

M Pensil Series

updated
16-June-2011



Damped Air Coupler

Added: New Versions for Latest Generation Models

The Pencils are a small range of easy-to-build floorstanding cabinet designs for Mark Fenlon Audio drivers. They use a combination of traditional quarter-wave design, a custom T/S volume alignment, and Transmission Line damping to provide a balanced response with a flavour of both vented and TL enclosures.

The Pencils are designed not to require any form of correction circuits for step-loss. This is achieved through a combination of the compensation already built into the driver responses, and the damped air alignment, which together bring the system response ~flat in-room. The impedance load is easy, being largely unreactive, and driver displacement is well controlled.

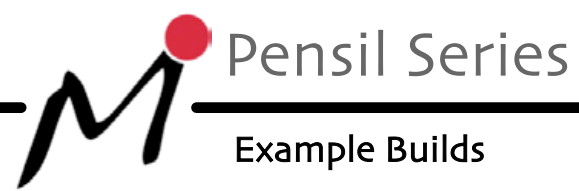
Many have been built, and with many happy end users. See diyAudio.com for discussion, comments, variations, reviews, and help.

Default recommended damping quantities (assuming dacron hollow-fibre material) are suggested in the plans; tailor these if required to suit your own amplifier[s] / room / taste. It is suggested that a removable back is employed on all boxes to allow easy tweaking of the damping

superPensil 12	Alpair 12	<i>current</i>
Pensil 12	Alpair 12	
Pensil 10.2	Alpair 10.2	
Pensil 10	Alpair 10	
Pensil 7.3	Alpair 7.3	
Pensil 7	Alpair 7	
Pensil 6P	Alpair 6.2P	
Pensil 6R	Alpair 6.2M	
Pensil 6	Alpair 6	
Pensil RP70.3	CHR-70.3 / CHP-70.2	
Pensil R70	CHR-70	
Pensil P70	CHP-70	



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16-june-2011
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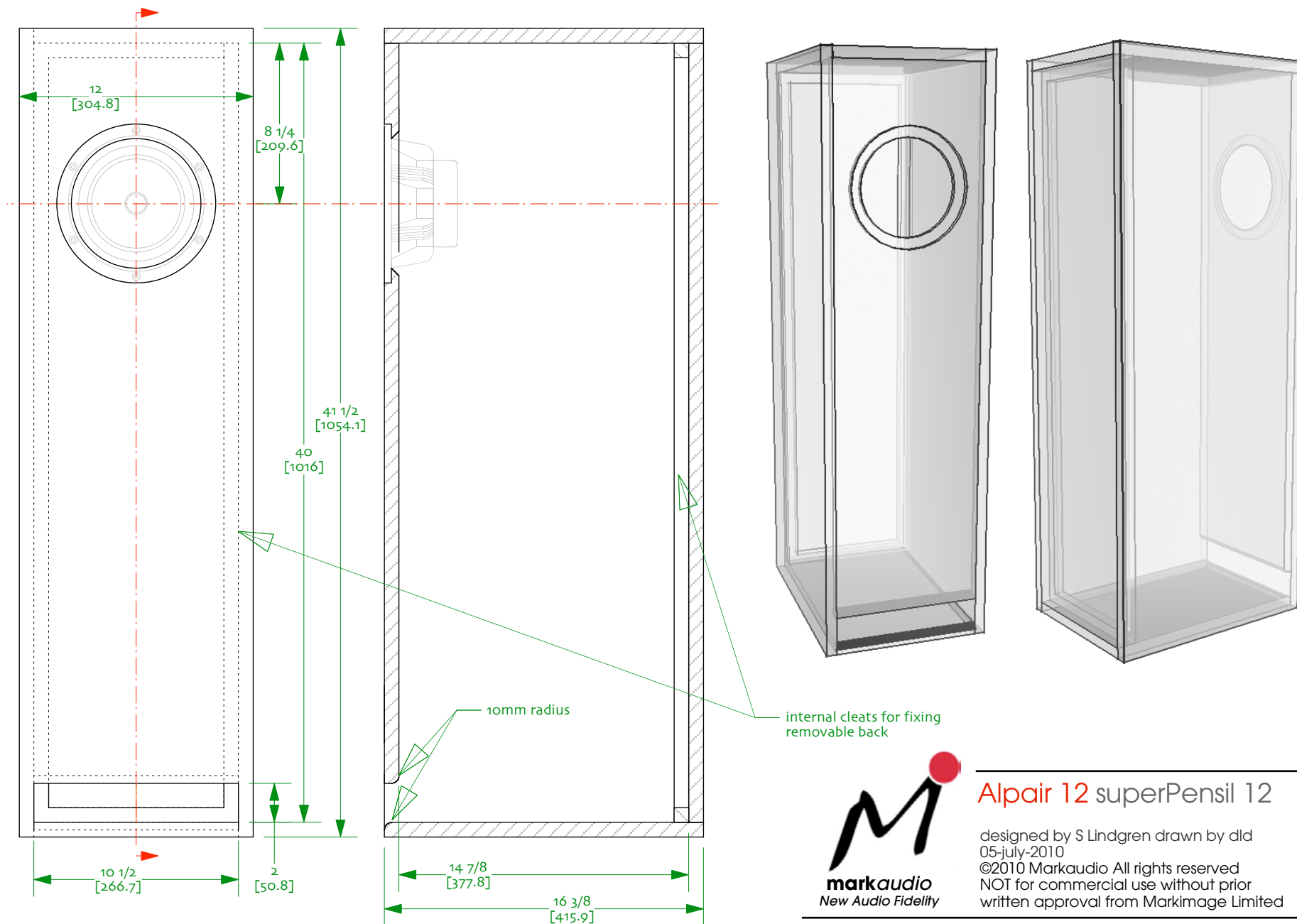


Example Builds



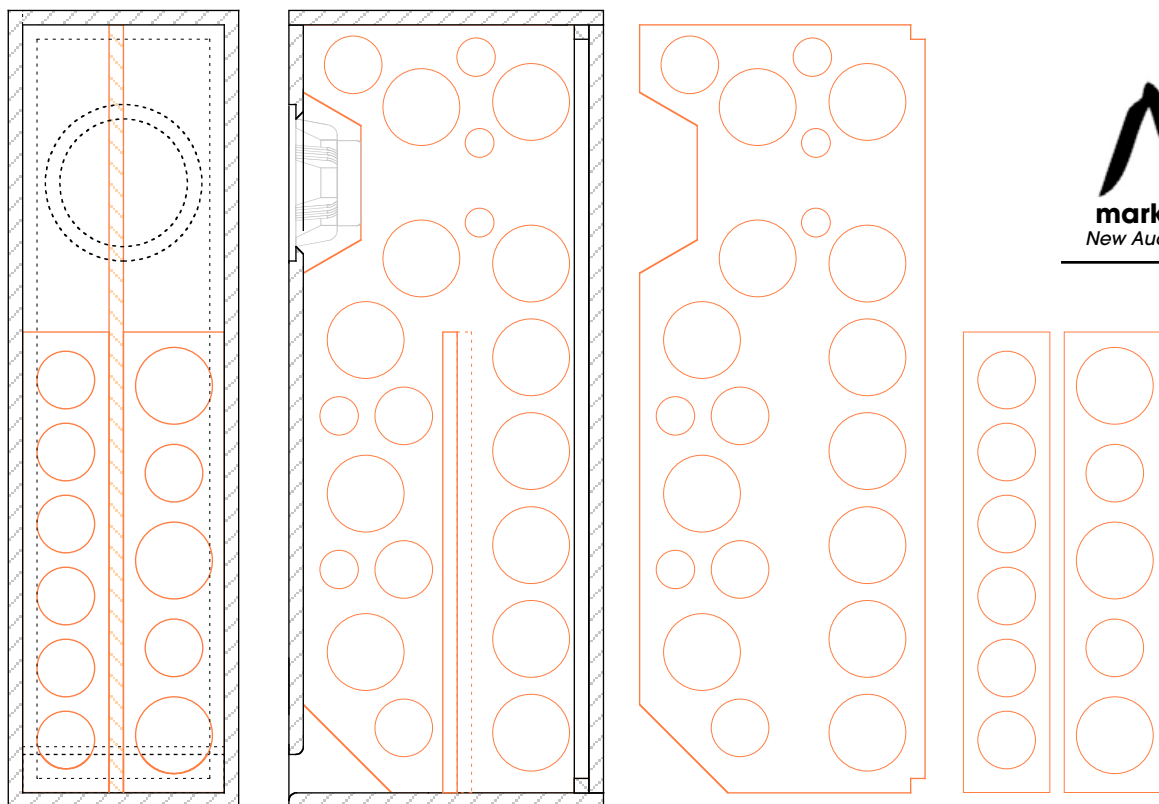
Notes:

- 0/ drawing uses 3/4" (19.1mm) material. Quality multi-ply recommended
- 1/ stuff with 1/2 to 3/4 pound per ft³ (1.15 to 1.8 pounds = 0.52 - 0.8 kg) of polyfill
- 2/cleats on back to allow for removable back, useful for adjusting the stuffing
- 3/ optional racing shown on next sheet



Alpair 12 superPensil 12

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Alpair 12 superPensil 12

Optional bracing scheme
 designed by S Lindgren & D Dlugos
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Notes:

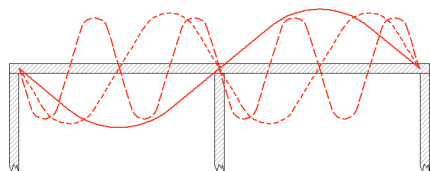
0/ drawing uses 3/4" (19.1mm) material. Quality multi-ply recommended

1/ large panel spans may be subject to unwanted resonance and colour the sound. Shown is an optional bracing scheme we have found to be effective in combatting this.

2/ Any braces you add should not impede the 1/4-wave action of the design (ie they should be vertical), or impede the terminus slot

3/ this scheme divides panels such that the aspect ratio of the subpanels is greater than the panel being braced.

