



# ECE 445 Project Presentation

Project 7

Thomas Satrom

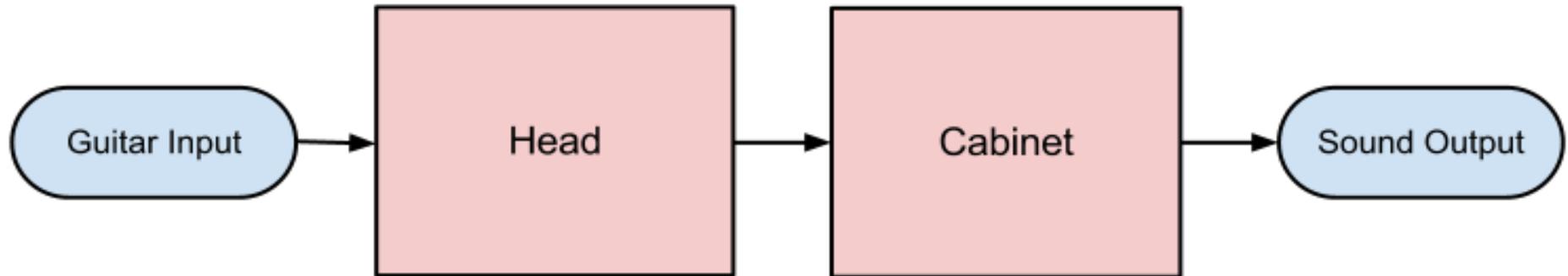
Jeremy Pessin



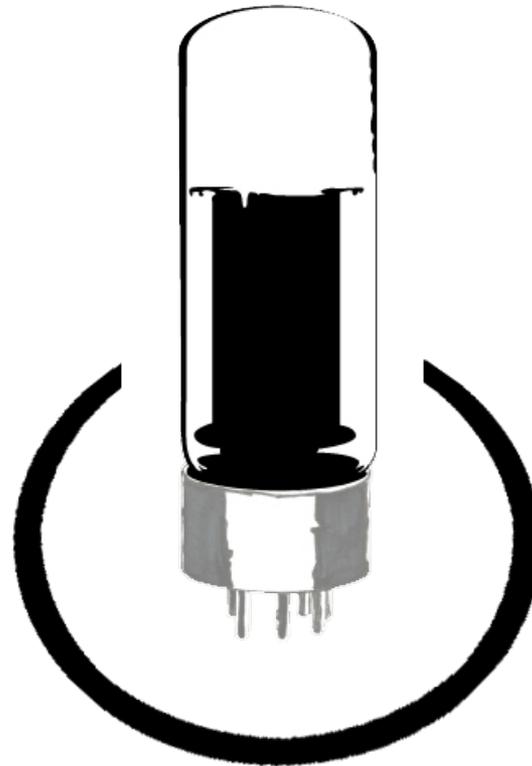
# Objective

- 50W guitar amplifier
  - Contains entire 1W tube amplifier
  - Switching power supply & power amplifier
- 2 x 10" loudspeaker cabinet
  - Inward-tilted speakers for wide horizontal dispersion
  - Lightweight materials

