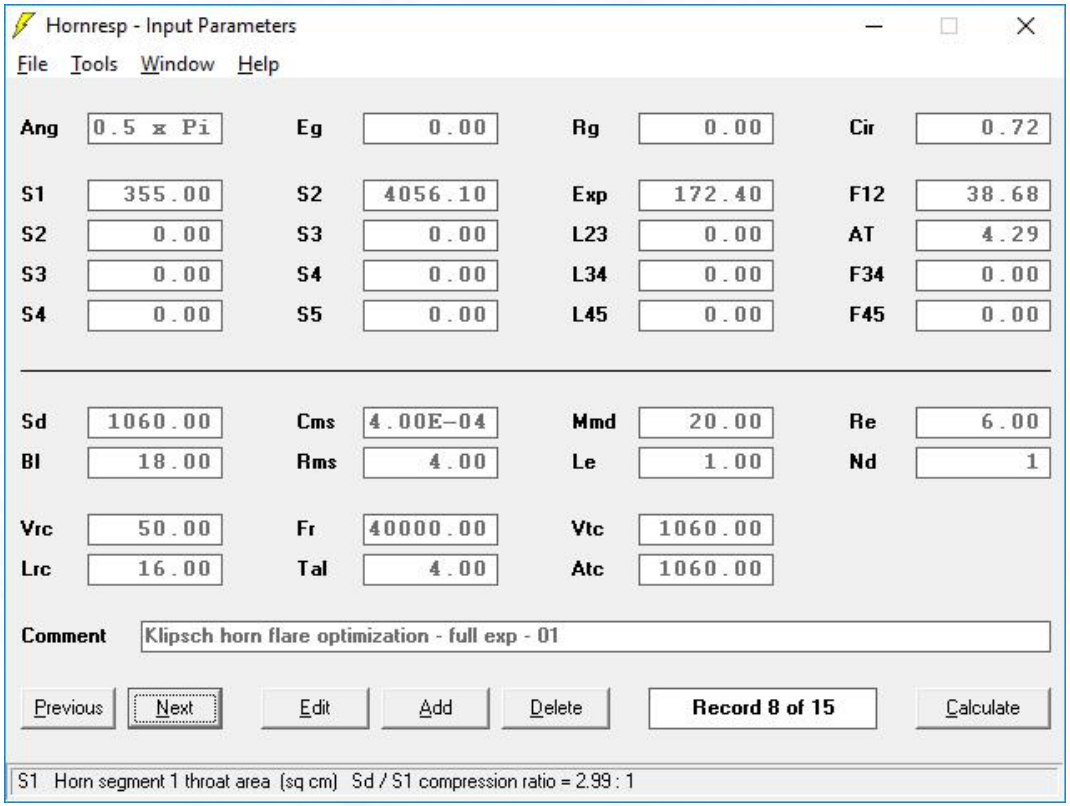
Klipsch Horn Flare Optimization

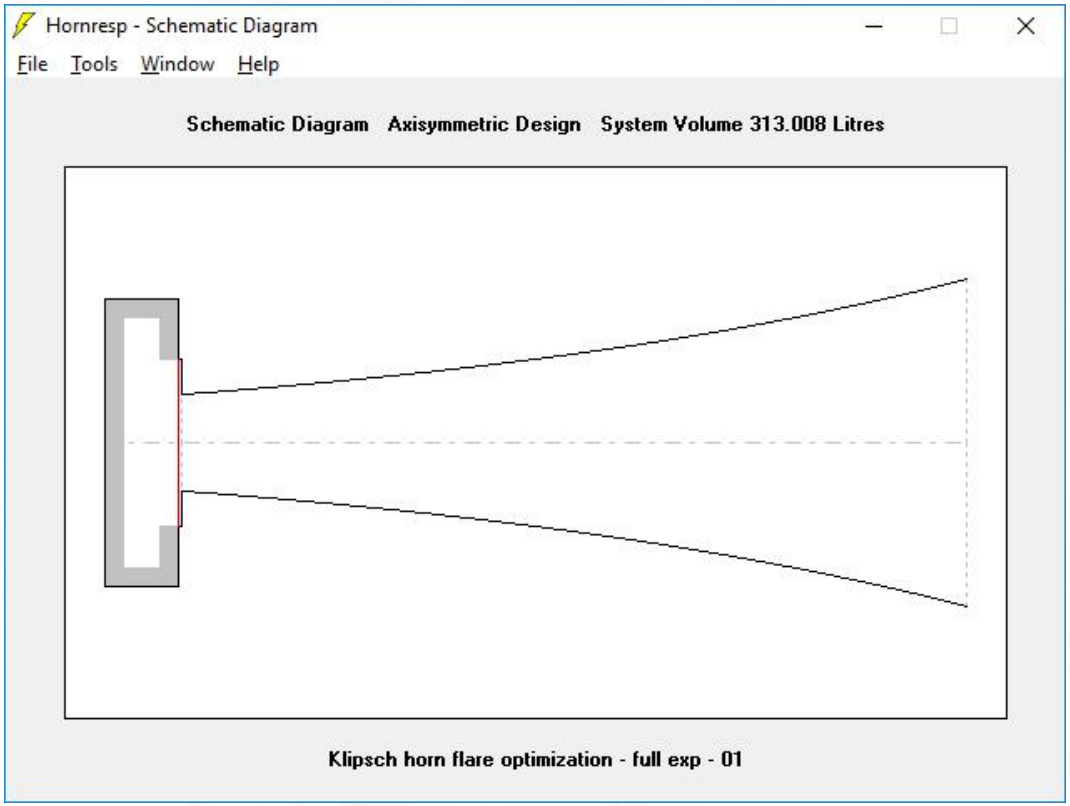
It has been said that the corner horn can be made smaller by providing an initial flare that is higher than the nominal flare. An initial flare of 100 Hz has been modeled for the first 20 cm distance in this study and compared to full nominal flare of approximately 45 Hz. Drive voltage is set to zero, so we can focus on the affect of the horn shape.

Note that driver surface area is equivalent to (2) 12 inch diaphragms for all models.