4/ braces are not dead centre as that does not affectively kill the 1st mode. (see figure below) They are placed with an edge on centre. Side to side braces have more placement latitude



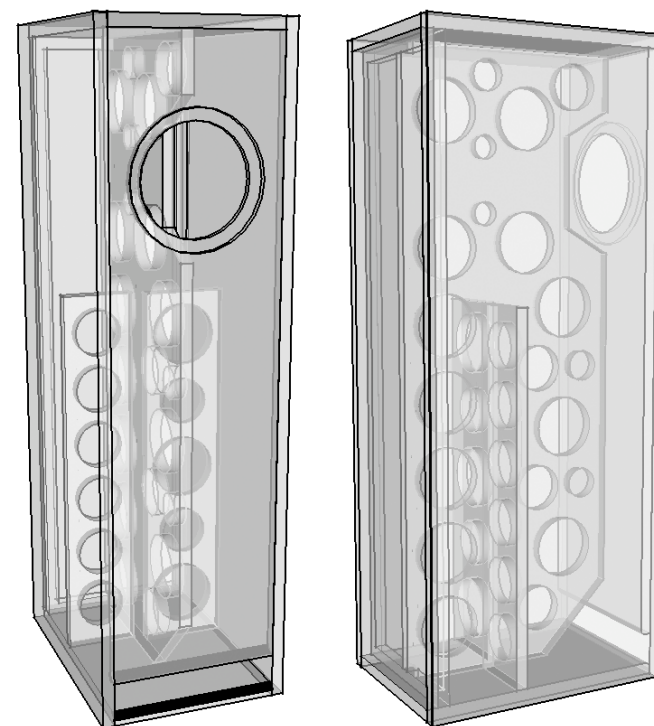
panel modes with centred brace

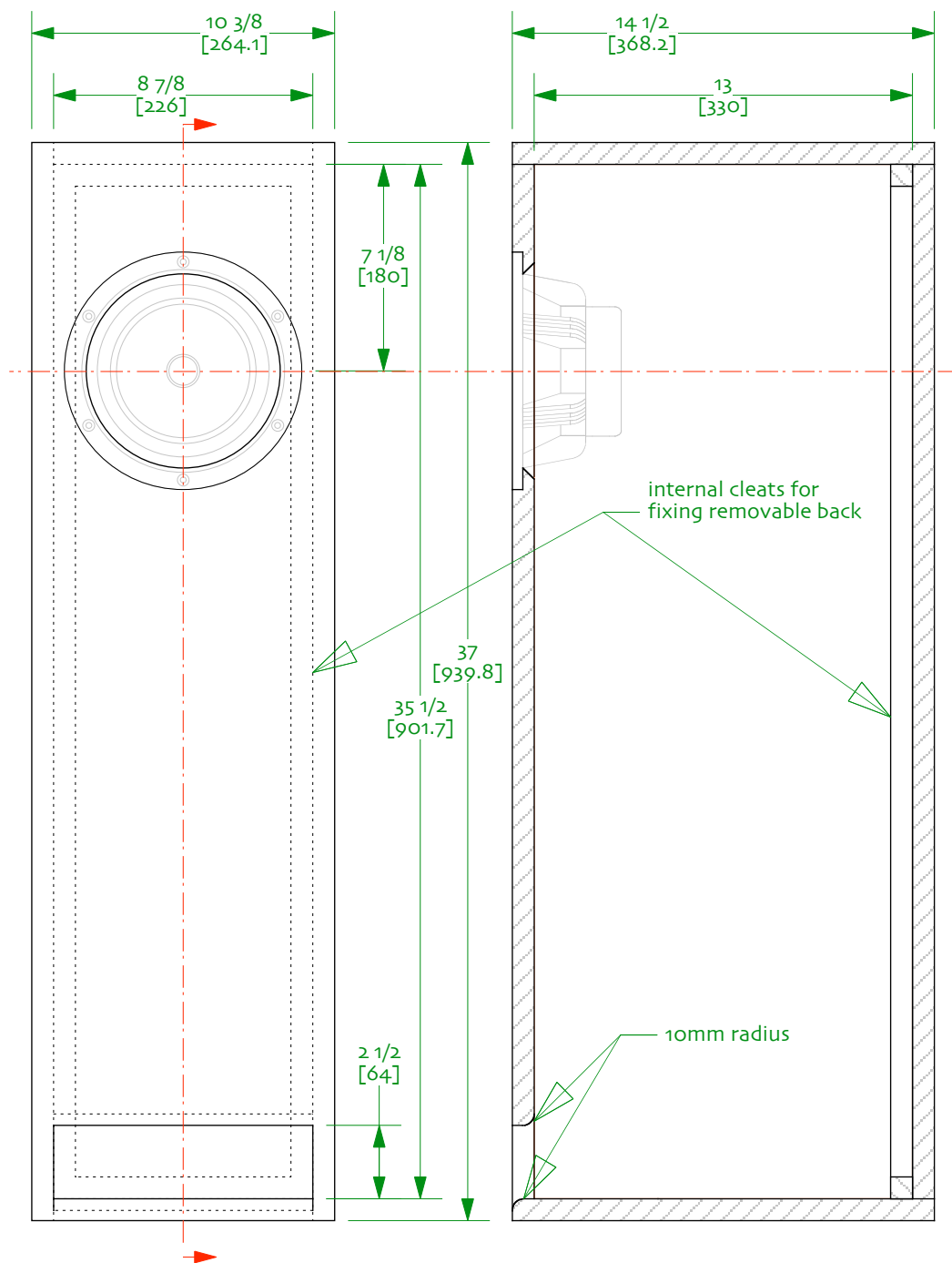
5/ braces should be 30-50% holes. They do not have to be circles. This proportion of holes also acts to make side-to-side standing waves more complex (making them less audible) and to hold the fibrous damping material in place

6/ the brace behind the driver is intended to shunt vibration energy to the back panel, and not just leave it all in the baffle. This spreads the energy across more panels, reducing the likelihood of exciting a resonance. And if a resonance is excited, one on the back panel will be much less audible. The brace should be tight up against the magnet, but not so tight as to stress the basket. If you leave it a bit deep, fill the space with something relatively stiff (paper, wood, compressed neoprene closed cel foam).

Adding this bracing can be as much work as the whole rest of the cabinet, but really helps to get the last bit of performance out of the design

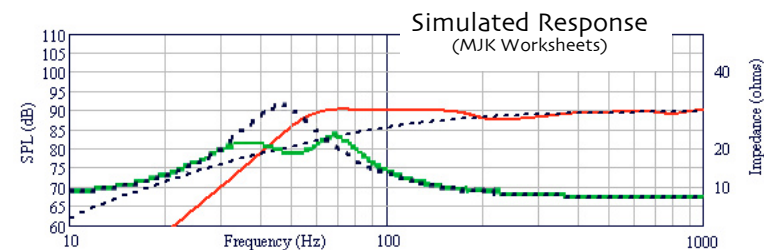
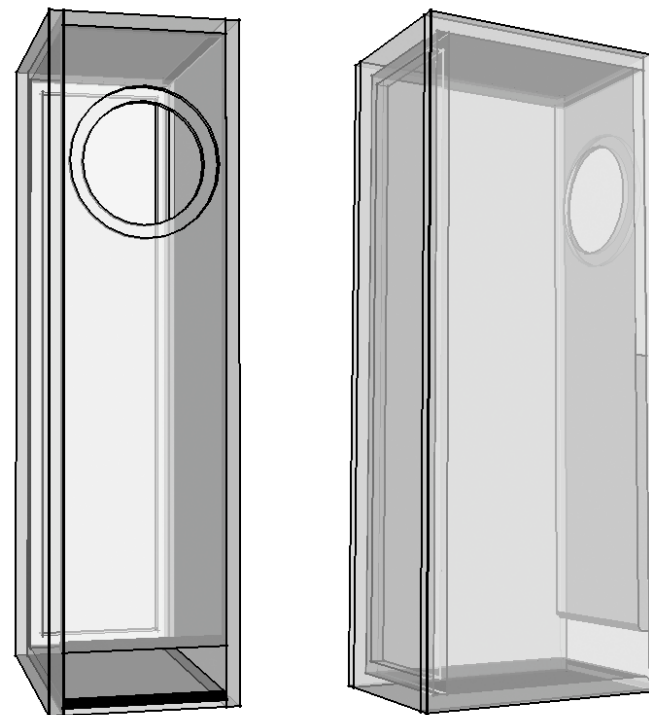
The same or similar scheme can be used on all the other pensils. On the smaller ones the side to side braces will be unnecessary and the driver brace can be abbreviated.





Notes:

o/ drawing uses $\frac{3}{4}$ " (19.1mm) material. Quality multi-ply recommended
 1/ stuff with $\frac{1}{2}$ to $\frac{3}{4}$ pound per ft³ (1.15 to 1.8 pounds = 0.52 - 0.8 kg) of polyfill
 2/cleats on back to allow for removable back, useful for adjusting the stuffing
 3/ bracing is optional. For bracing ideas please see the bracing sheet in the superPensil12 plans



Alpair 12 Pensil 12

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 13-july-2010
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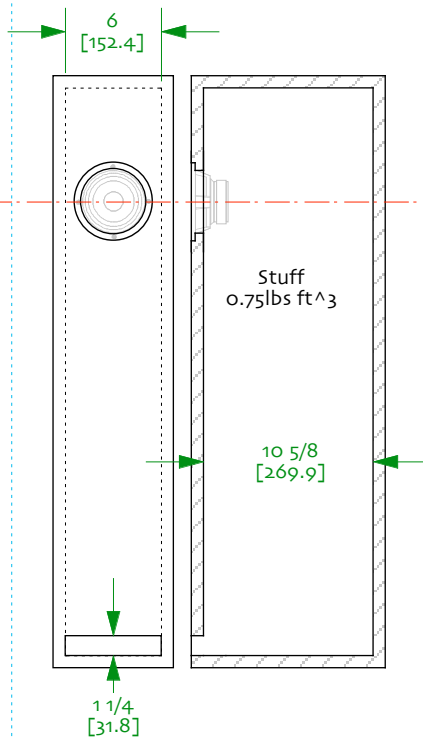