# Project Design



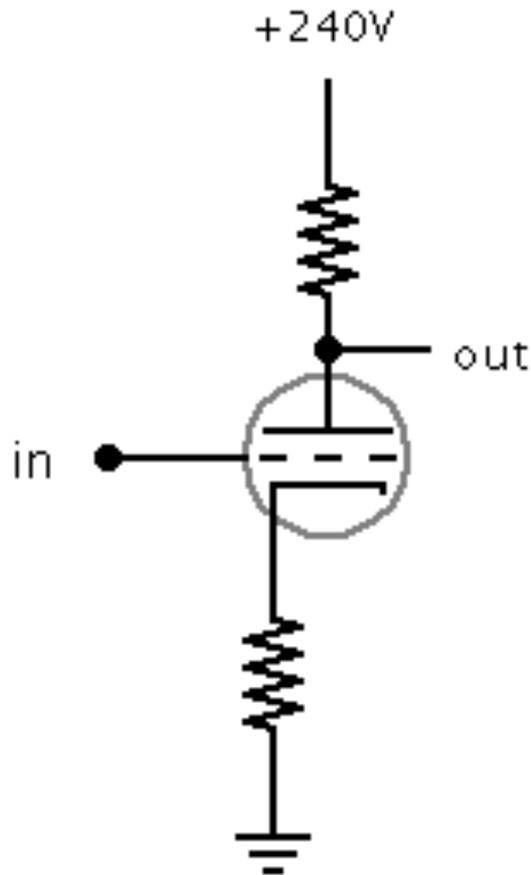
# Head Design



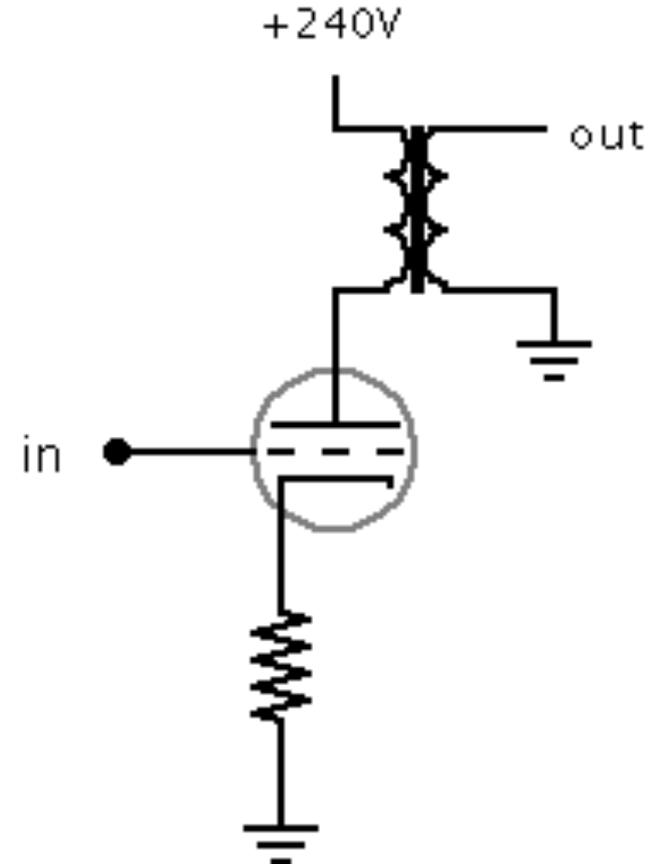
Cyclops  
Man

# Tube Amplifier Stages

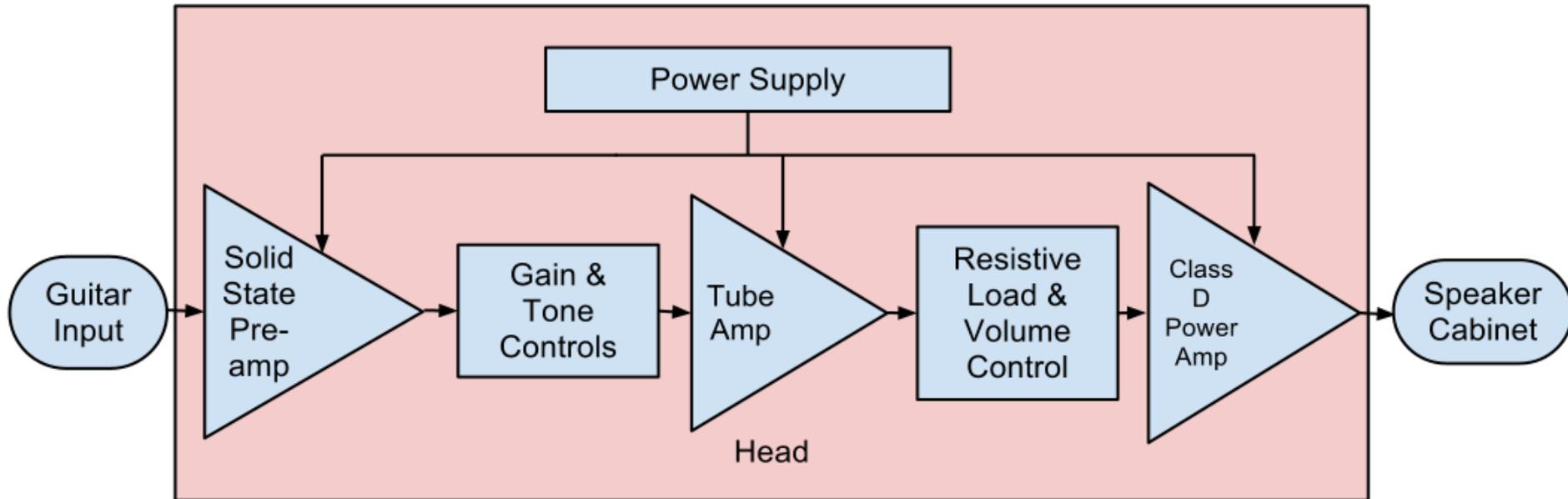
Tube Preamp Stage



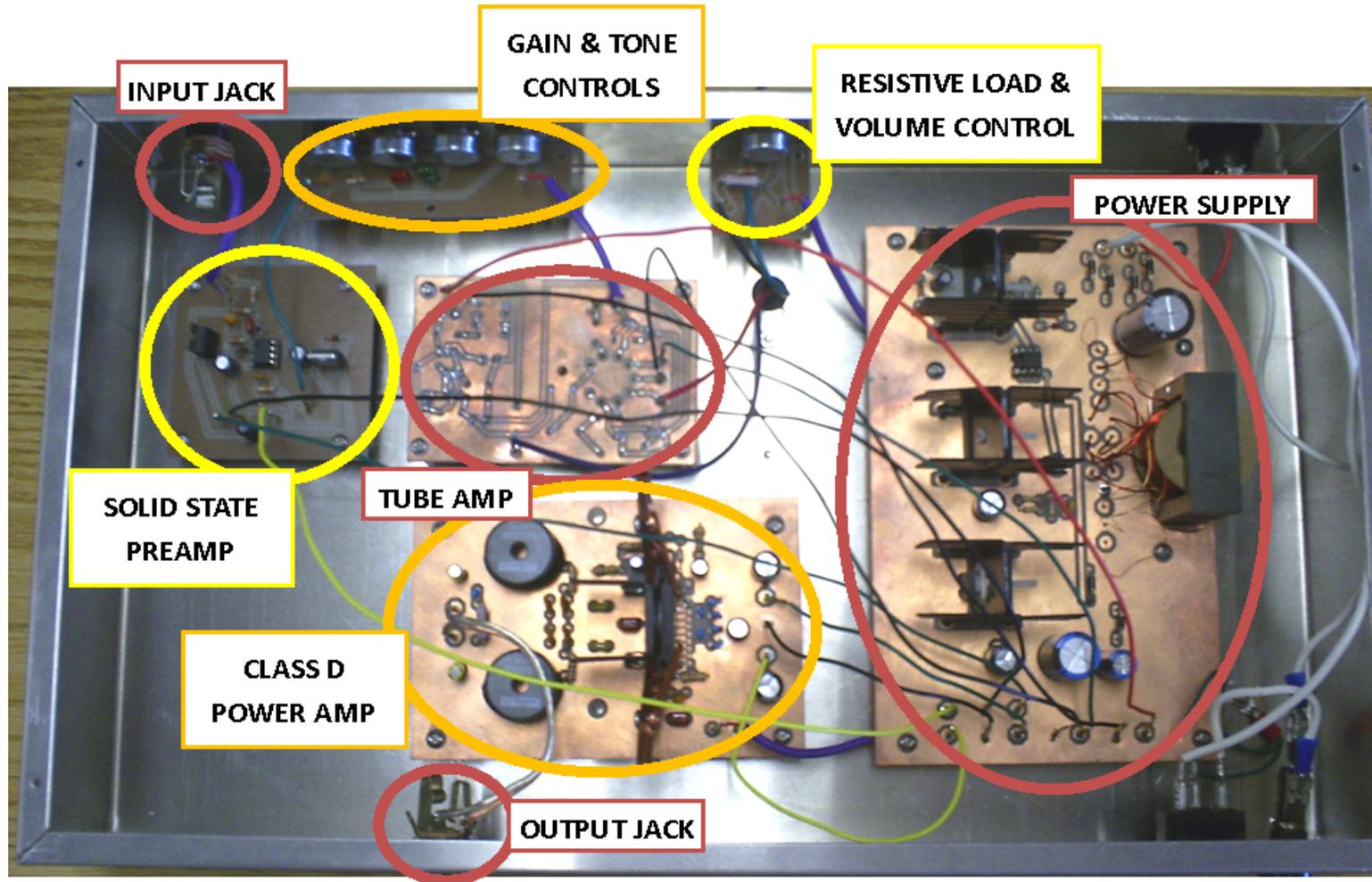
Tube Power Amp Stage



# Head Design



# Head Construction



# Head Results

## Power Supply Results

| Nominal Voltage | Acceptable Range | Actual Voltage | Acceptable Ripple (p-p) | Actual Ripple (p-p) |
|-----------------|------------------|----------------|-------------------------|---------------------|
| +250V           | (+245V, +290V)   | +272V          | <15V                    | 2.08V               |
| +18V            | (+13V, +30V)     | +18.3V         | <8V                     | 0.26V               |
| -18V            | (-30V, -13V)     | -20.8V         | <8V                     | 0.01V               |
| +12.6V          | (+11.3V, +13.9V) | +13.24V        | <6V                     | 1.63V               |