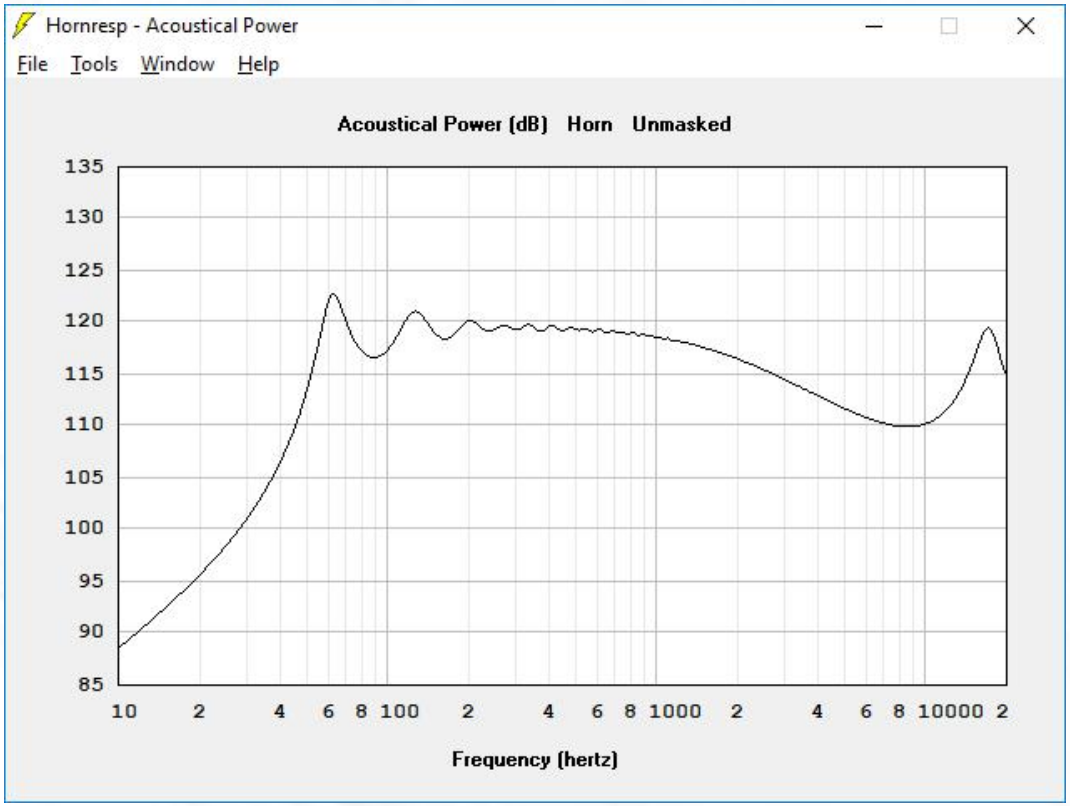
The classic flare cutoff of 38 Hz is modeled first, to establish the control SPL curve.



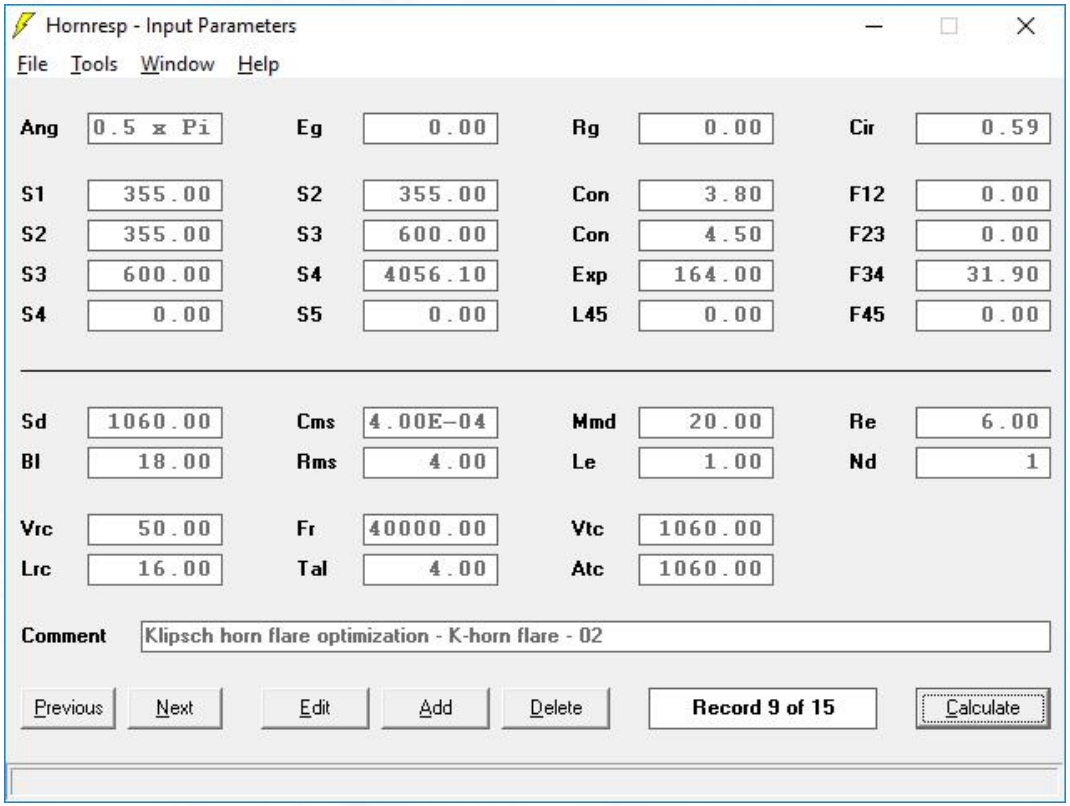
Full exponential horn shape.