Pensil Series

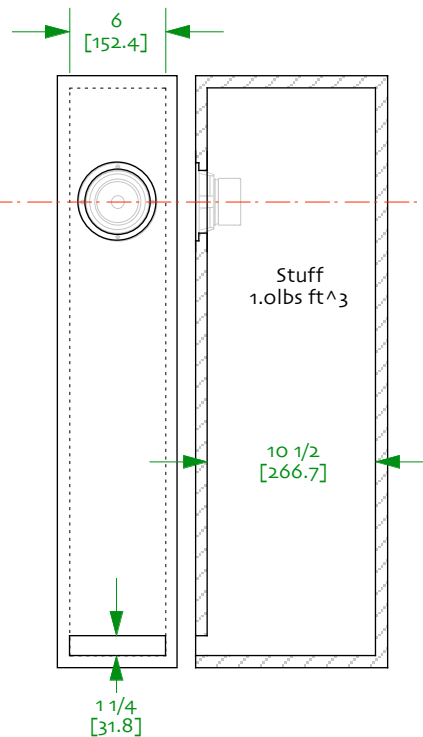
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designed by Scott Lindgren
drawn by dld / 17-june-2011
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Notes:
0/ drawing uses 3/4" (19.1mm) material. Quality multi-ply recommended
1/ common internal dimensions all 35.5in height, 7.125in Zd.
Stuff from the top to the top of the vent with polyfill at density specified
2/ cleats on back to allow for removable back, useful for adjusting the stuffing
3/ for bracing and other details check the Pensil12 drawing

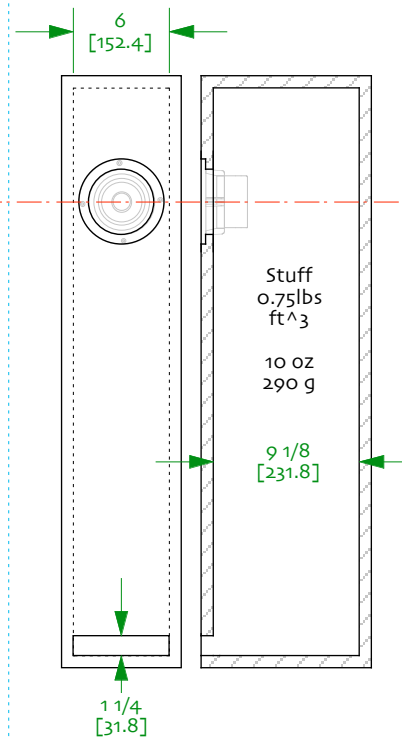
Pensil R70.3 CHR70.3



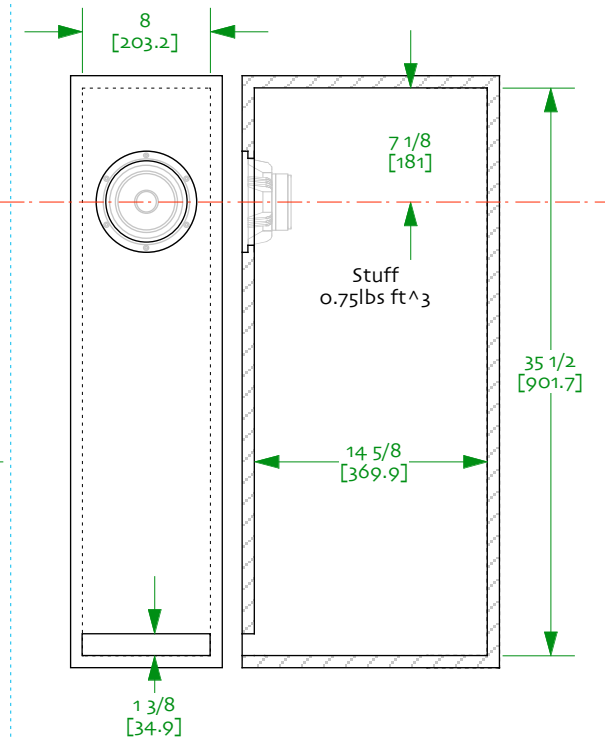
Pensil P70.3 CHP70.2



Pensil 7.3 Alpair 7.3 | CHBW70



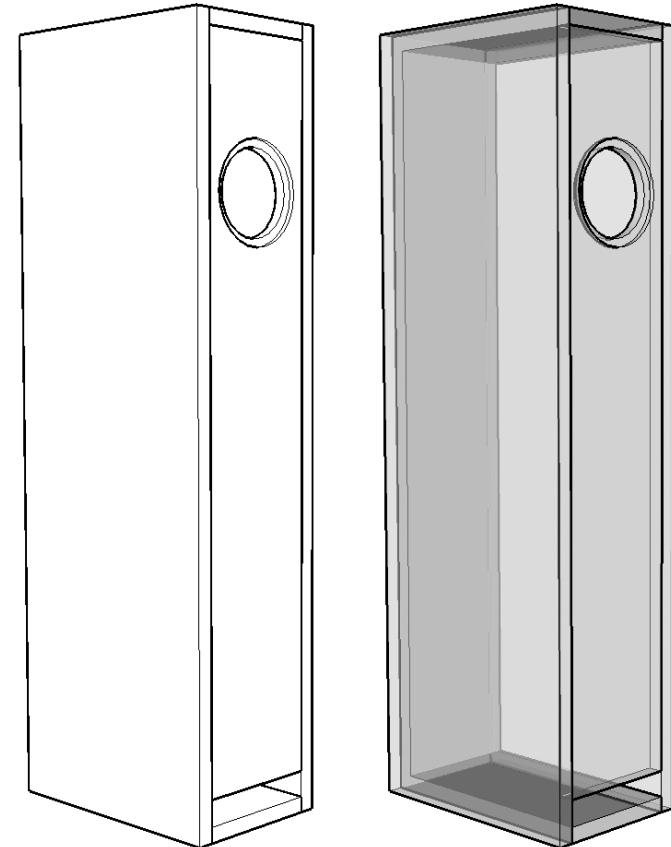
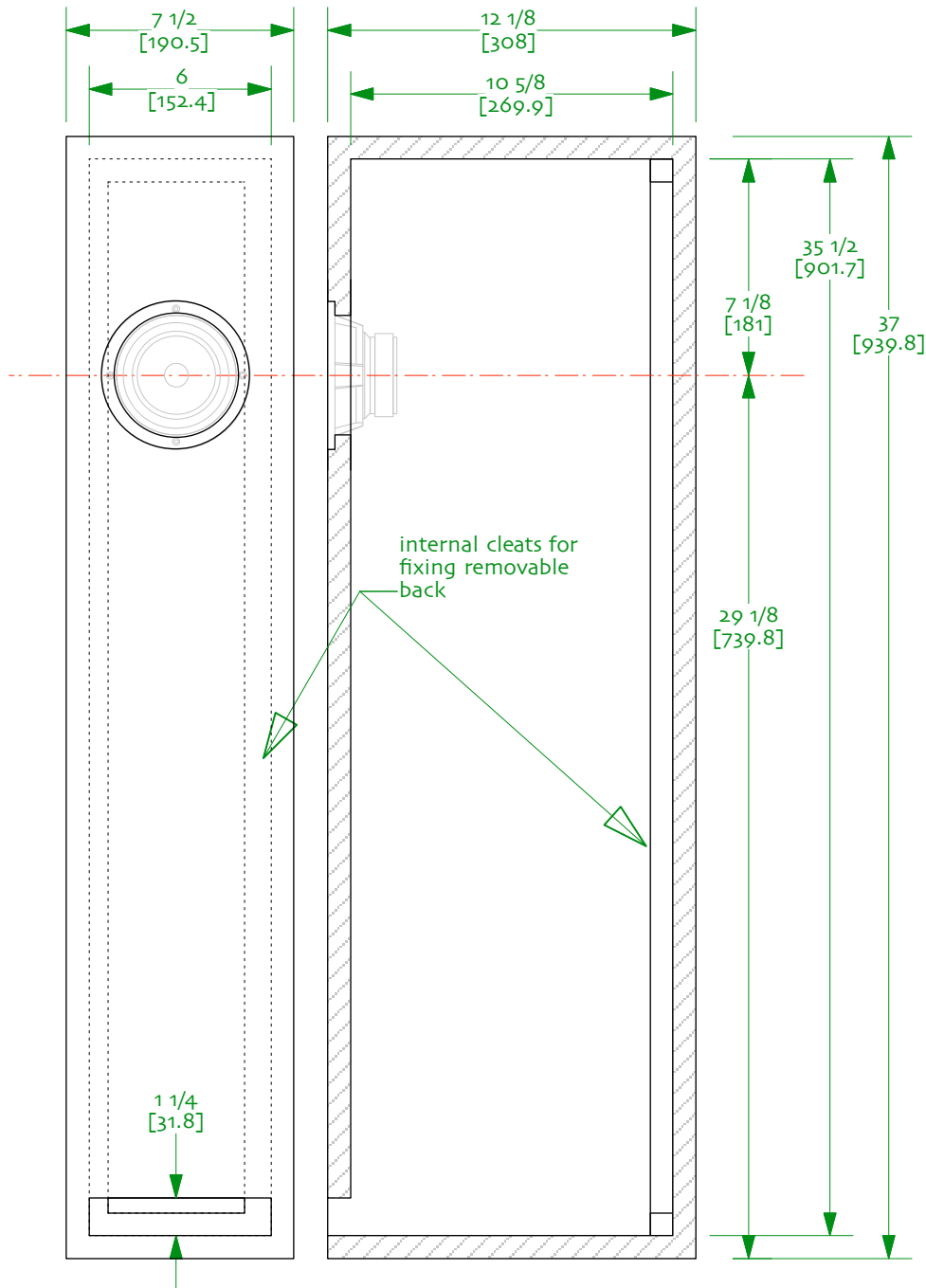
Pensil 10.2 Alpair 10.2