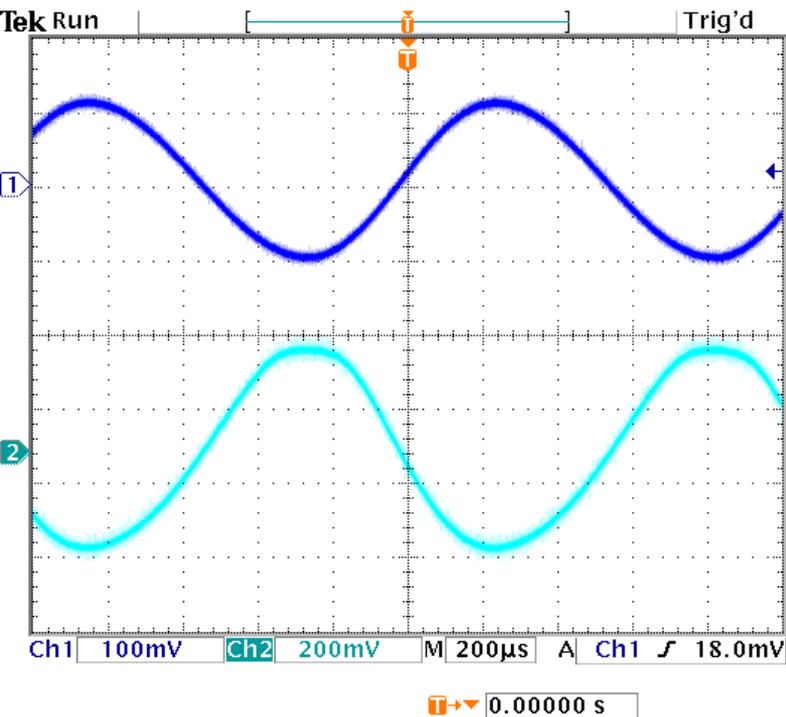
# Head Results

## Audio Path Results

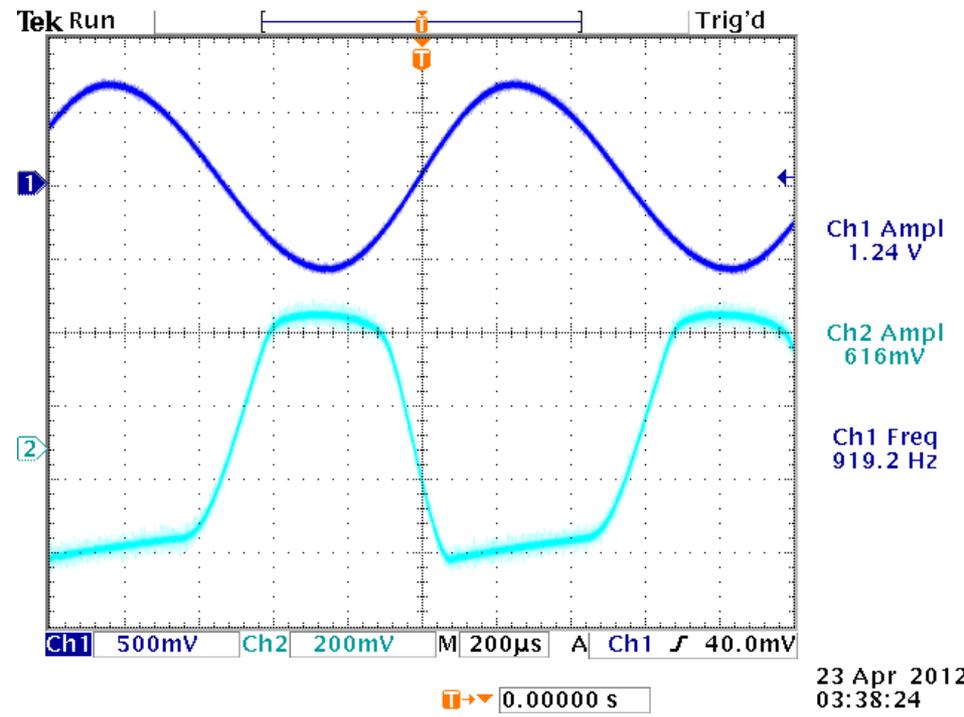
| Stage   | Expected Maximum Voltage Gain | Actual Maximum Voltage Gain |
|---|-------------------------------|-----------------------------|
| Solid State Preamp  | 34                            | 34.4                        |
| Gain & Tone Controls  | 0.1                           | 0.1                         |
| Tube Amp,<br>Transformer,<br>Resistive Load &<br>Volume Control | 10.7                          | <b>2.6</b>                  |

