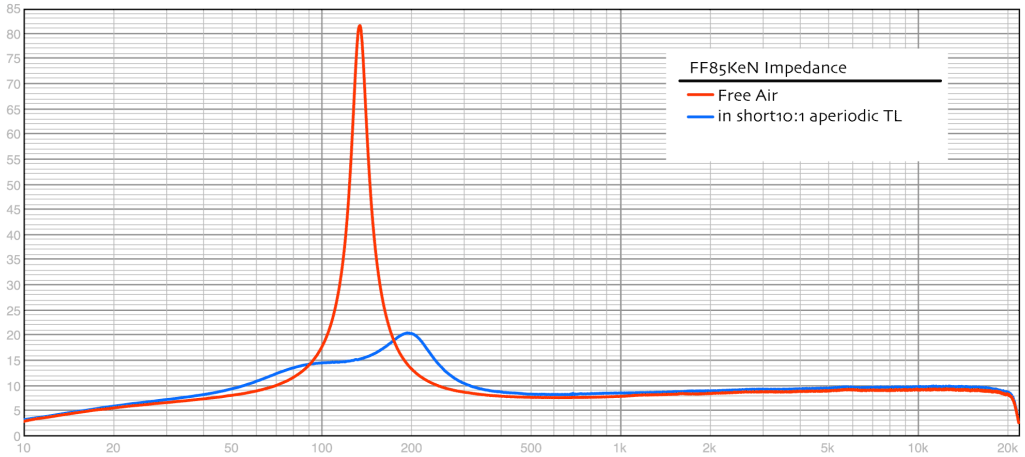


4560 / 14 = 325

which suggests an XO between 230 – 325 Hz for baffle step compensation purposes.

Quarter wavelength of the driver separation is about 240 Hz which suggests the XO be less than 240 Hz.





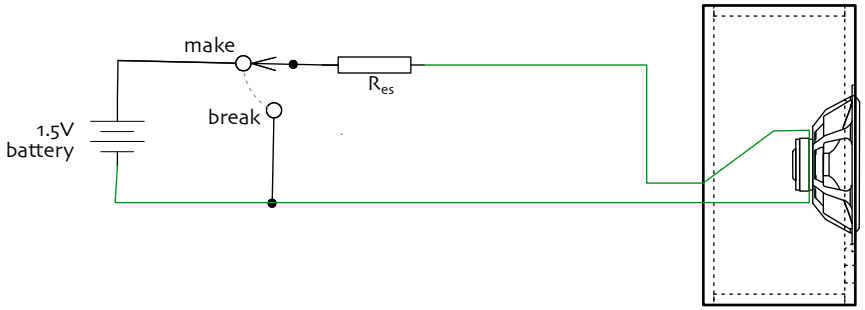
Fine-tuning the resistance of an aperiodic vent in an enclosure can be monitored by measuring the impedance of th eloudspeaker. We are trying to flatten the impedance resonance as much as possible.

The example is not an A26, but a short midTL, but teh chart is illustrative of the goal.

Resistance of the aperiodic vent involves increasing the amount and density of the damping sandwhiched in the vent.

As well as impedance, some may want to keep mor eof the bump just before roll-off which will require less damping.

The amount of damping used in the vent will also be omformed by your room, room placement, amplifier, & taste.