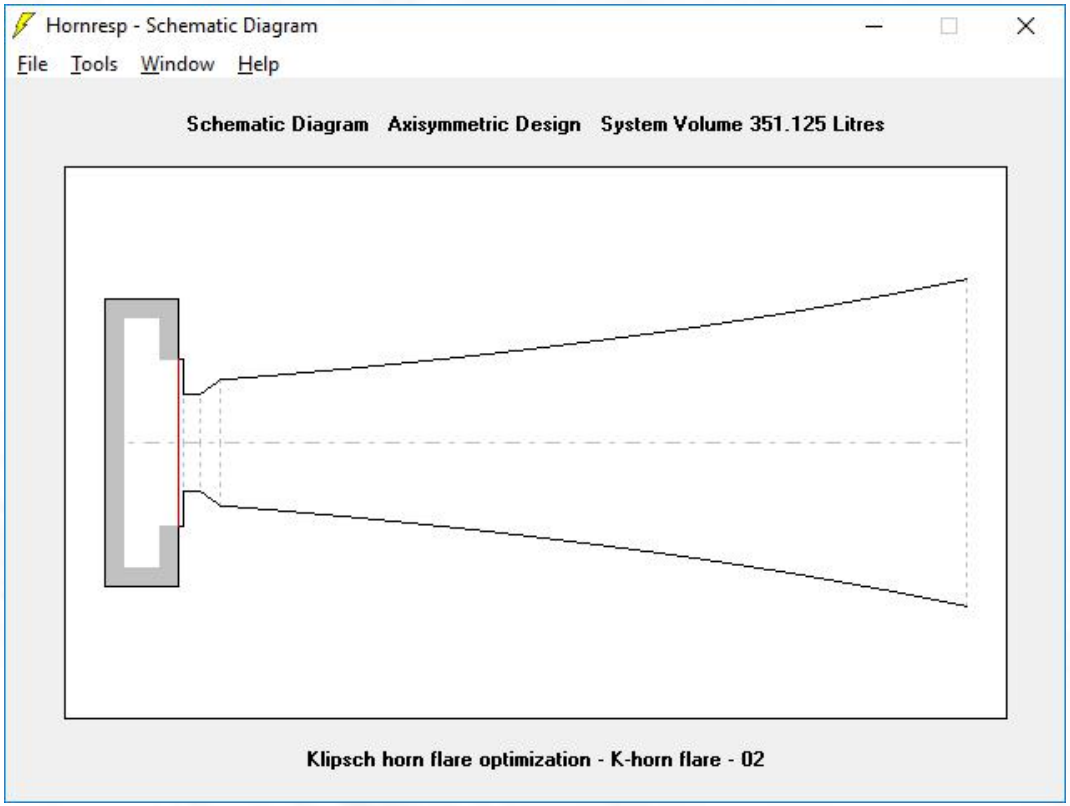
Full exponential SPL



Classic Klipsch Flare with stepped throat

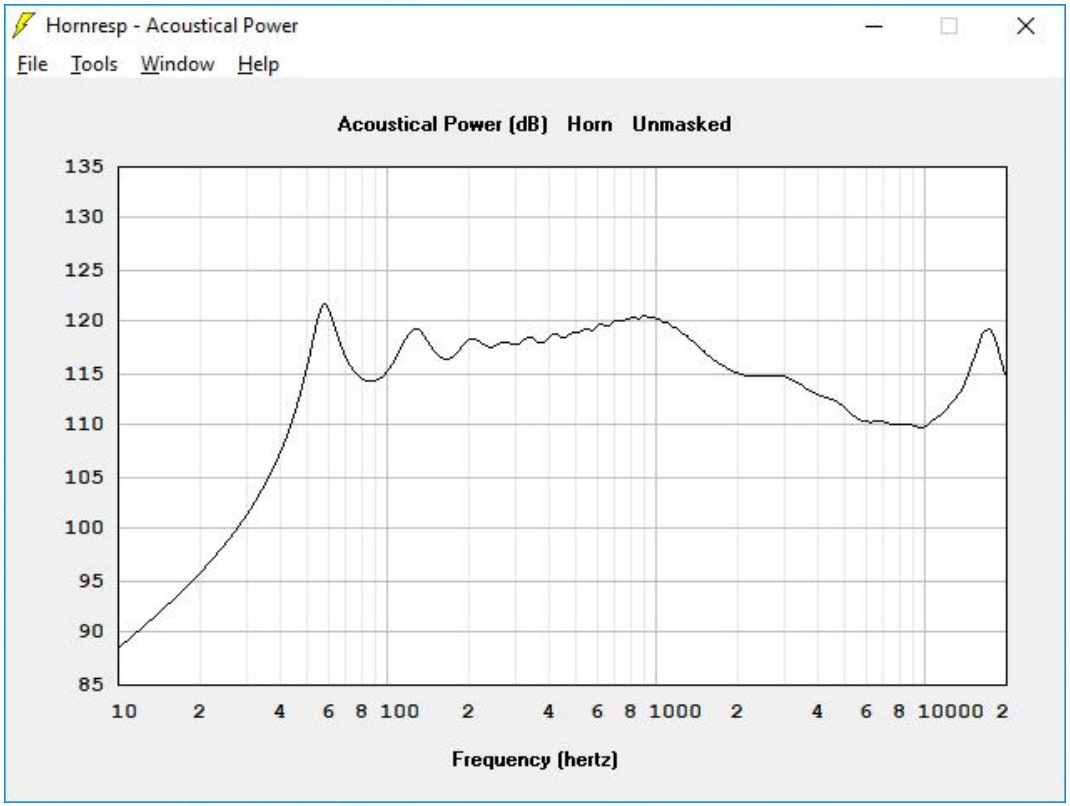


Classic Klipsch Flare Shape

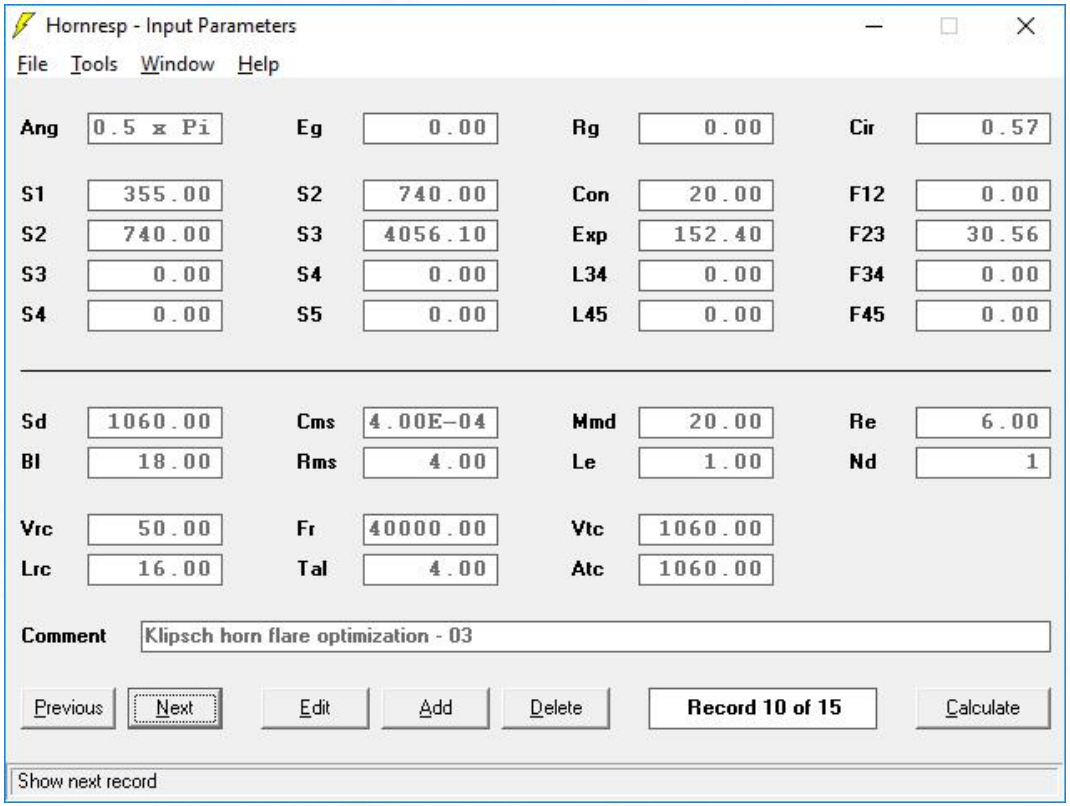