# Head Results

## Tube Amplifier Input and Output Traces

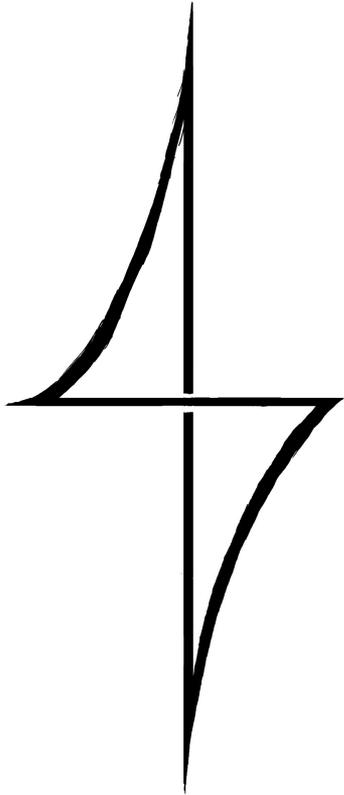


Onset of Distortion



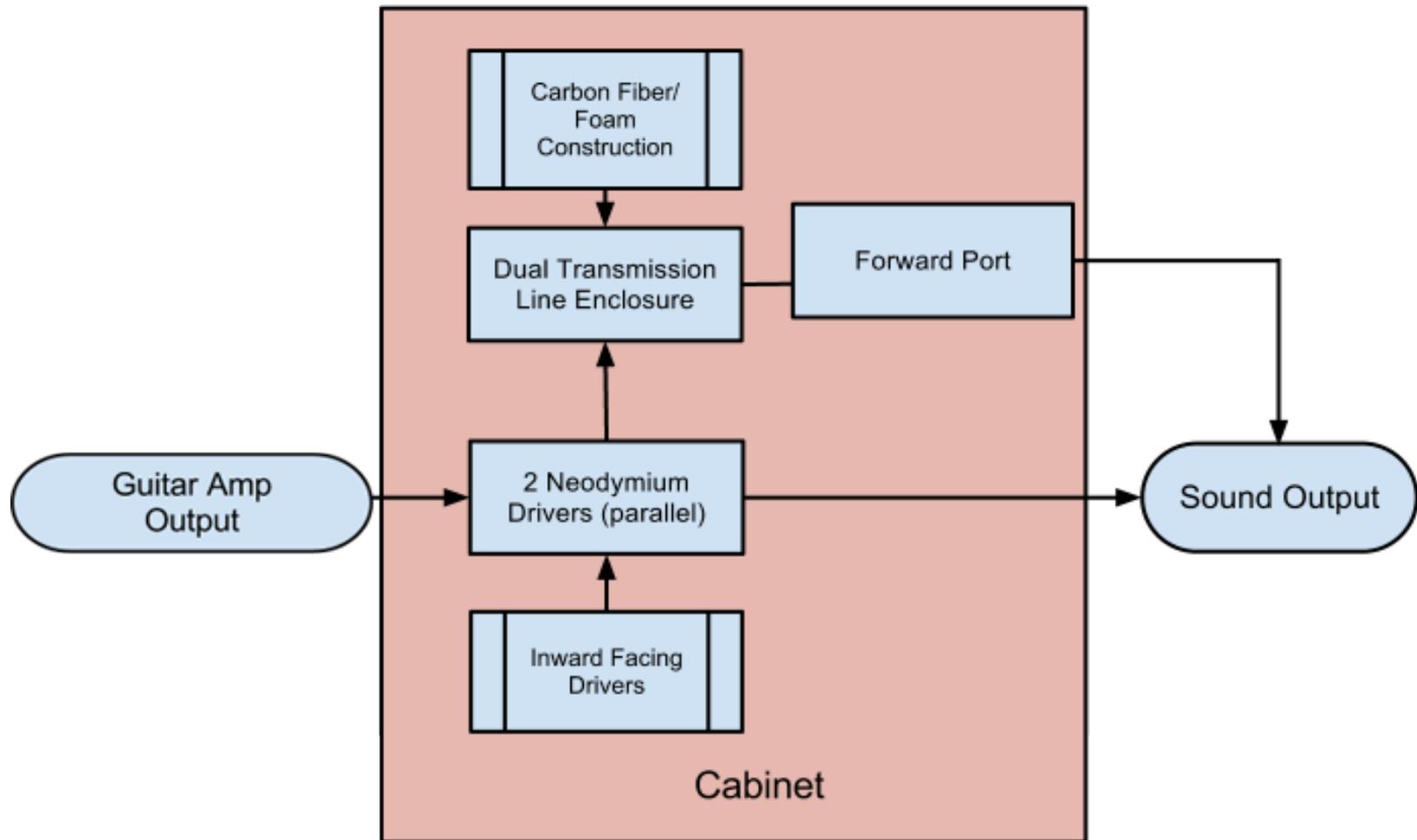
Significant Distortion

# Cabinet Design



Sætyr Music