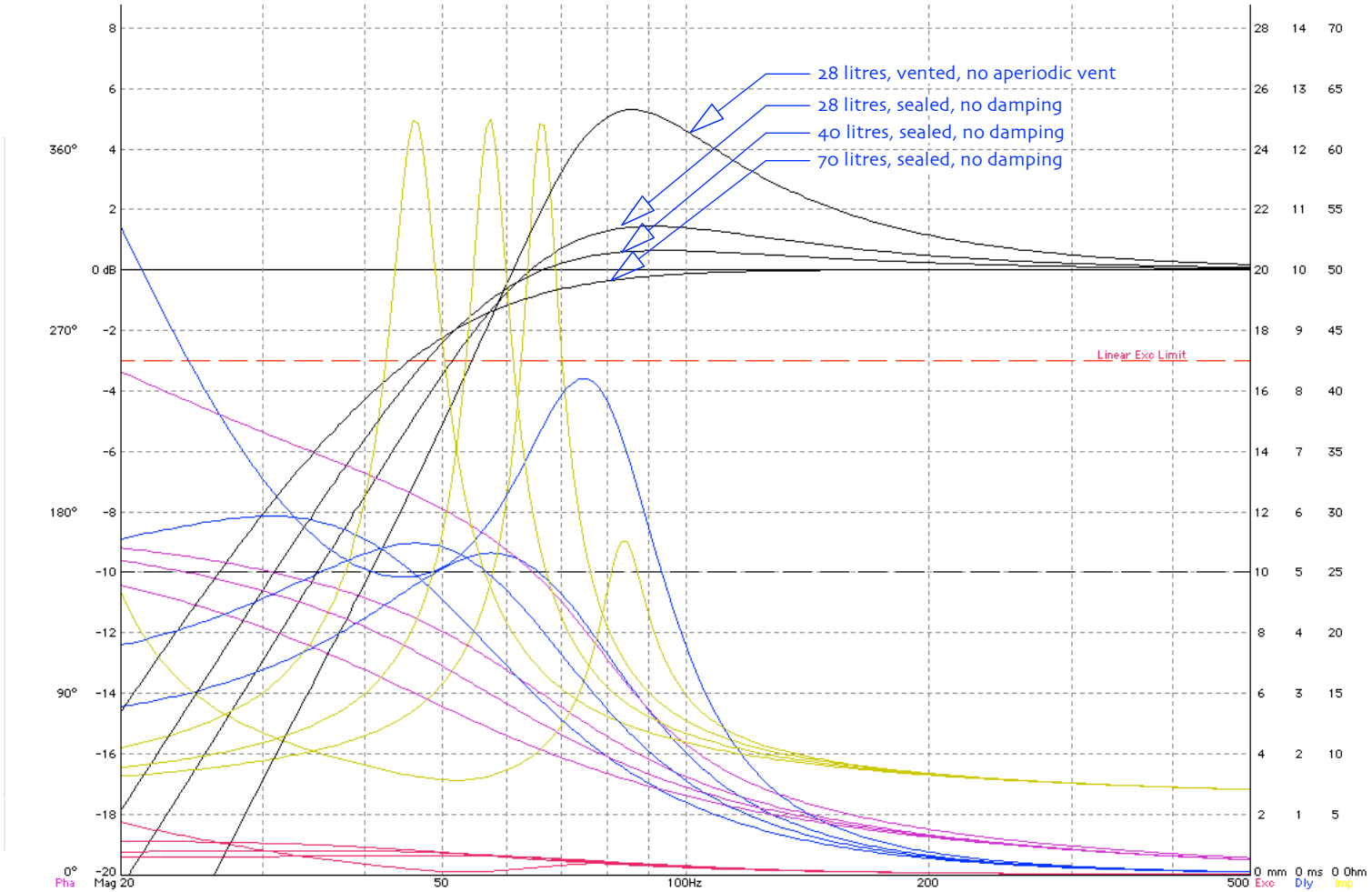
If you don't use a computer program to measure impedance, you can determine when it is damped "close enuff" by ear using the simple circuit shown.