Classic Klipsch Flare SPL

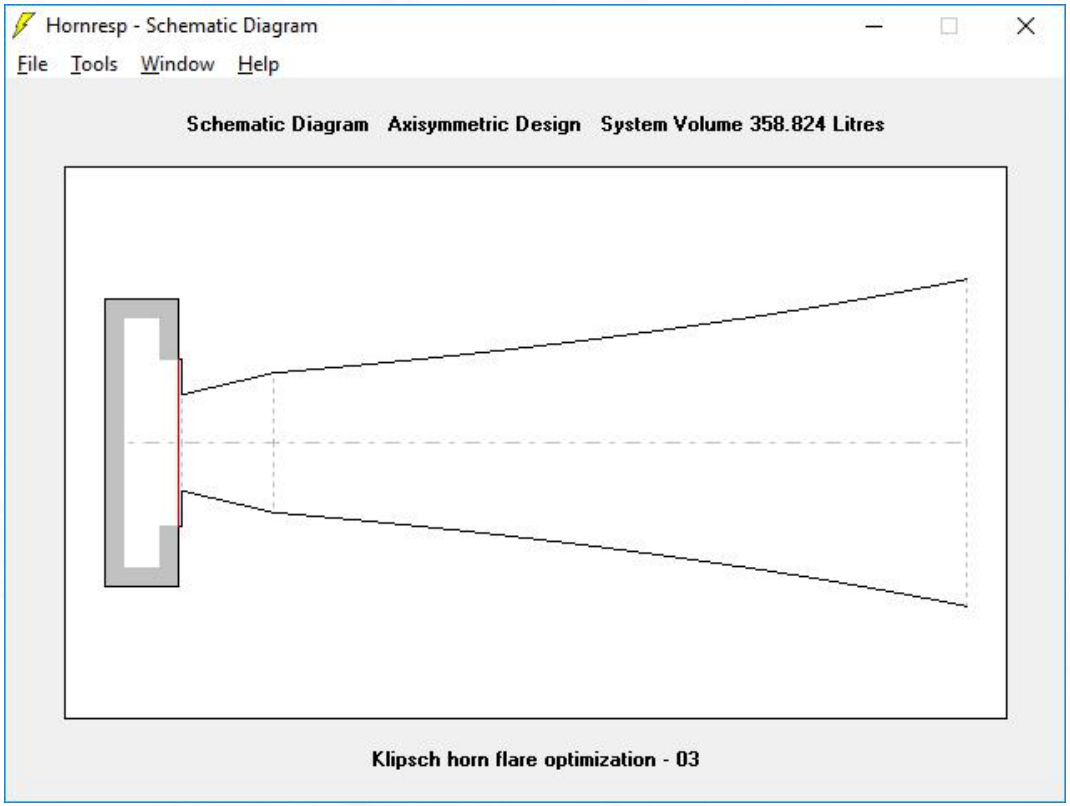
Notice that the SPL level is already lower than the pure eponential flare. This trend continues for all prototypes modeled.