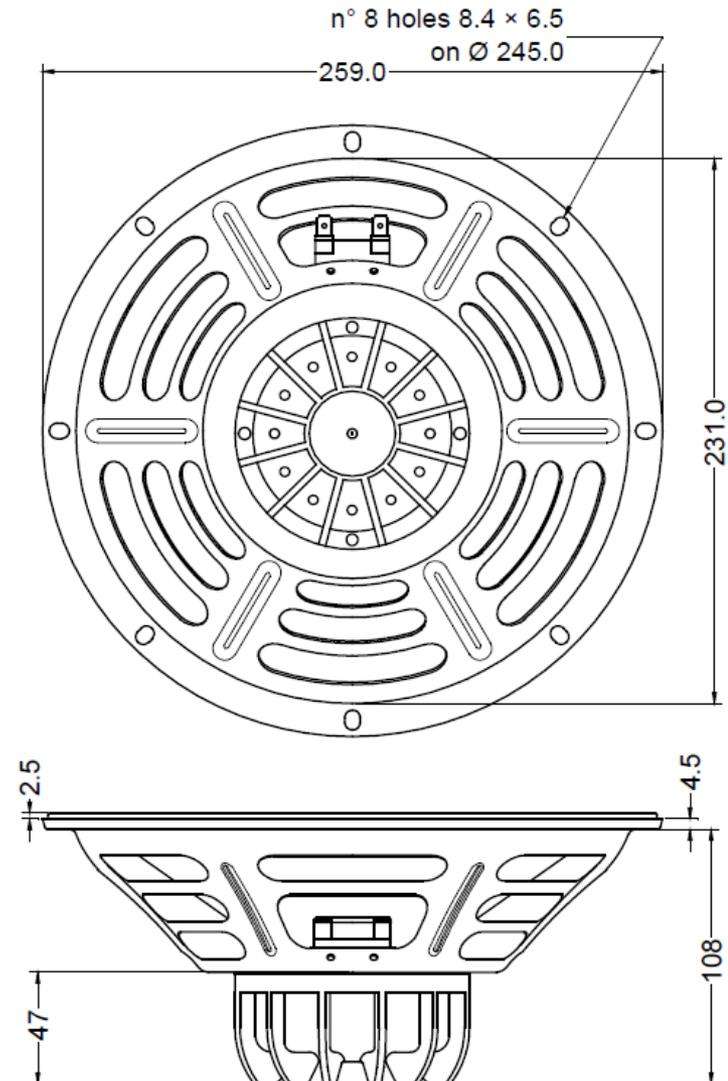




# Speaker Selection



Jensen Neo 10 -100



# Cabinet Materials

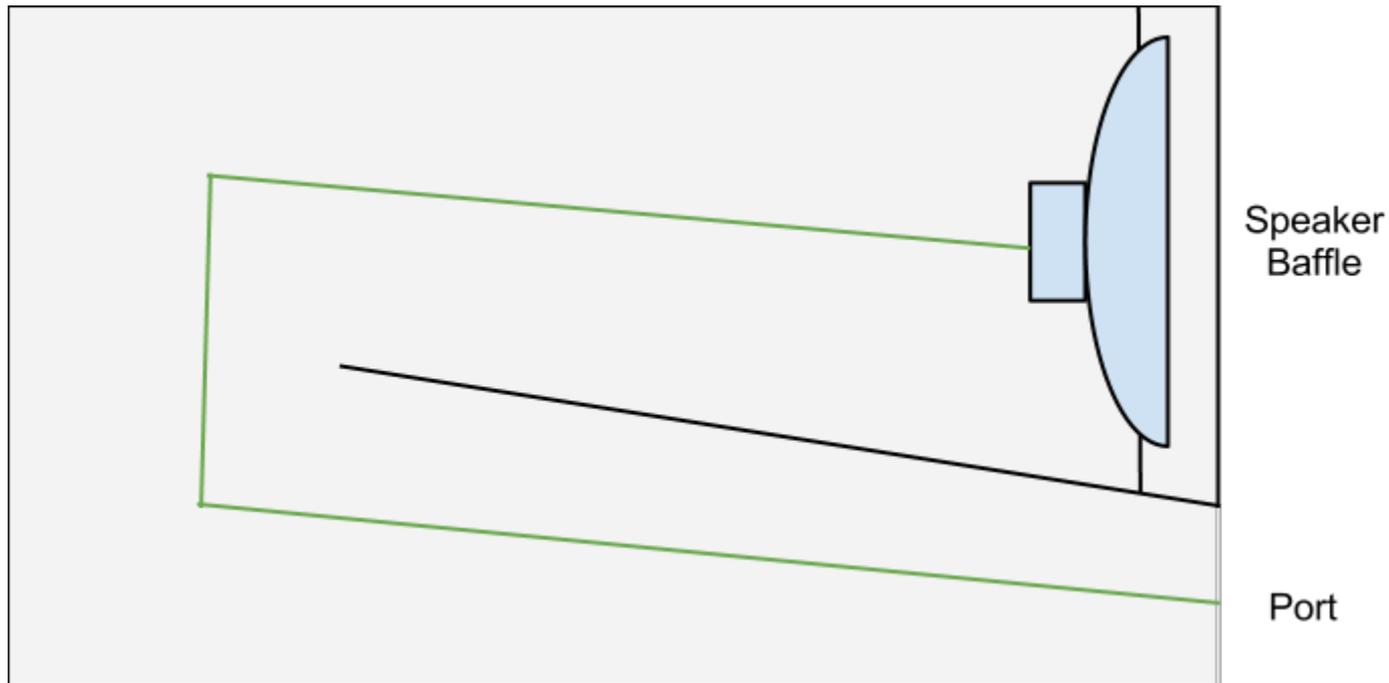
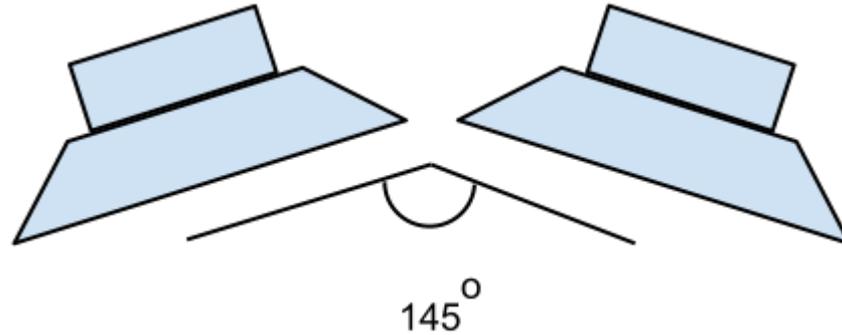


XPS sheet 3/4"