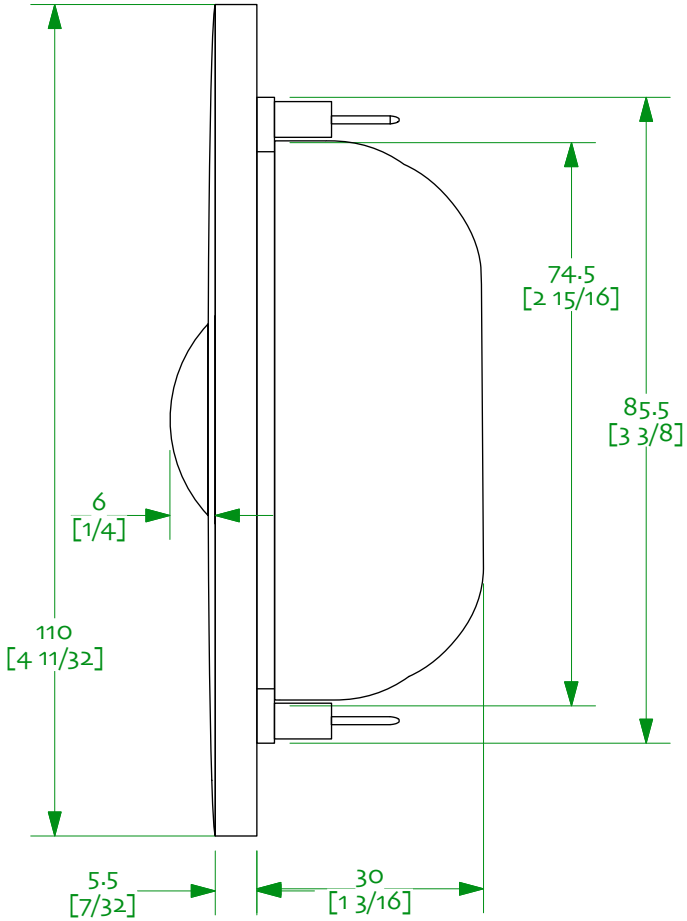
Make a tester with a SPDT togglr or pushbutton switch, 1,5v C or D size battery and a resistor.

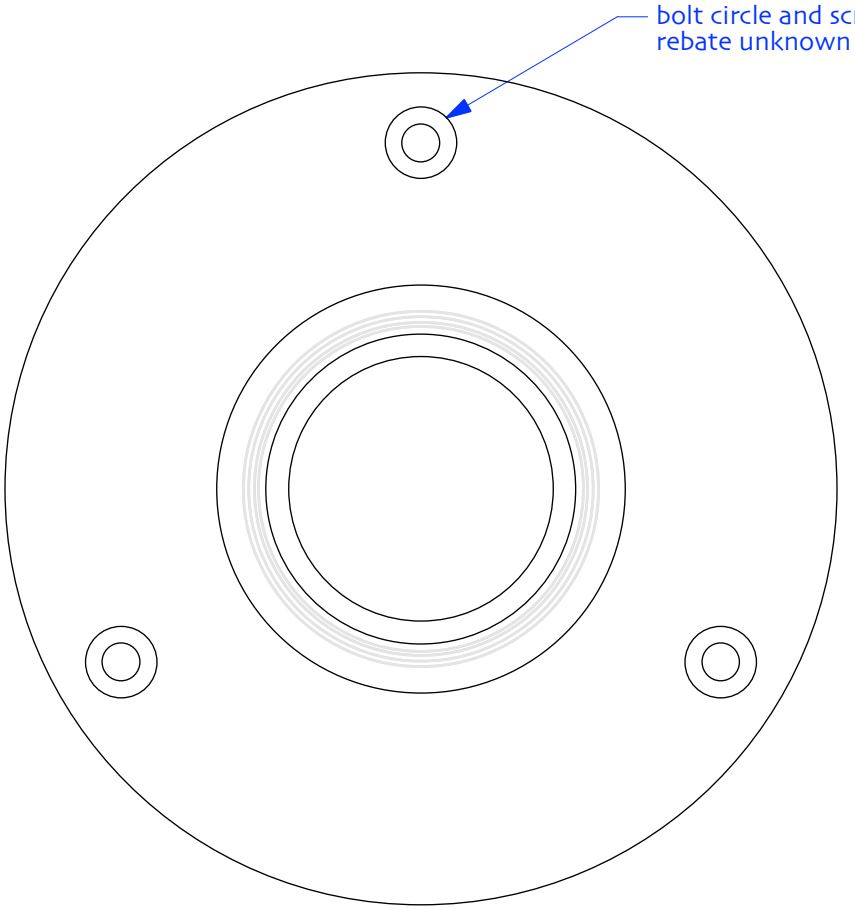
If amplifier damping factor is known:

$R_{es} = Z_{driver}$ / damping-factor

The speaker should reproduce a distinct "click" on 'make' and 'break'. If there is "hangover" or "boom" then increase damping density.