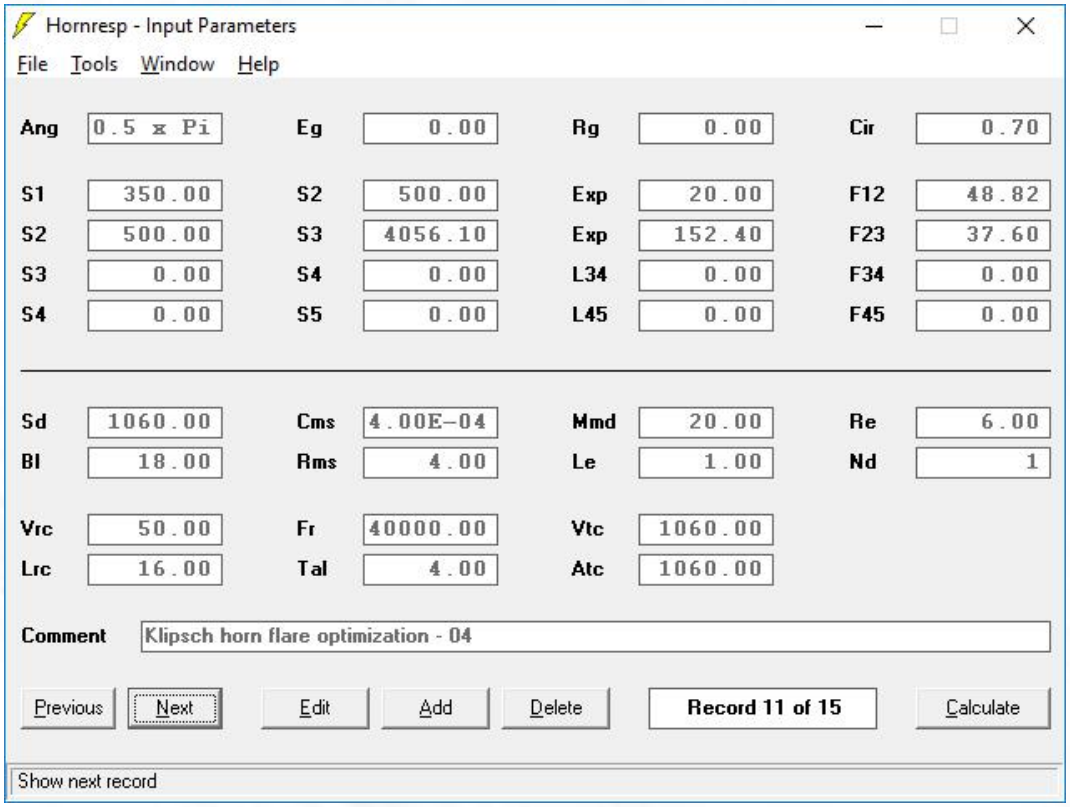
High Initial Flare #1



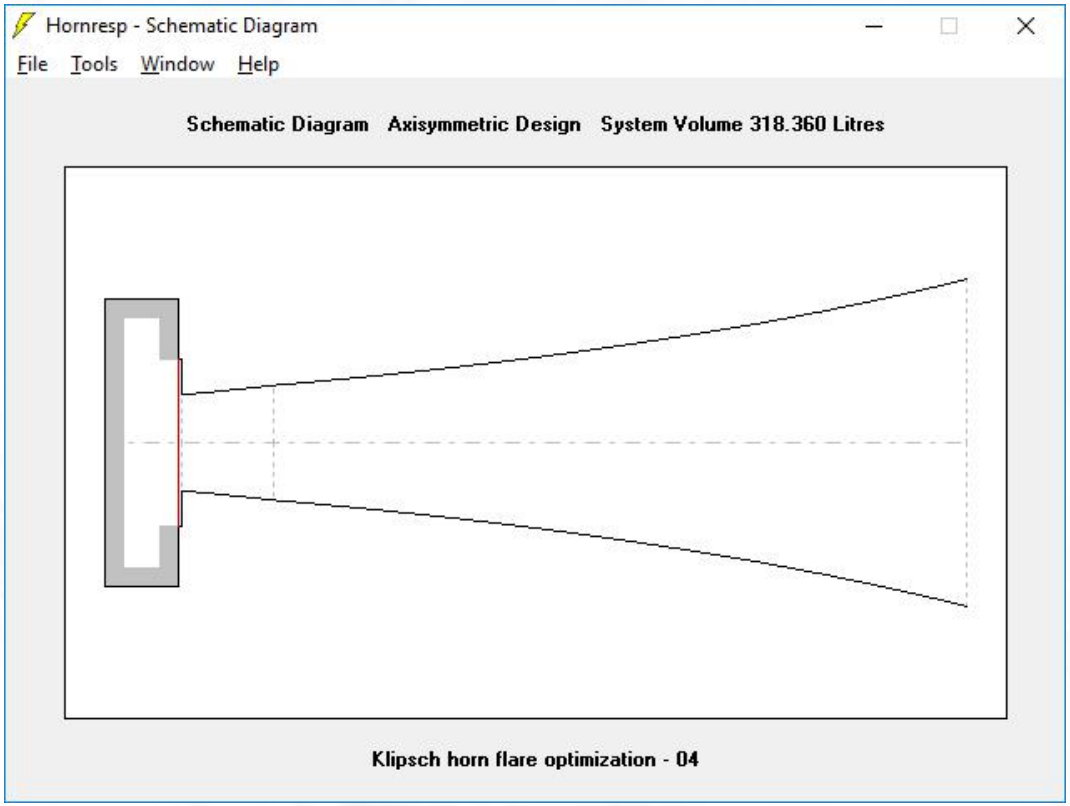
High Initial Flare #1 Shape