Pensil R70.3 | CHR-70.3

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20-june-2011
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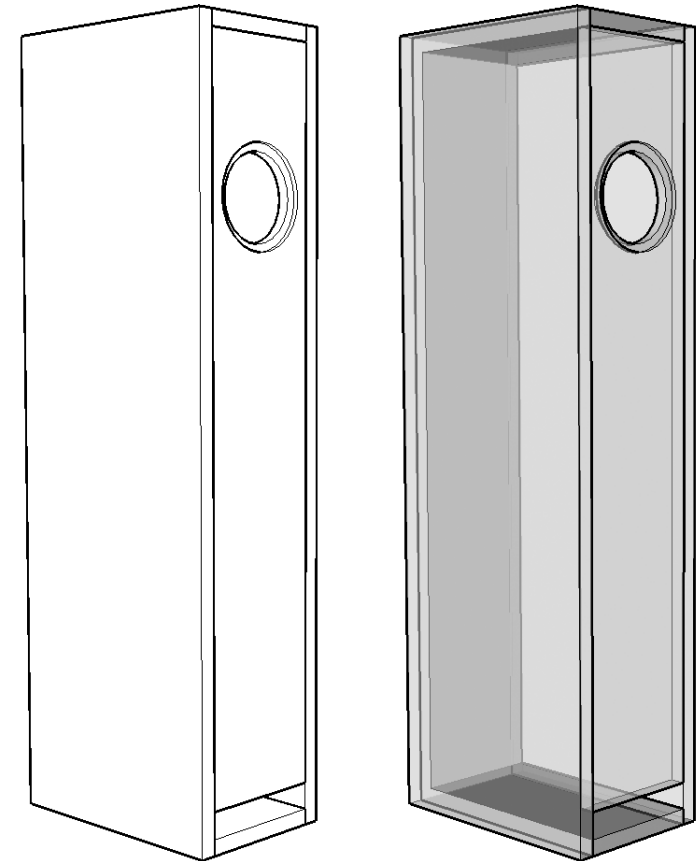
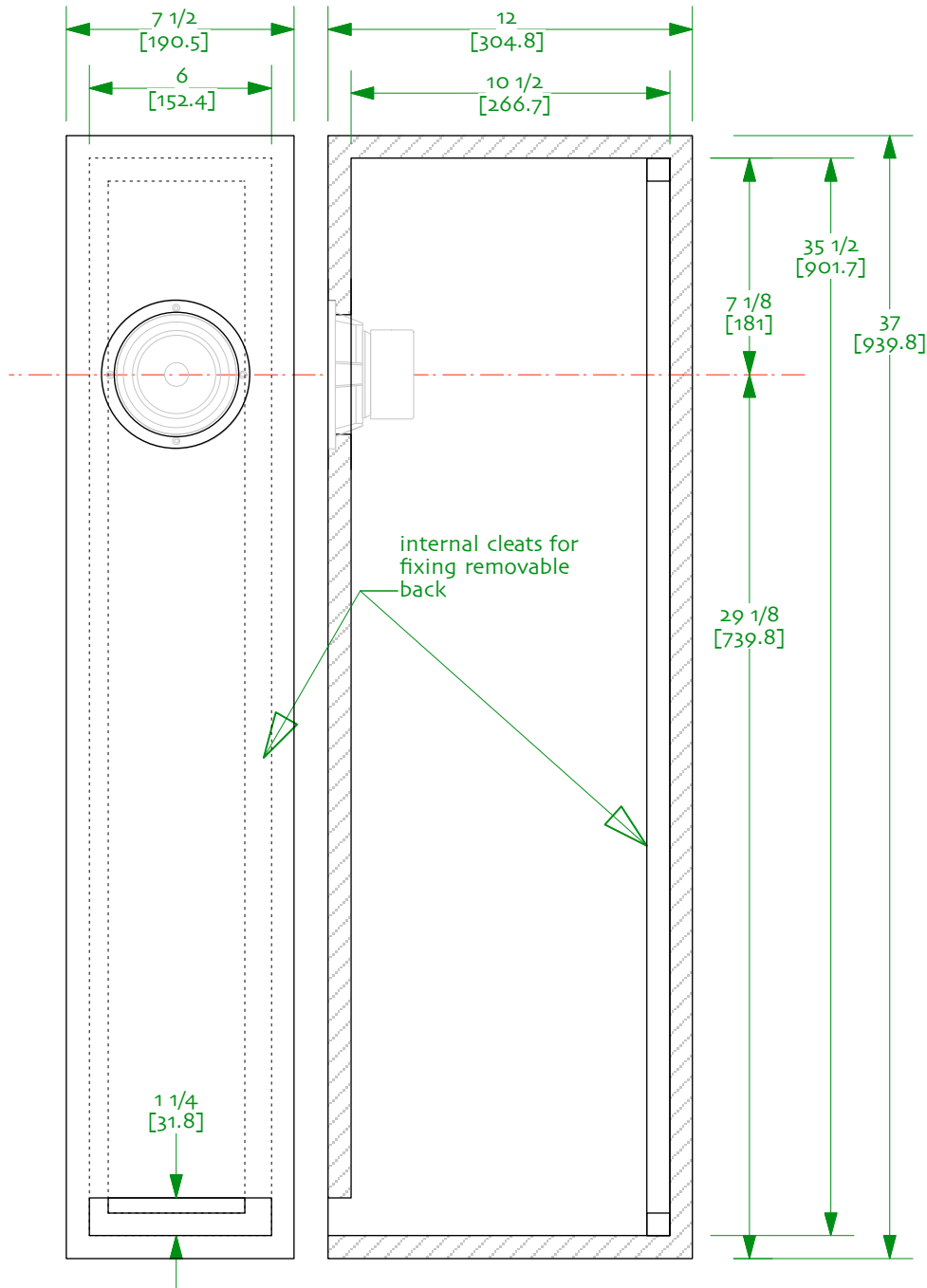
Notes:

- 0/ drawing uses $\frac{3}{4}$ " (19.1mm) material. 18-20mm OK. Quality multi-ply recommended
- 1/ stuff with 0.7 lbs / ft³ (14.7 ounces = 410 g) of polyfill
- 2/ cleats on back to allow for removable back, useful for adjusting the stuffing
- 3/ bracing is optional. For bracing ideas please see the bracing sheet in the superPensil12 plans



Pensil P70.3 | CHP-70.2

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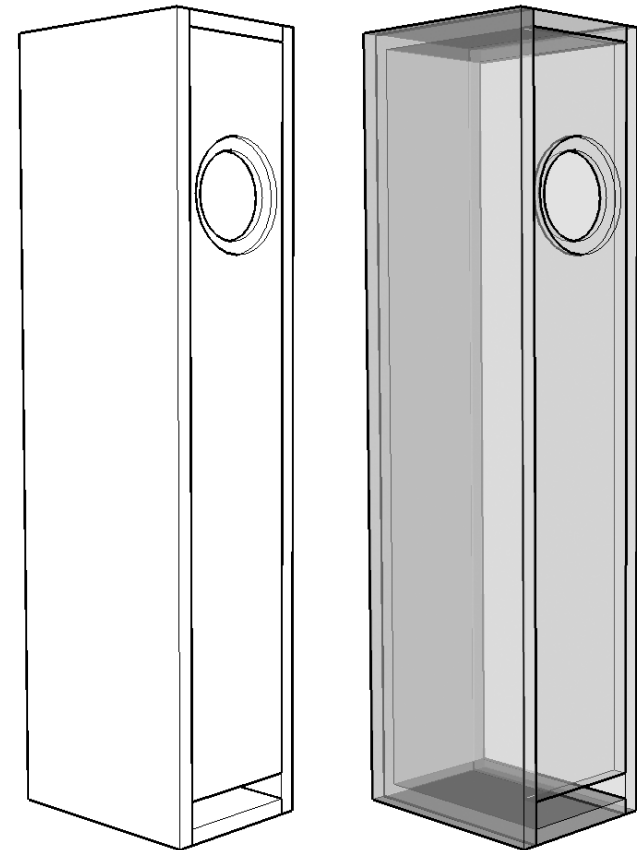
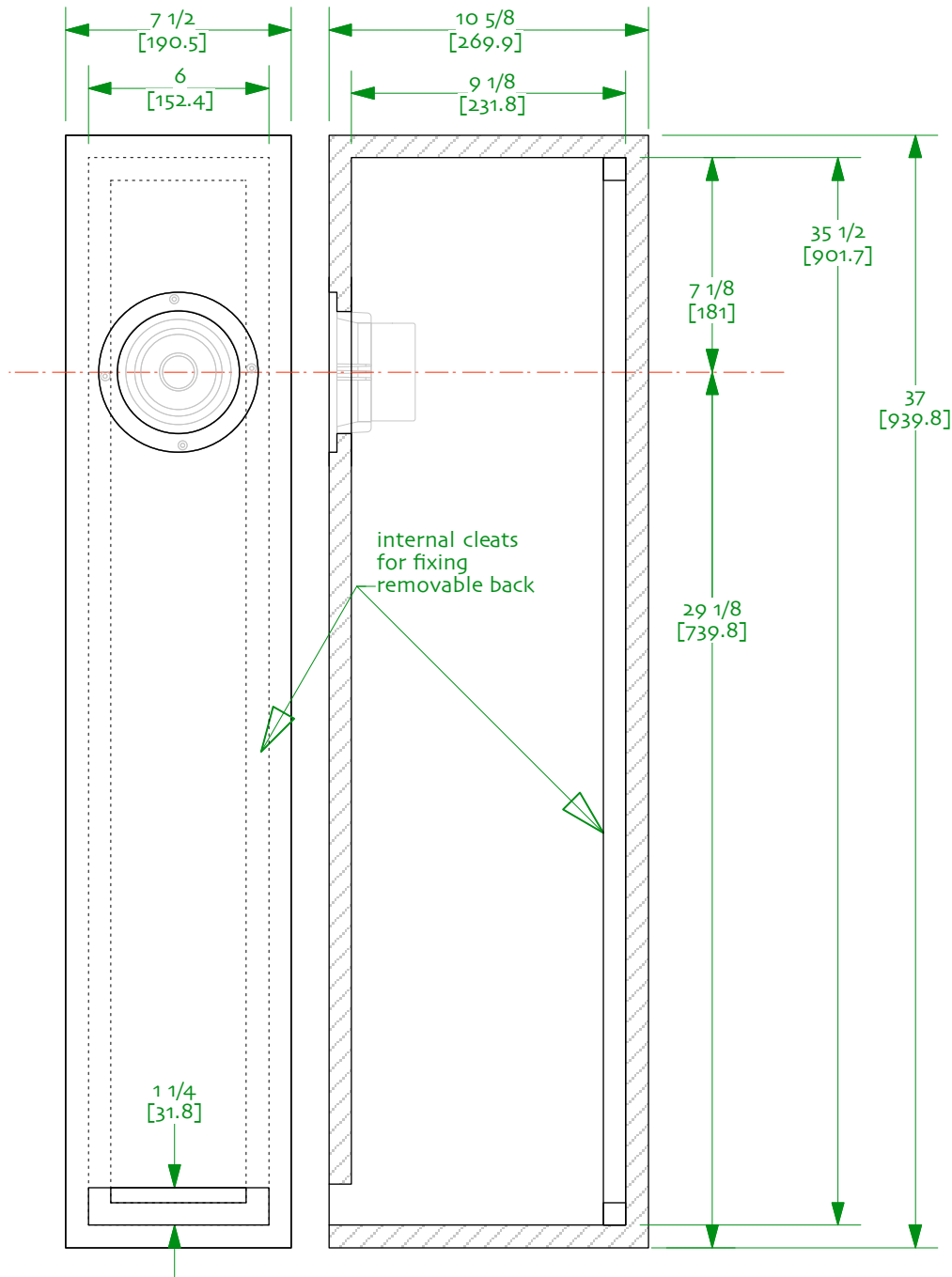
Notes:

- 0/ drawing uses $\frac{3}{4}$ " (19.1mm) material. 18-20mm OK. Quality multi-ply recommended
- 1/ stuff with 0.7 lbs / ft³ (14.5 ounces = 406 g) of polyfill
- 2/ cleats on back to allow for removable back, useful for adjusting the stuffing
- 3/ bracing is optional. For bracing ideas please see the bracing sheet in the superPensil12 plans



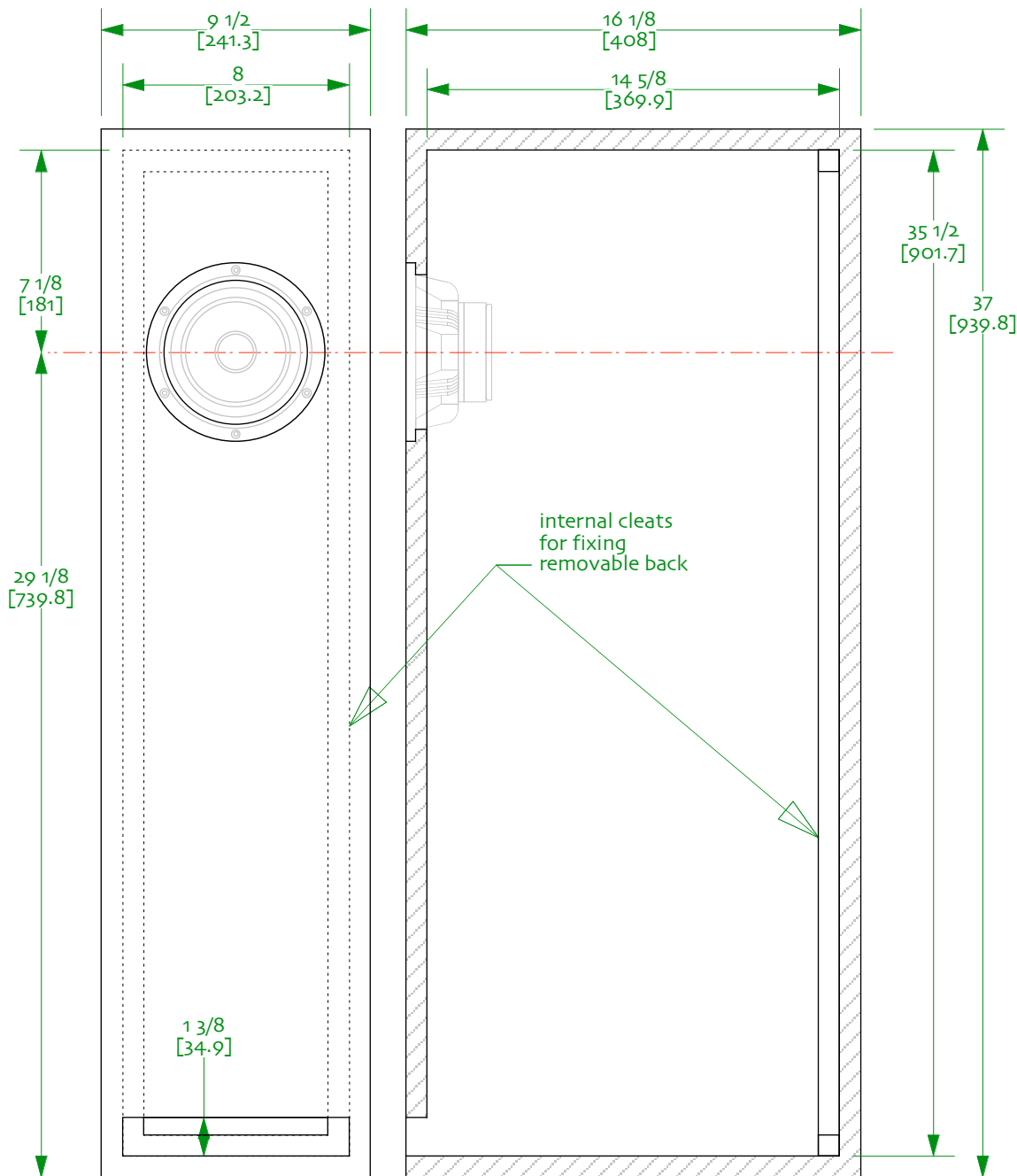
Pensil 7.3 | Alpair 7.3 / CHBW70

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Notes:

- 0/ drawing uses $\frac{3}{4}$ " (19.1mm) material. 18-20mm OK. Quality multi-ply recommended
- 1/ stuff with 0.7 lbs / ft³ (13 ounces = 355 g) of polyfill
- 2/cleats on back to allow for removable back, useful for adjusting the stuffing
- 3/ bracing is optional. For bracing ideas please see the bracing sheet in the superPensil12 plans



Alpair 10 Pensil 10.2

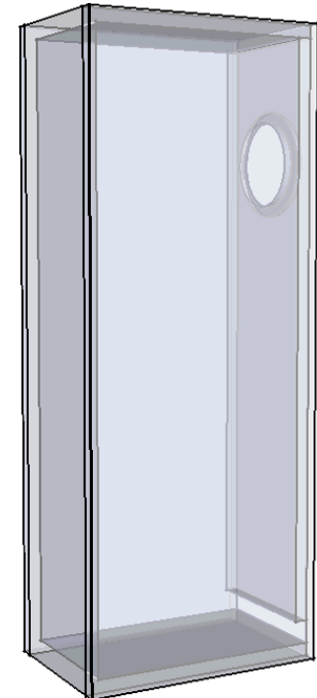
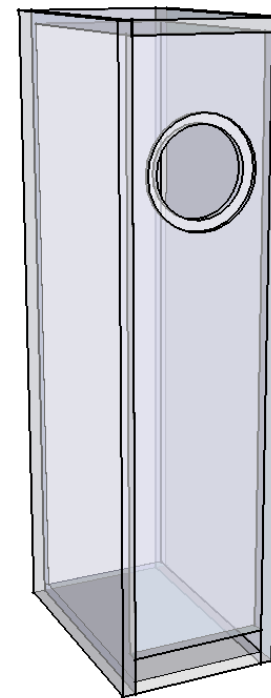
for Alpair 10 Generation 2

designed by S Lindgren drawn by dld

21-october-2010

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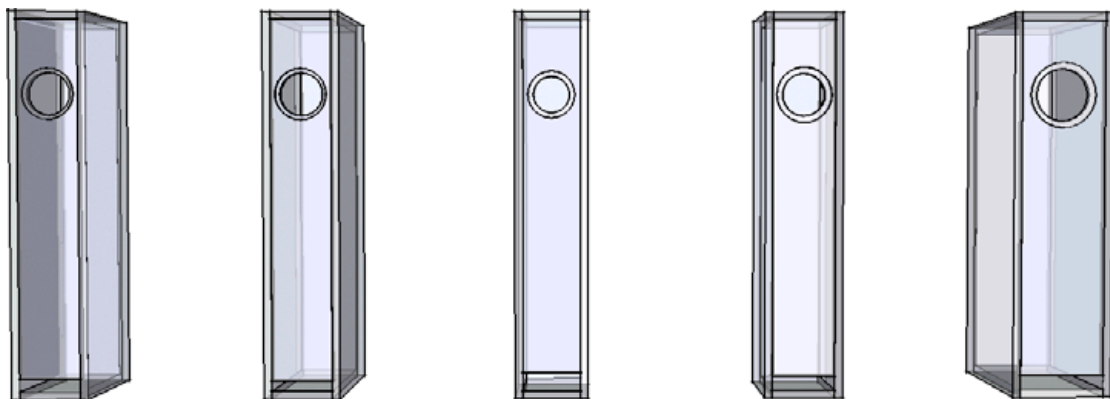
Notes:

0/ drawing uses $\frac{3}{4}$ " (19.1mm) material. 18-20mm OK. Quality multi-ply recommended

1/ stuff with 0.75 lbs / ft³ (1.59 pounds = 0.72 kg) of polyfill

2/cleats on back to allow for removable back, useful for adjusting the stuffing

3/ bracing is optional. For bracing ideas please see the bracing sheet in the superPensil12 plans