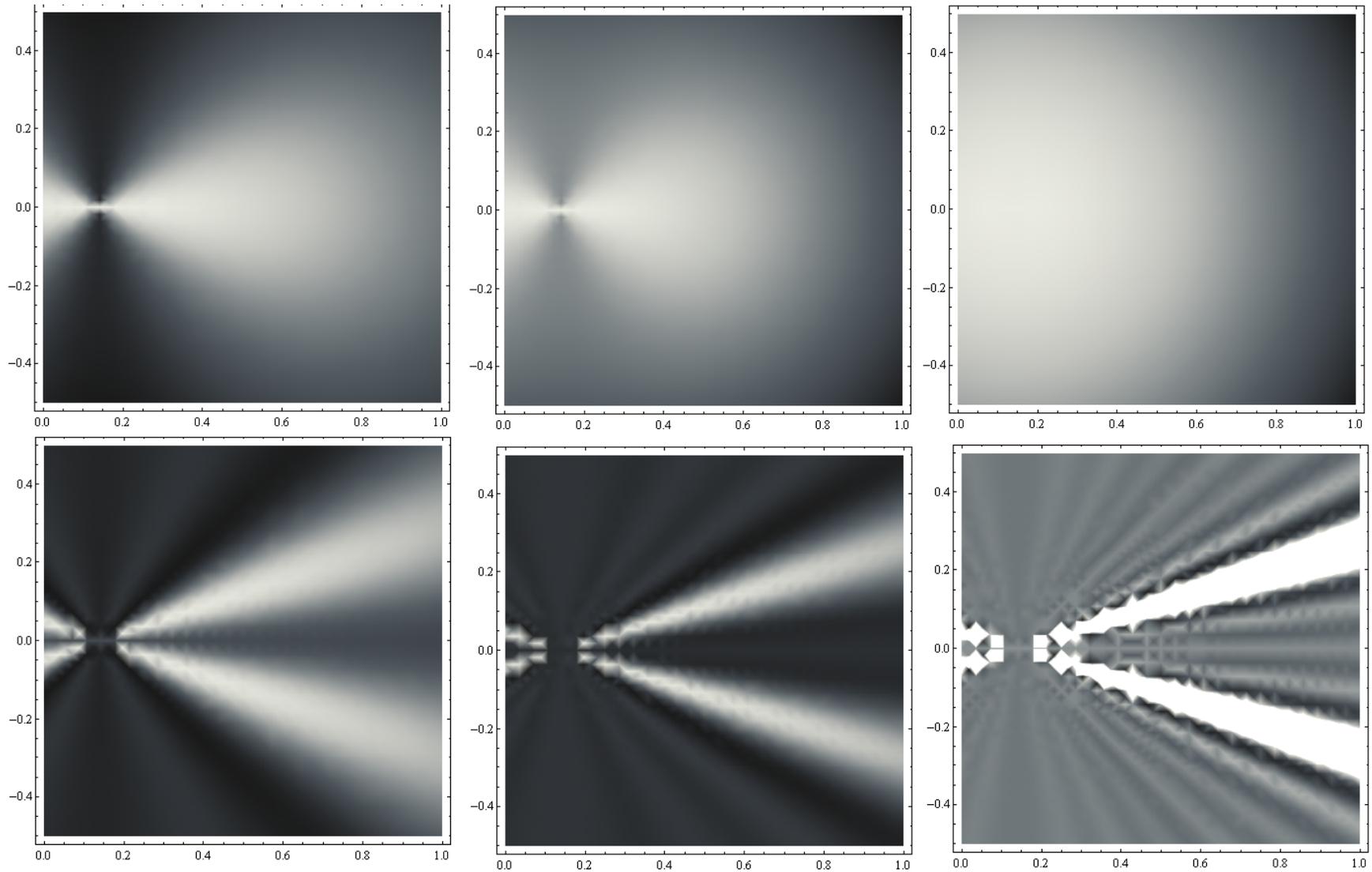


2k 2x2 twill Carbon Fiber

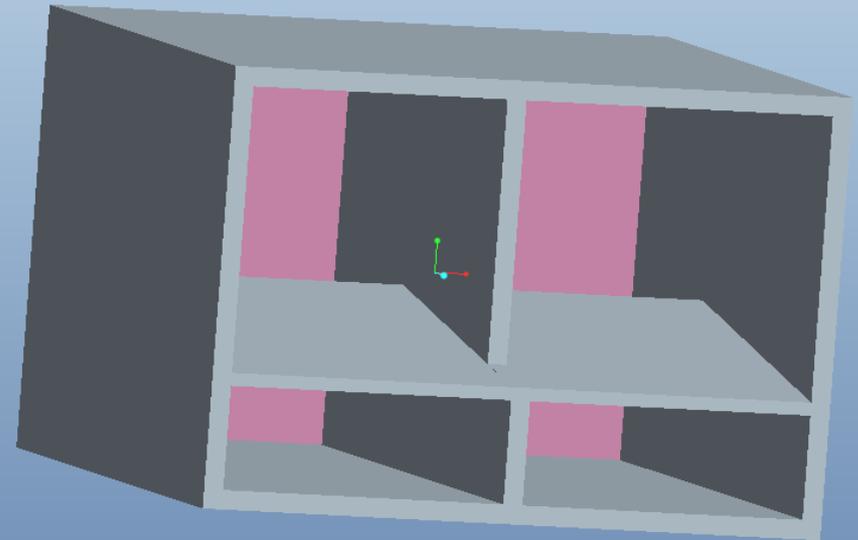
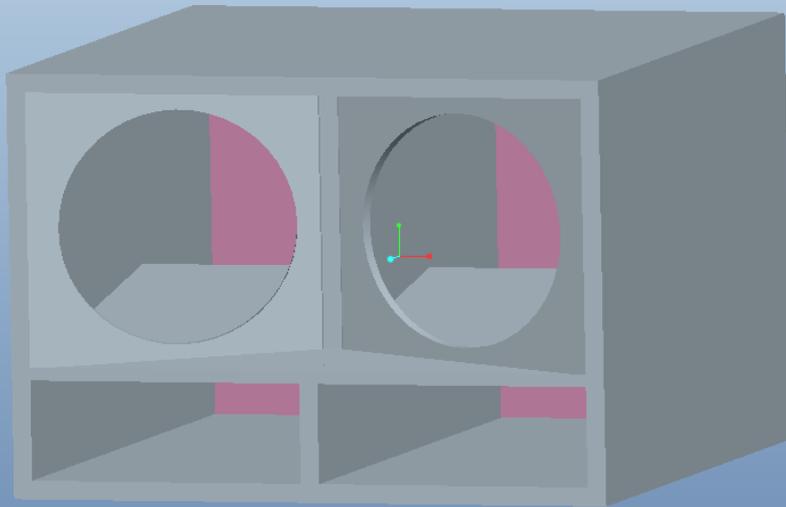
# Cabinet Configuration