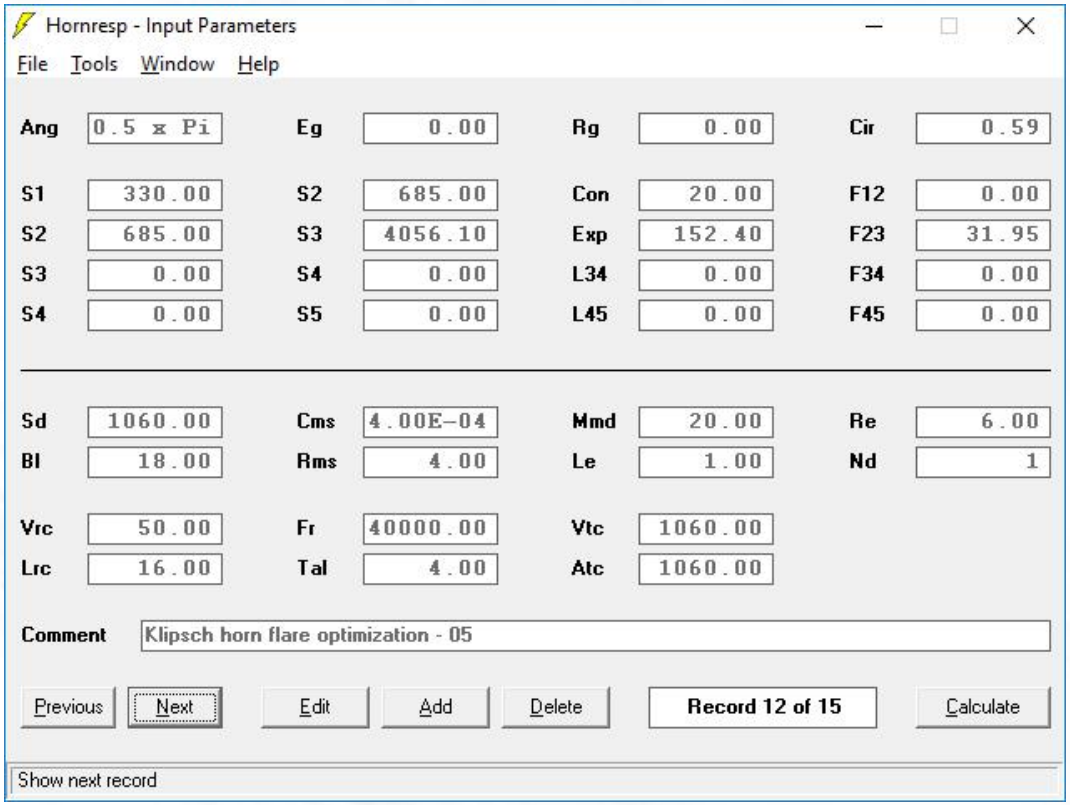
High Initial Flare #2



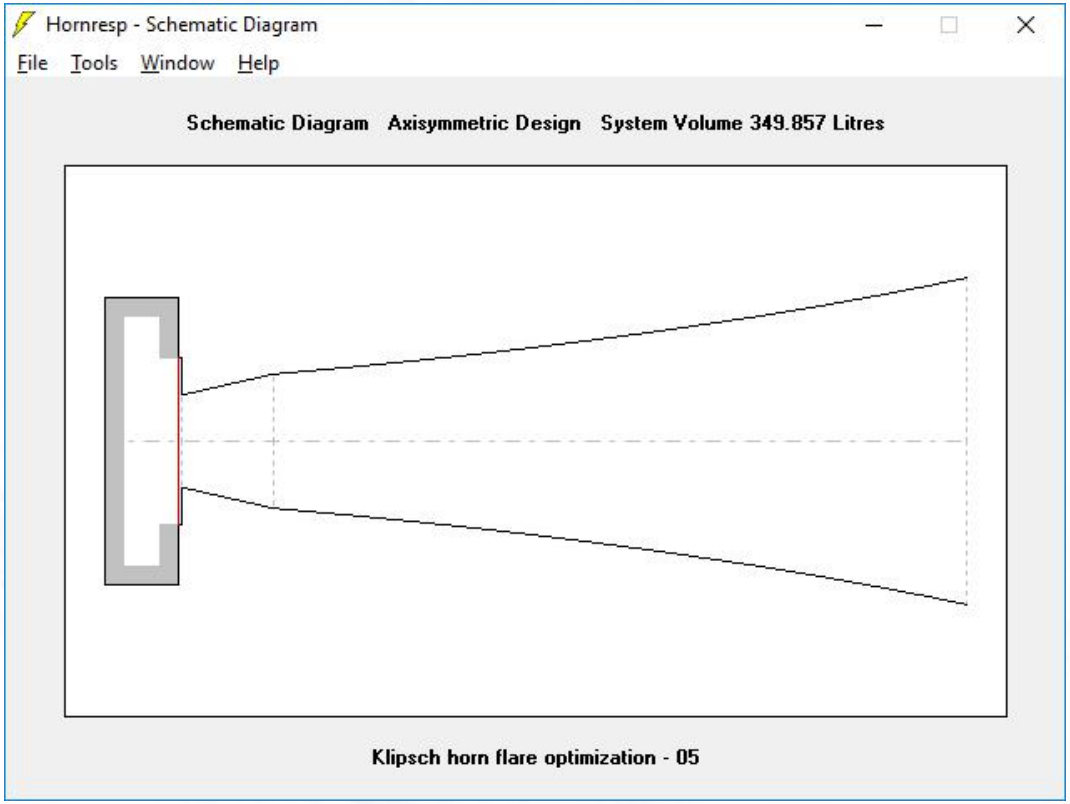
High Initial Flare #2 Shape



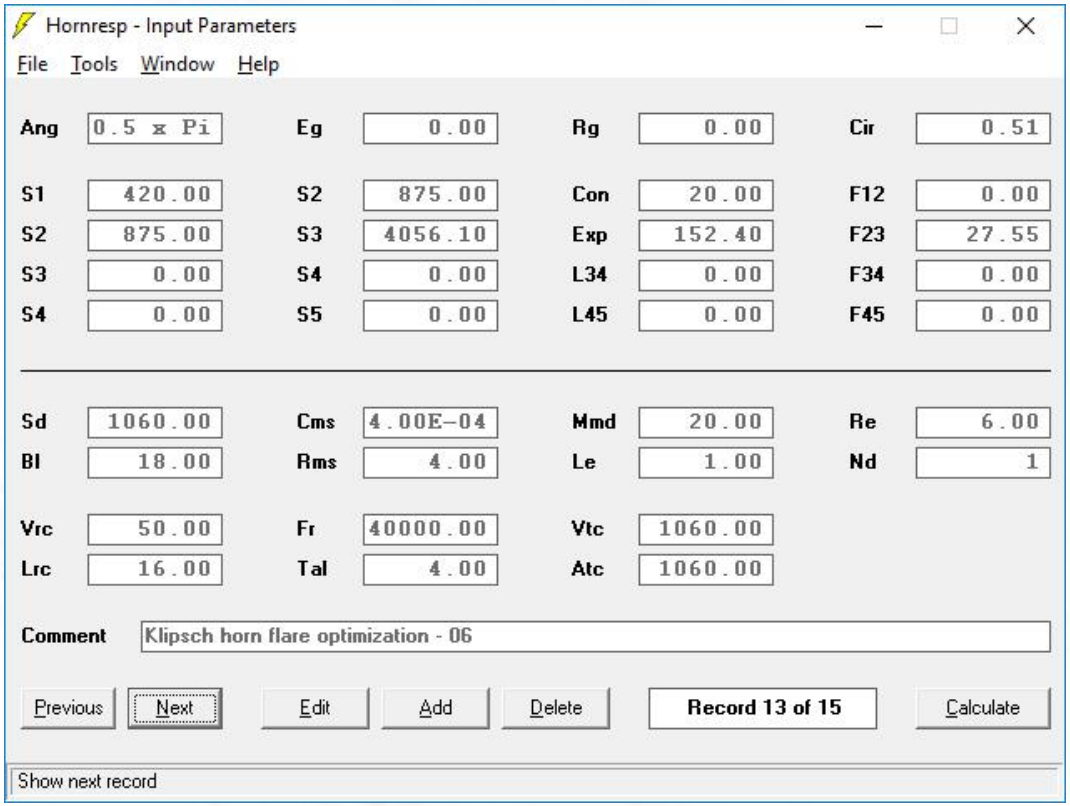