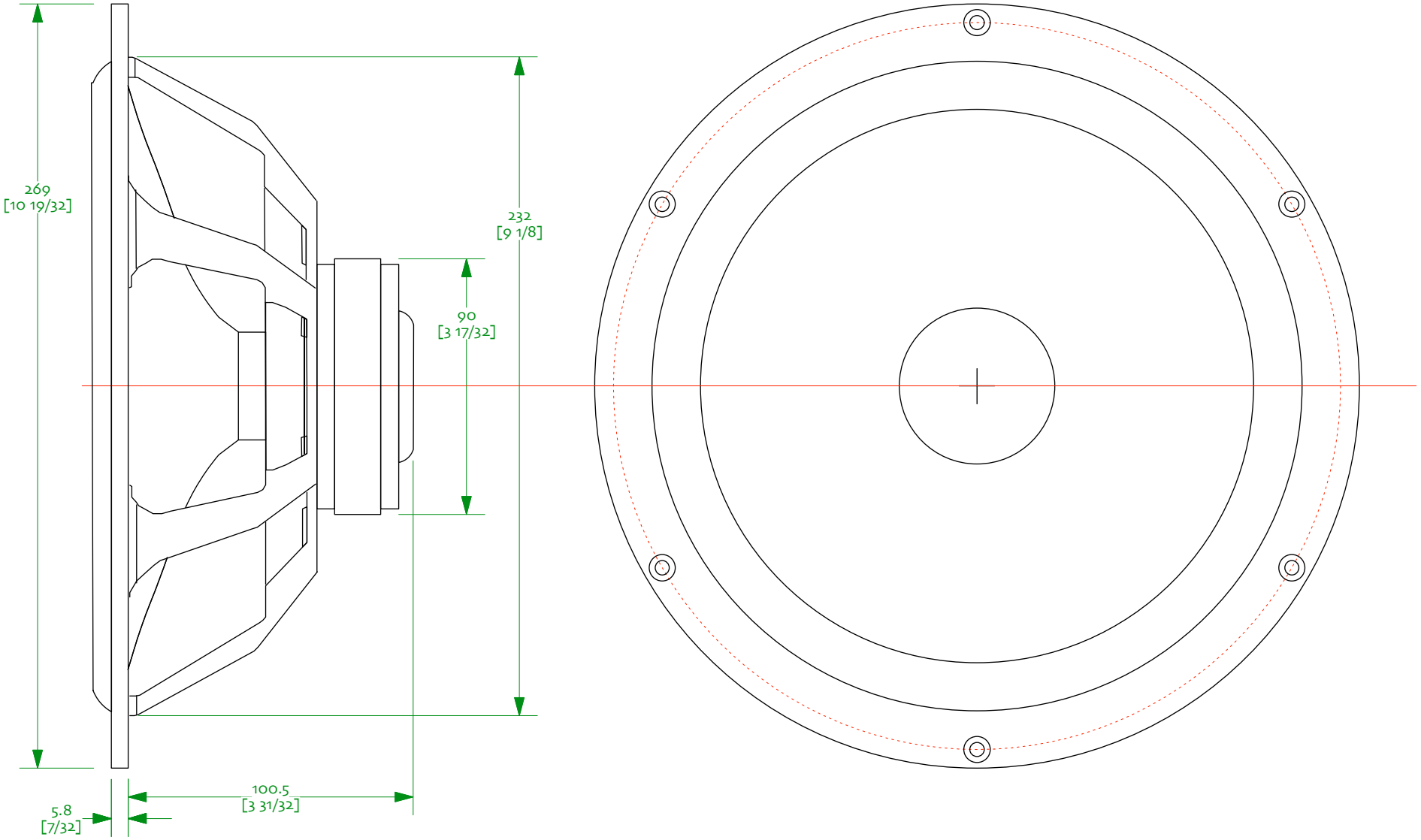


Notes:
o/ after the factory drawing

SEAS T35C002 Tweeter

Dimensions ov72

05-march-2021 | drawn by D Dlugos



Notes:
o/ after the factory drawing

SEAS A26Rxx Woofer

Dimensions ov72

06-march-2021 | drawn by D Dlugos