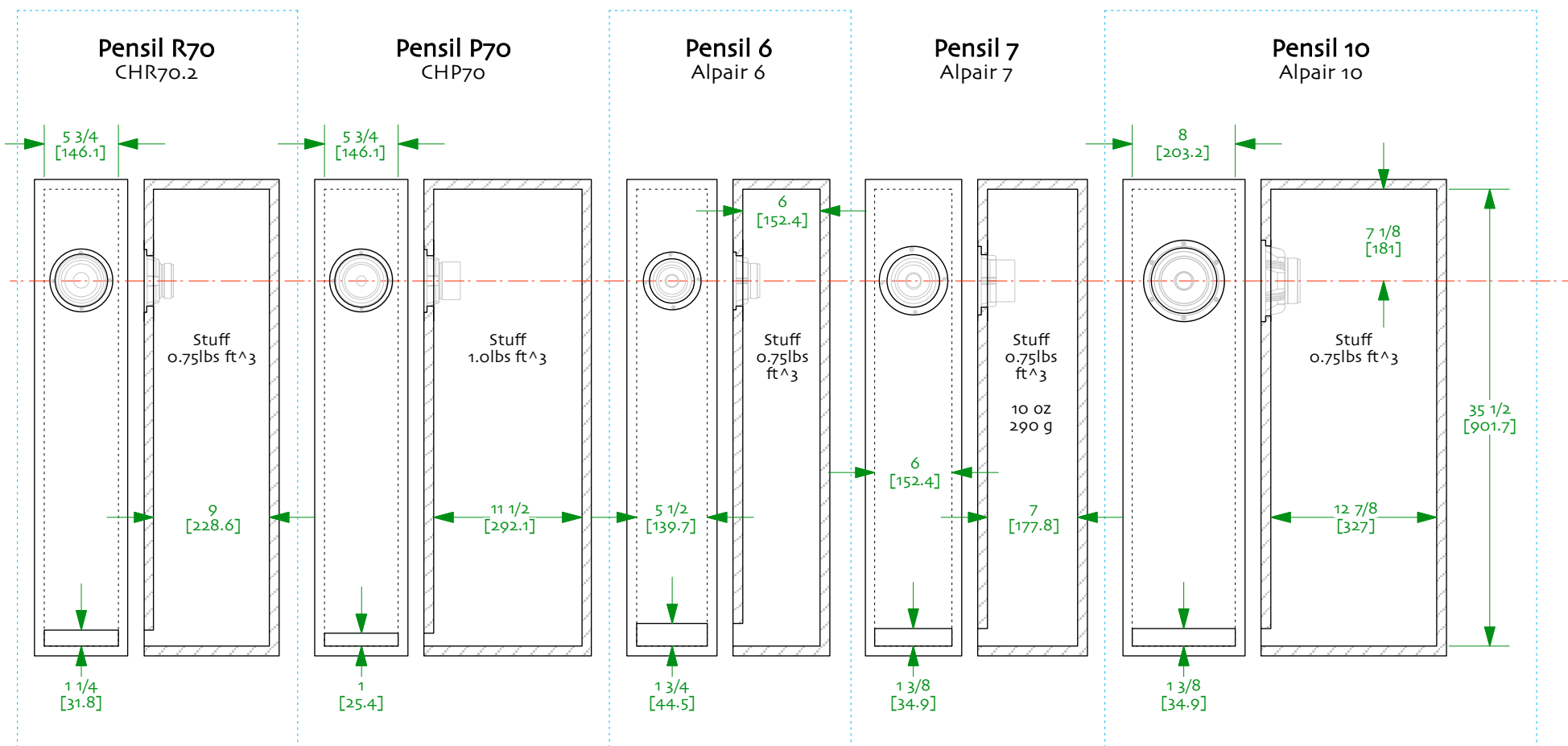


Pensil Series

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Notes:

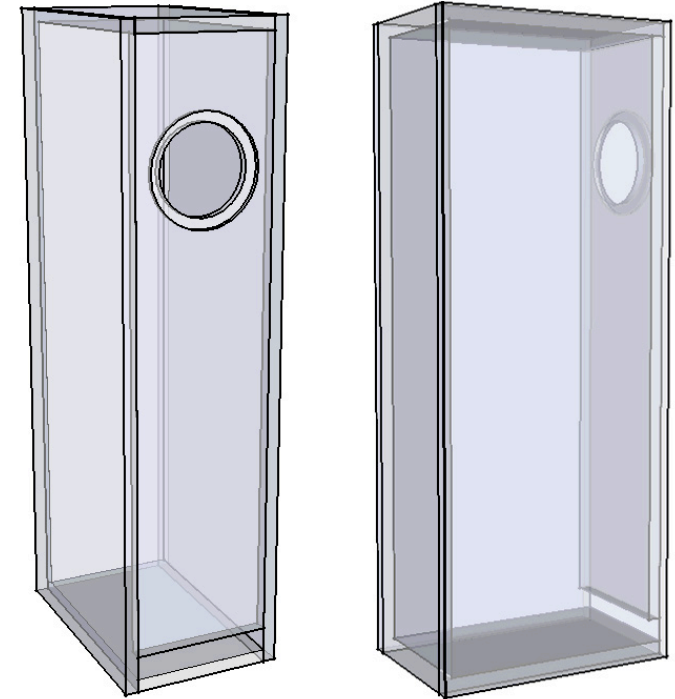
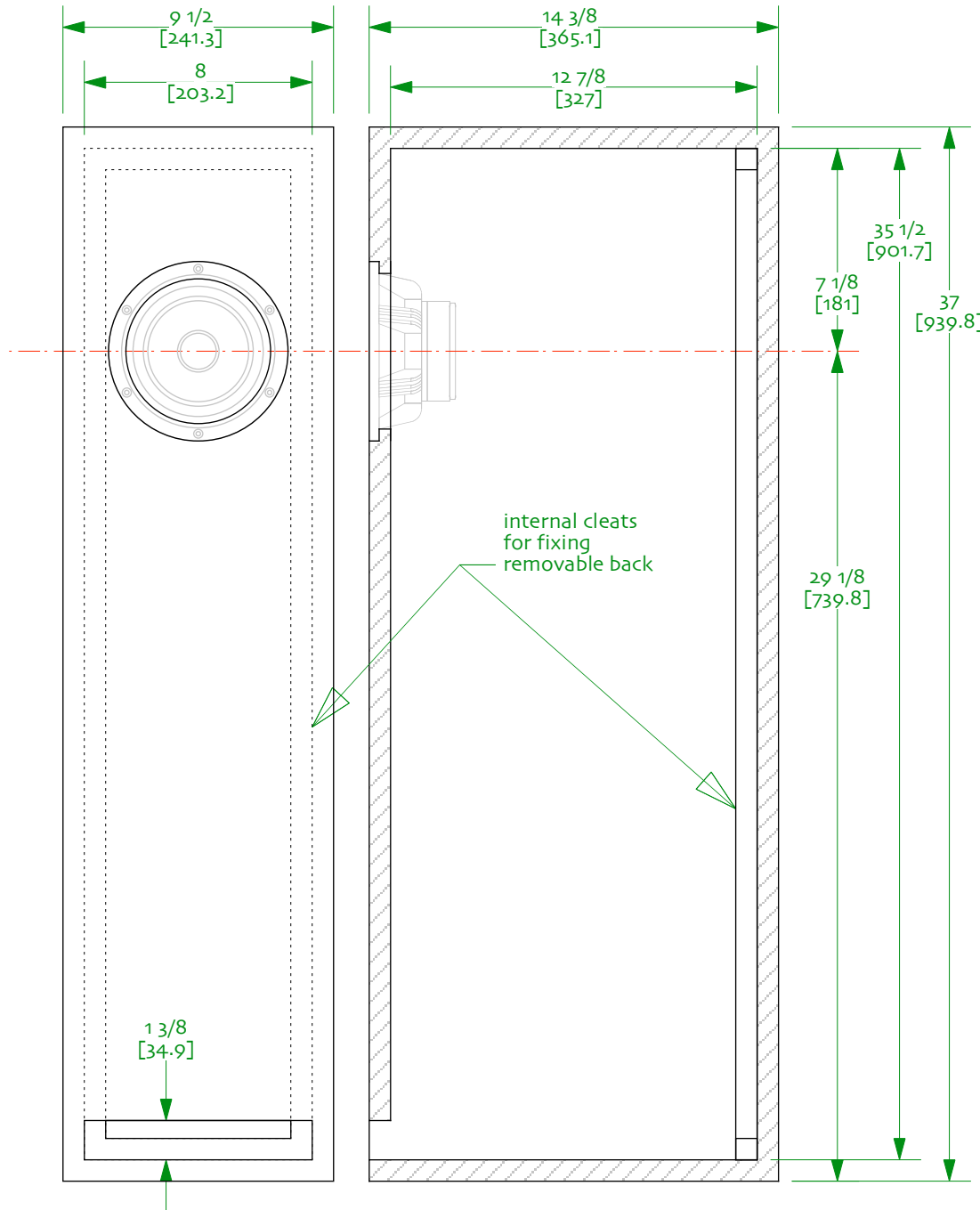
- 0/ drawing uses 3/4" (19.1mm) material. Quality multi-ply recommended
- 1/ common internal dimensions all 35.5in height, 7.125in Zd.
- Stuff from the top to the top of the vent with polyfill at density specified
- 2/cleats on back to allow for removable back, useful for adjusting the stuffing
- 3/ for bracing and other details check the Pensil12 drawing





Alpair 10 Pensil 10

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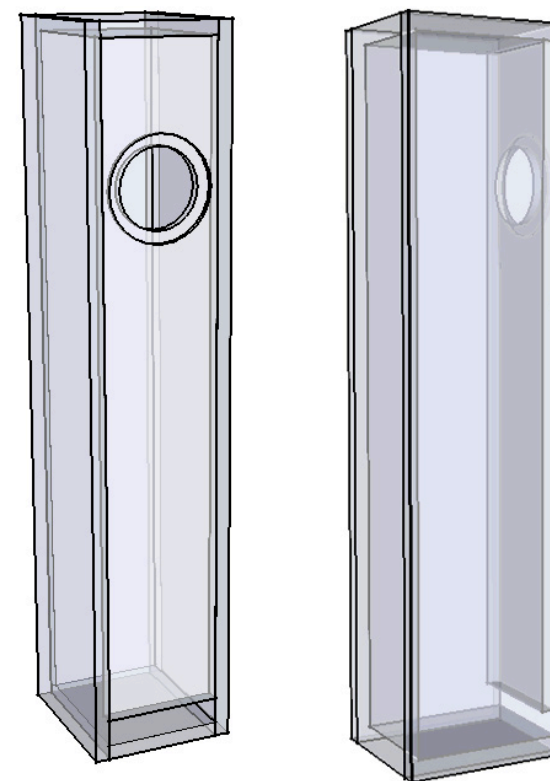
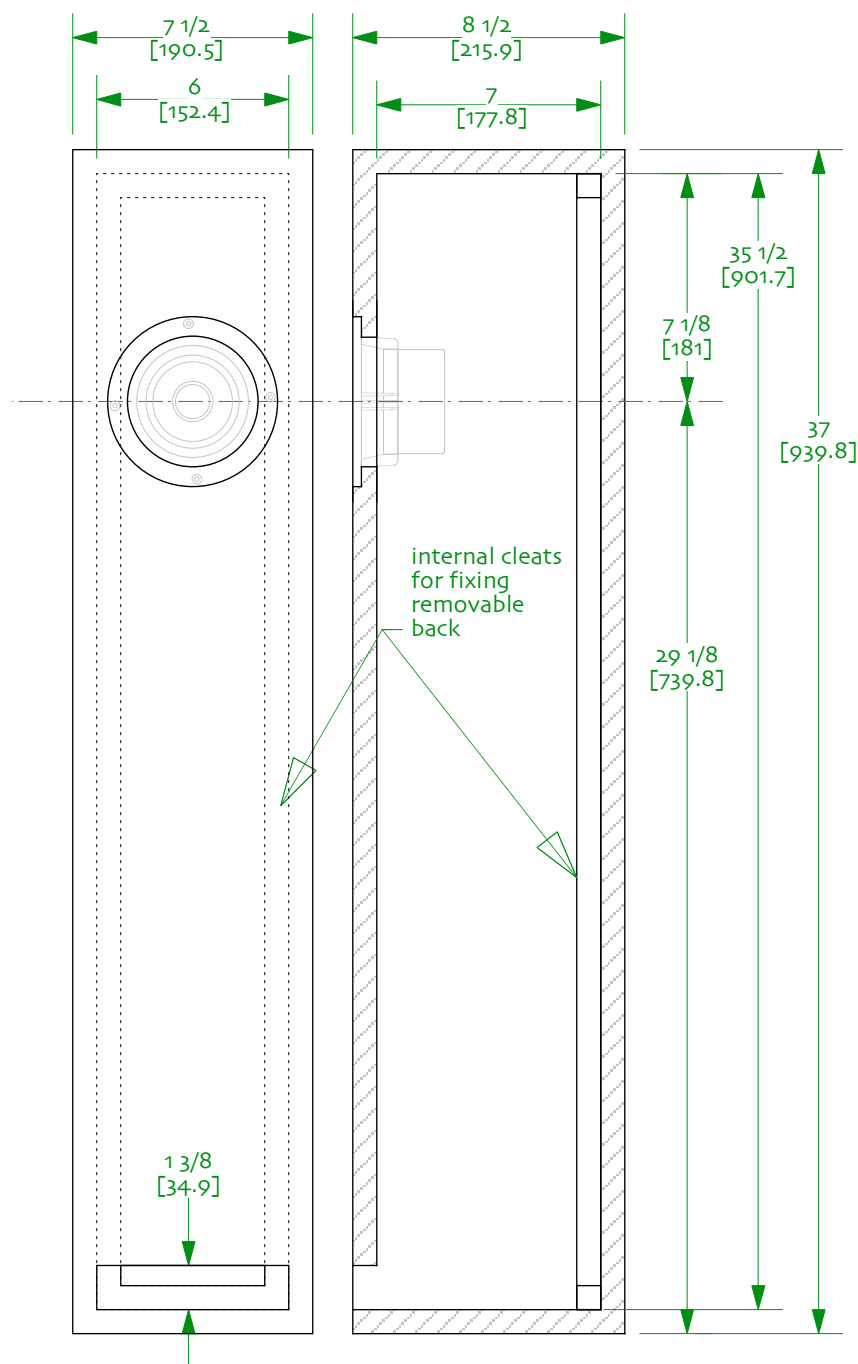
Notes:

- 0/ drawing uses $\frac{3}{4}$ " (19.1mm) material. 18-20mm OK. Quality multi-ply recommended
- 1/ stuff with 0.75 lbs / ft³ (1.59 pounds = 0.72 kg) of polyfill
- 2/cleats on back to allow for removable back, useful for adjusting the stuffing
- 3/ bracing is optional. For bracing ideas please see the bracing sheet in the superPensil12 plans



Alpair 7 Pensil 7

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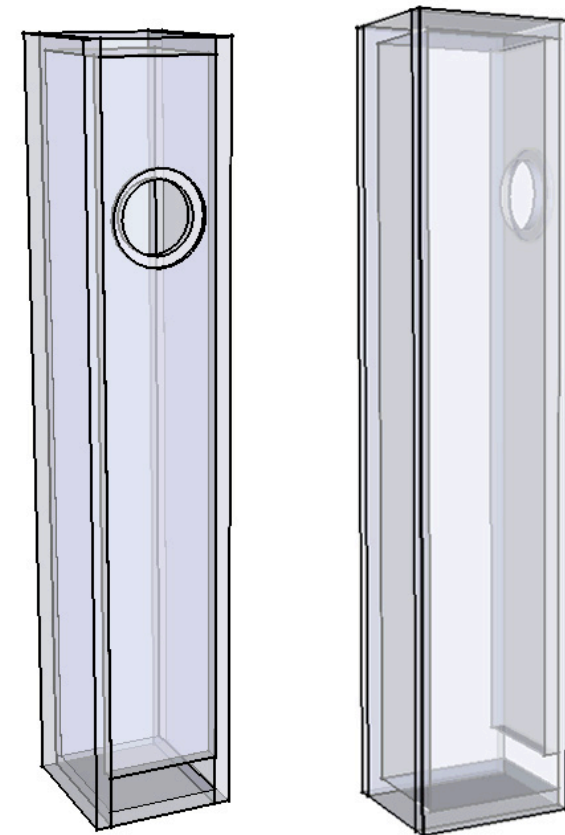
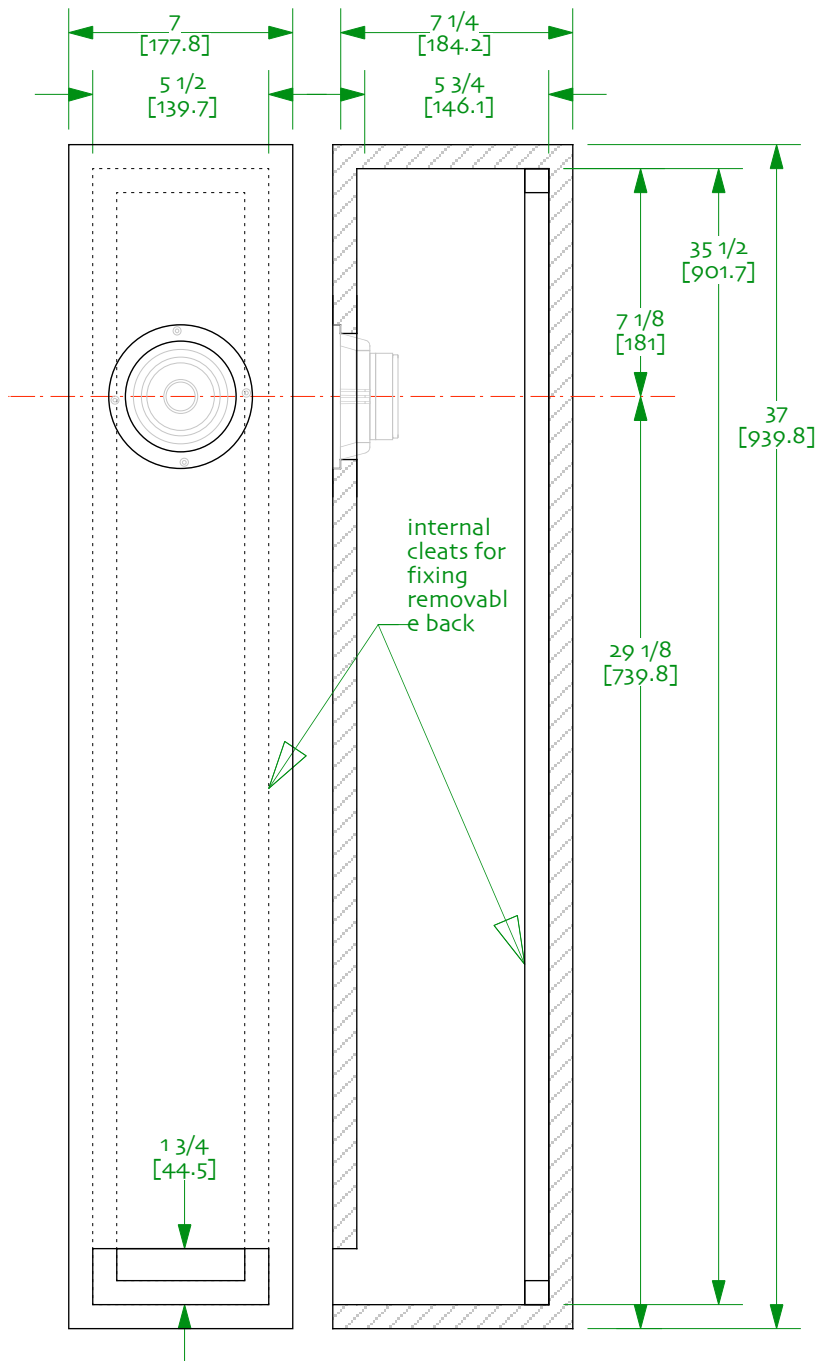
Notes:

- 0/ drawing uses $\frac{3}{4}$ " (19.1mm) material. 18-20mm OK. Quality multi-ply recommended
- 1/ stuff with 0.75 lbs / ft³ (0.65 pounds = 0.29 kg) of polyfill
- 2/cleats on back to allow for removable back, useful for adjusting the stuffing
- 3/ bracing is optional. For bracing ideas please see the bracing sheet in the superPensil12 plans