High Initial Flare #3



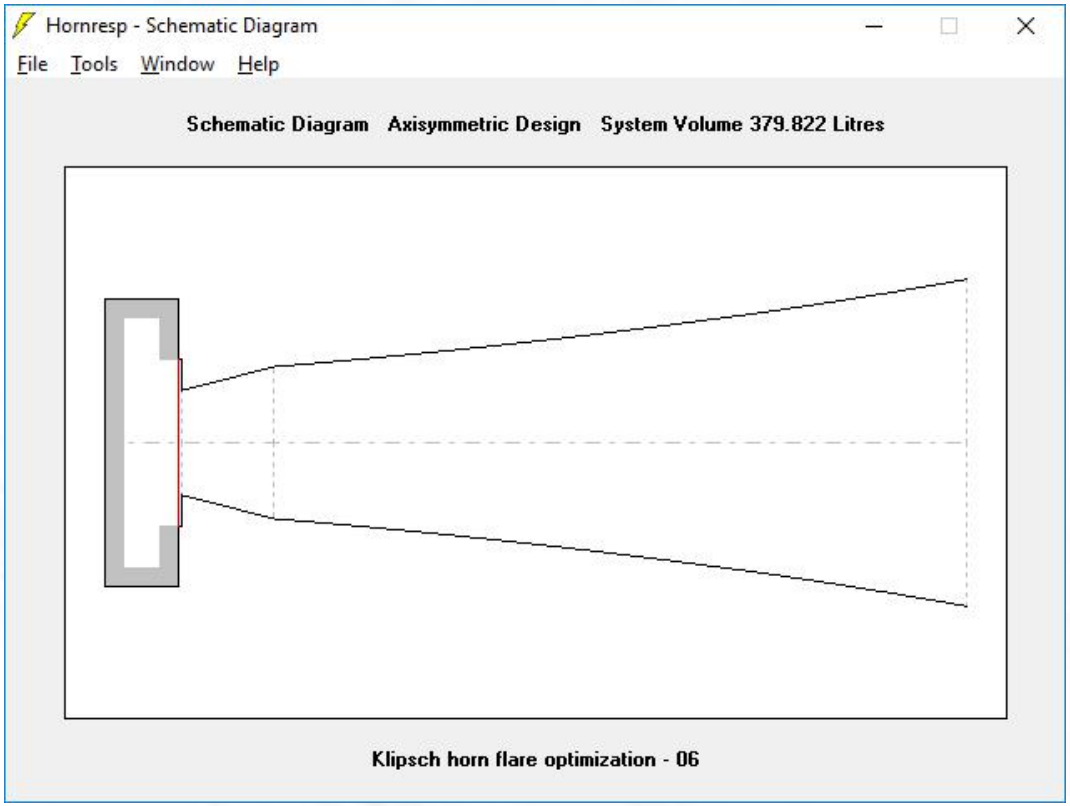
High Initial Flare #3 Shape



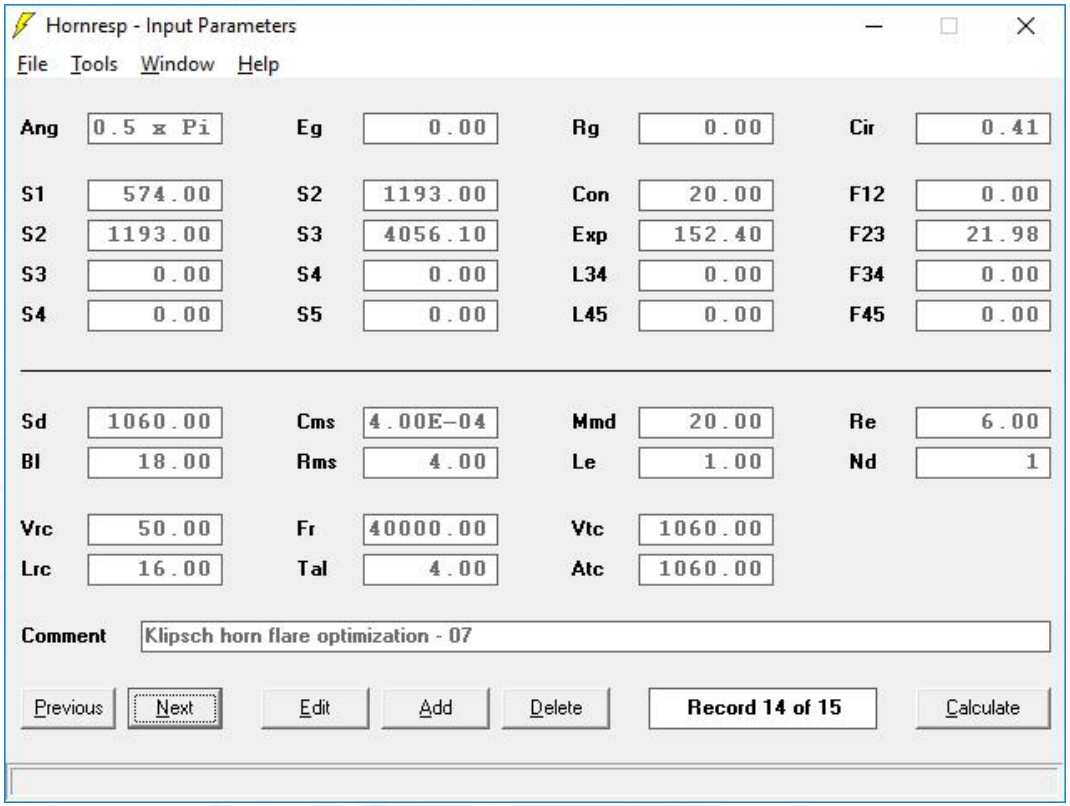