# Directivity Simulations



# CAD Model of Cabinet

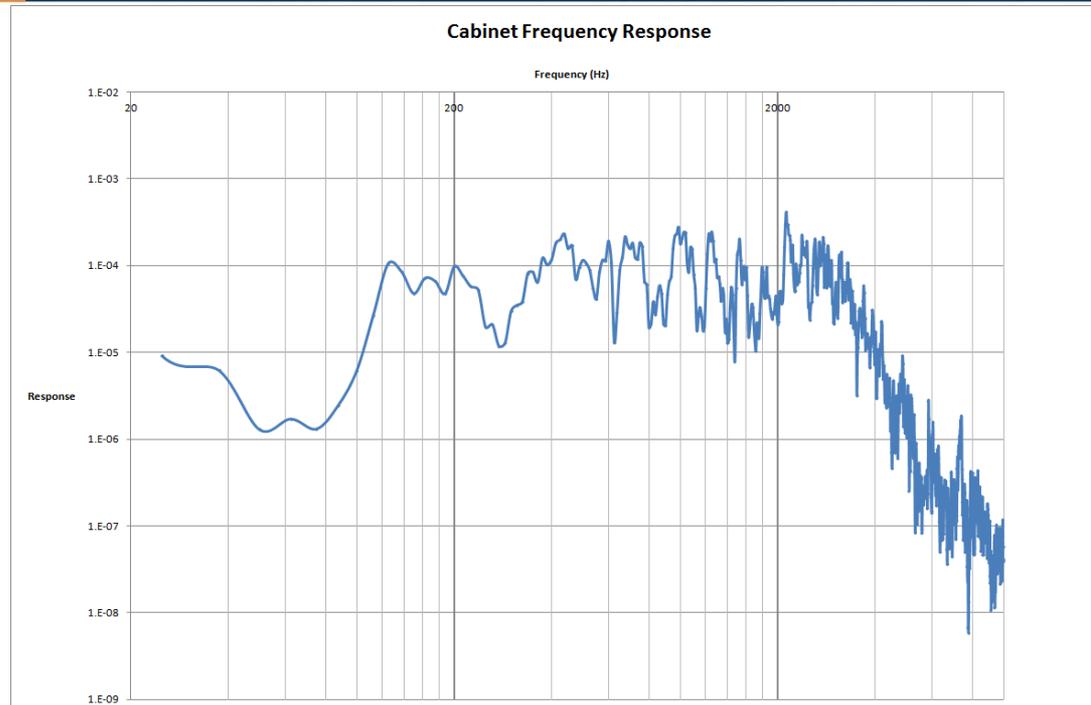


# Initial Construction

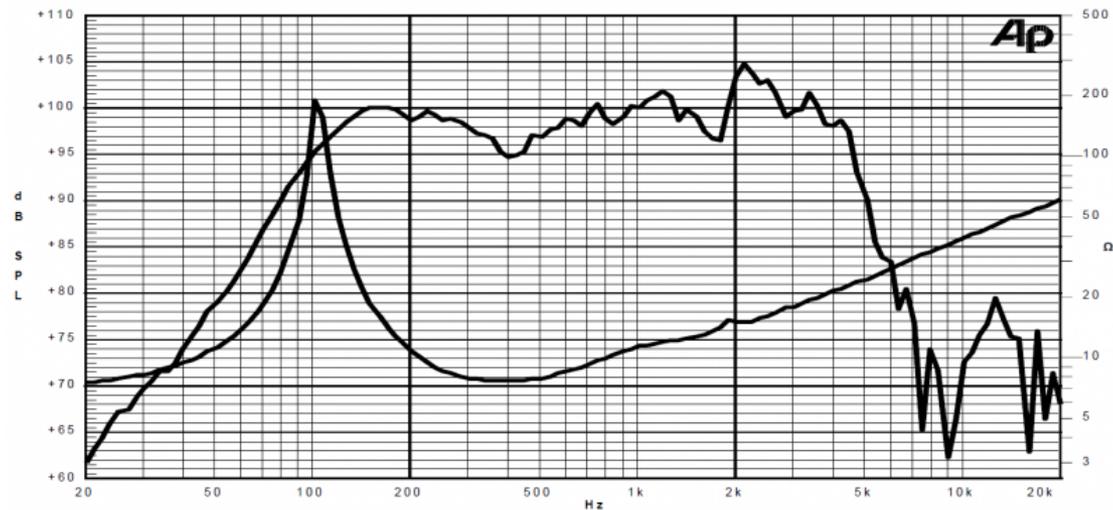


# Finalized Cabinet





Frequency Response on IEC Baffle (DIN 45575) @ 1 W, 1 m - Impedance





# Questions?