Alpair 6 Pensil 6

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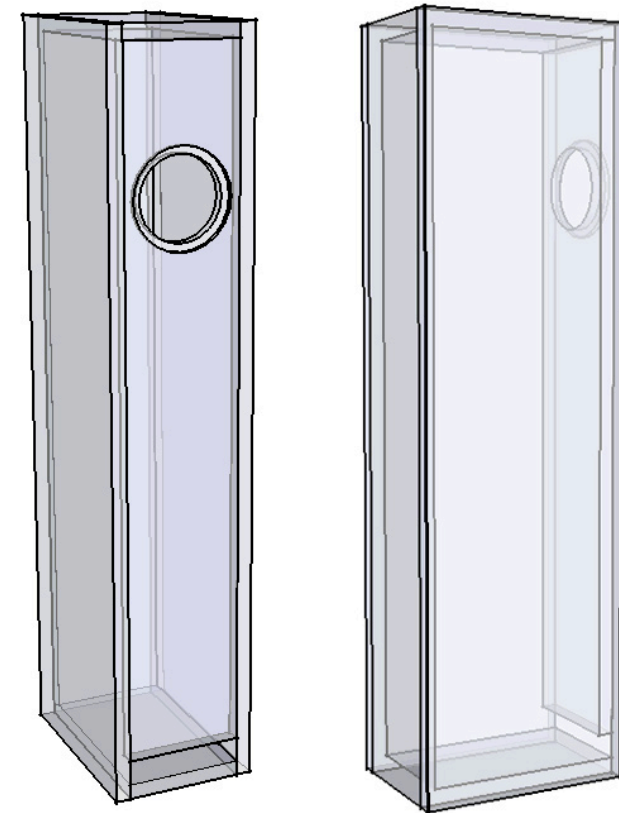
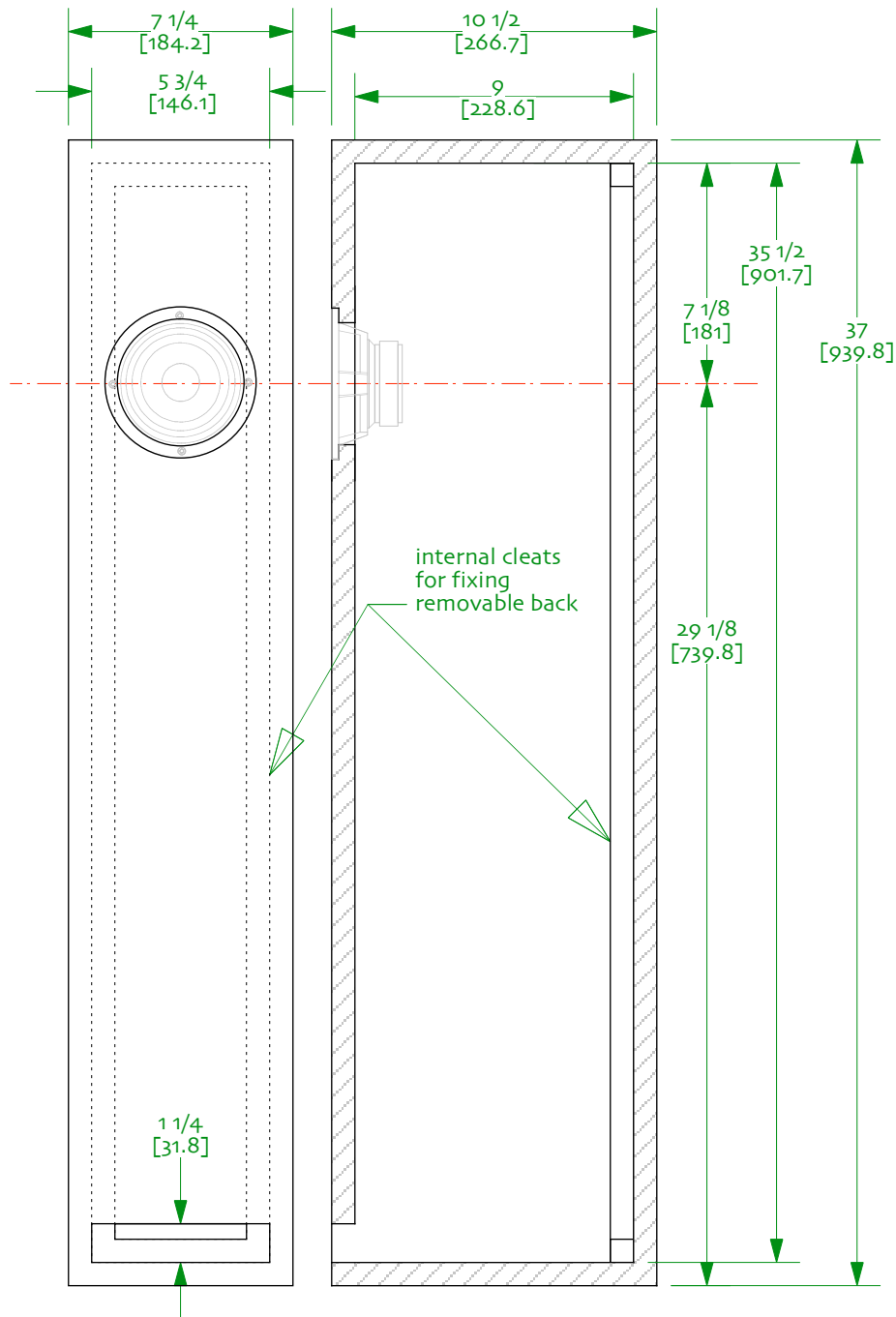
Notes:

- 0/ drawing uses 3/4" (19.1mm) material. 18-20mm OK. Quality multi-ply recommended
- 1/ stuff with 0.75 lbs / ft³ (0.49 pounds = 0.22 kg) of polyfill
- 2/cleats on back to allow for removable back, useful for adjusting the stuffing
- 3/ bracing is optional. For bracing ideas please see the bracing sheet in the superPensil12 plans



CHR-70 Pensil R70

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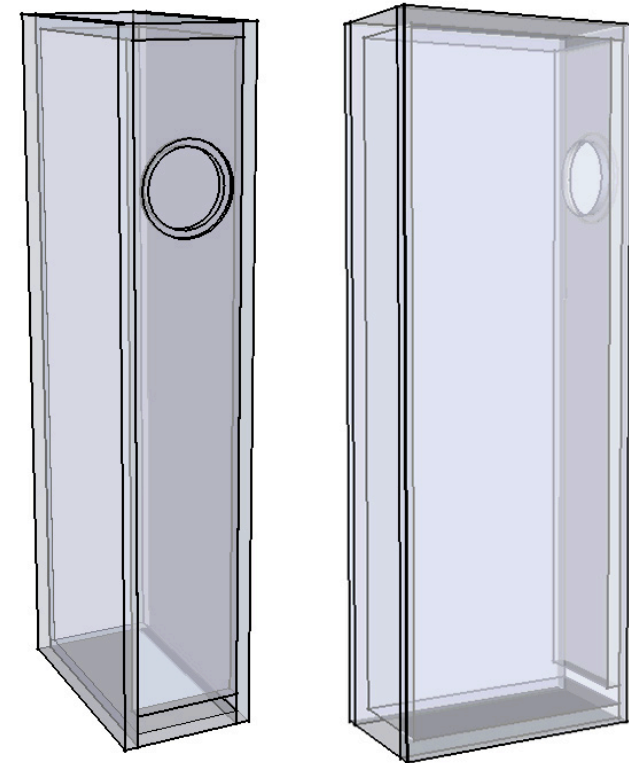
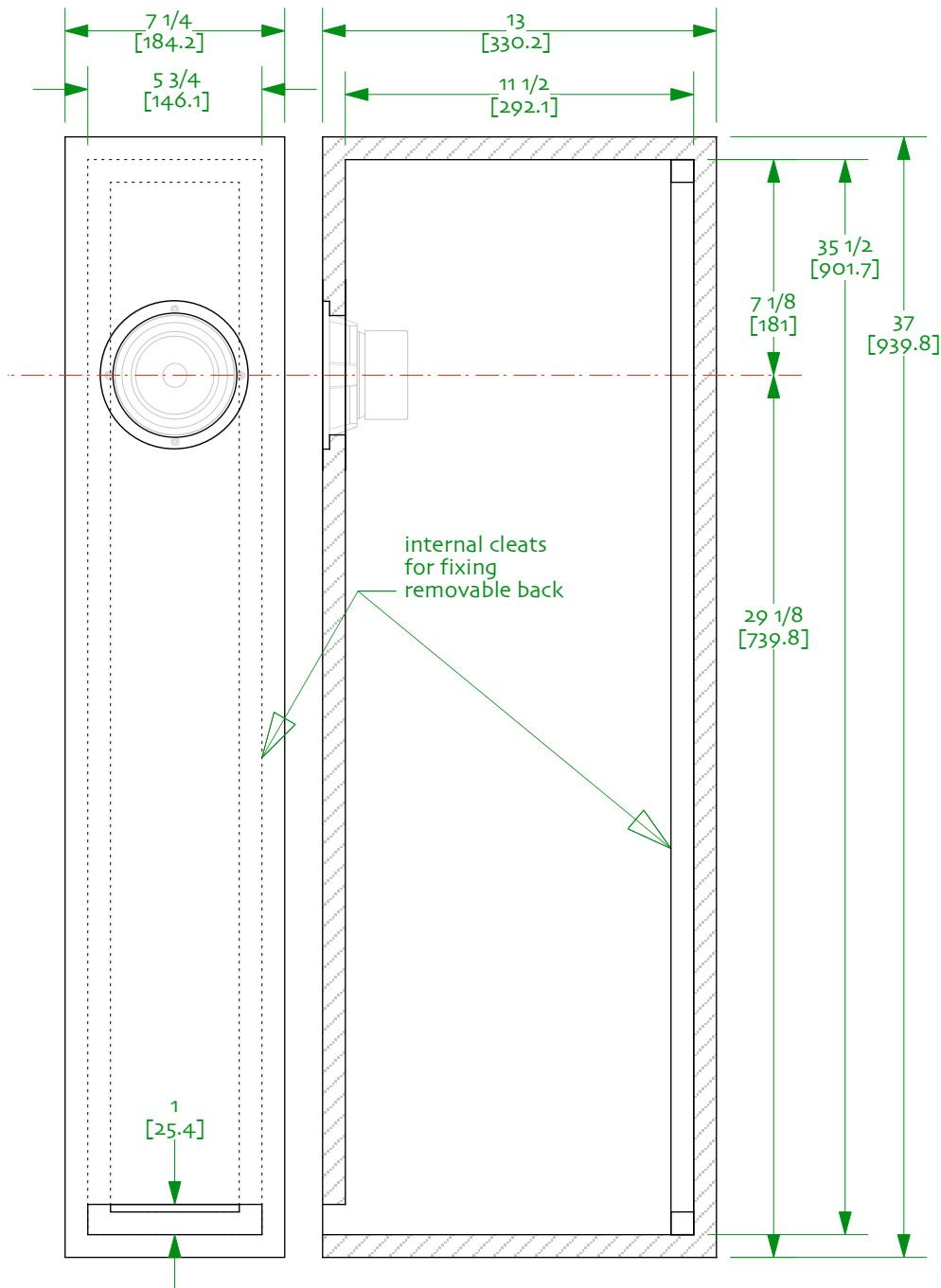
Notes:

- 0/ drawing uses $\frac{3}{4}$ " (19.1mm) material. 18-20mm OK. Quality multi-ply recommended
- 1/ stuff with 0.75 lbs / ft^3 (0.55 pounds = 0.25 kg) of polyfill
- 2/ cleats on back to allow for removable back, useful for adjusting the stuffing
- 3/ bracing is optional. For bracing ideas please see the bracing sheet in the superPensil12 plans



CHP-70 Pensil P70

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Notes:

- 0/ drawing uses $\frac{3}{4}$ " (19.1mm) material. 18-20mm OK. Quality multi-ply recommended
- 1/ stuff with 1.0 lbs / ft³ (1.36 pounds = 0.62 kg) of polyfill
- 2/cleats on back to allow for removable back, useful for adjusting the stuffing
- 3/ bracing is optional. For bracing ideas please see the bracing sheet in the superPensil12 plans