High Initial Flare #4



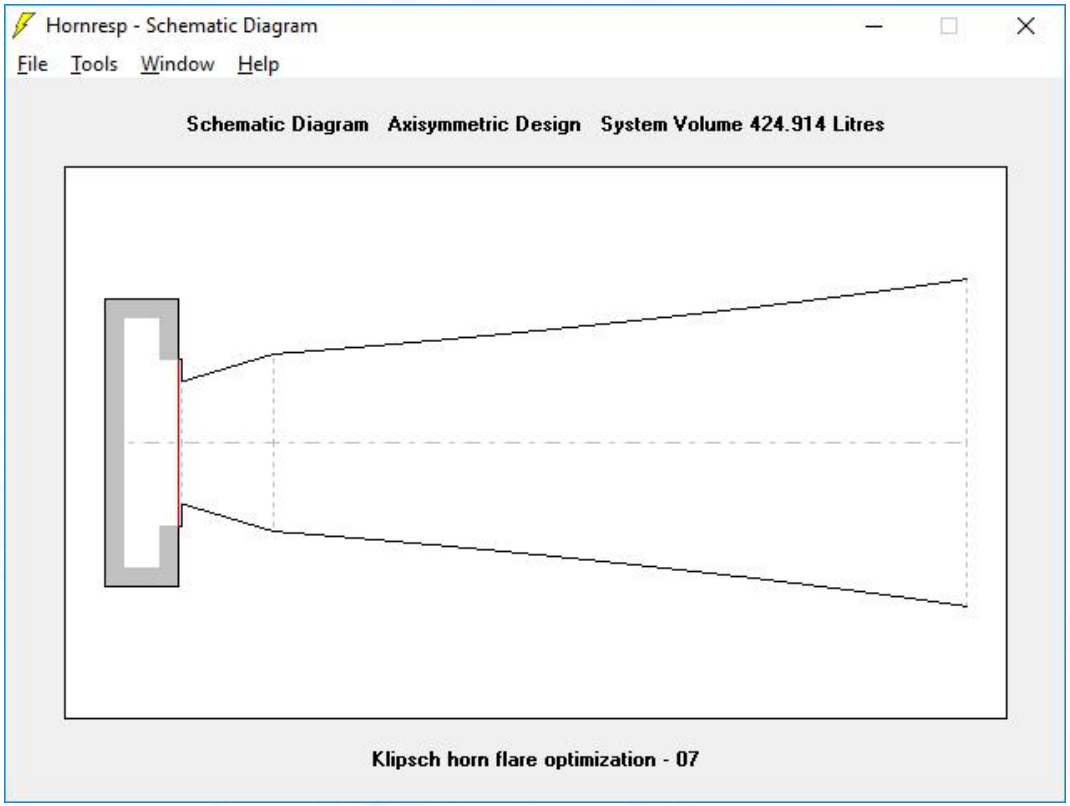
High Initial Flare #4 Shape



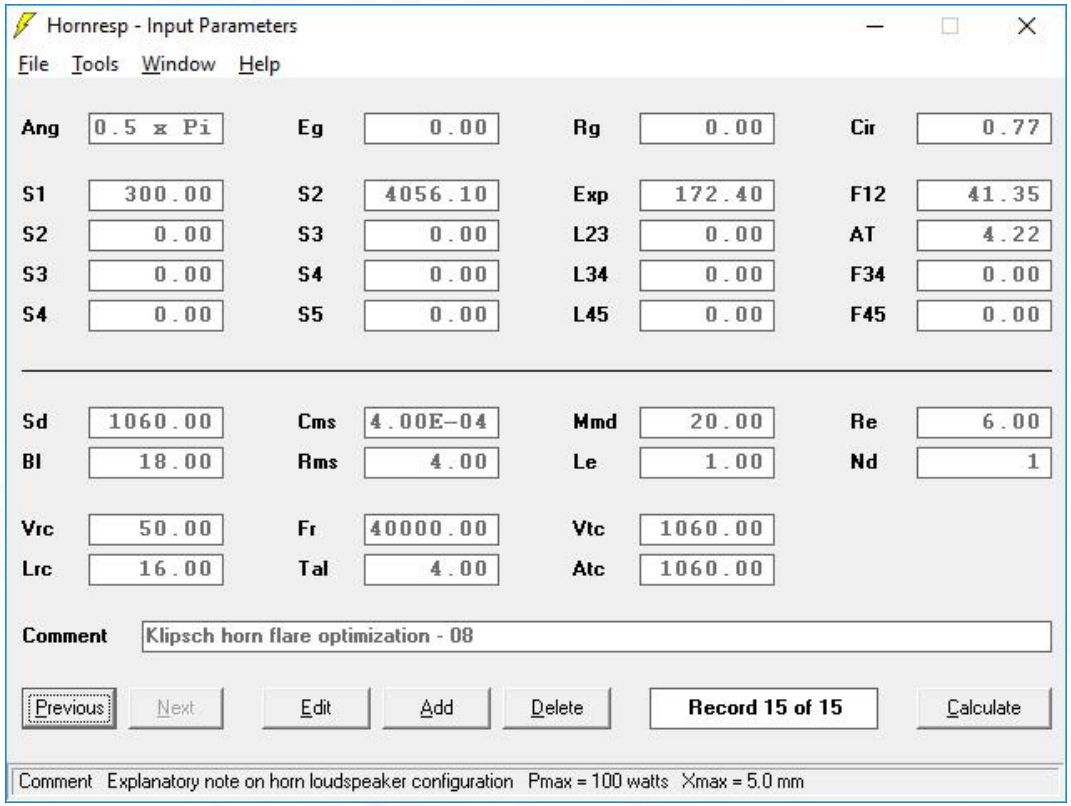
High Initial Flare #5



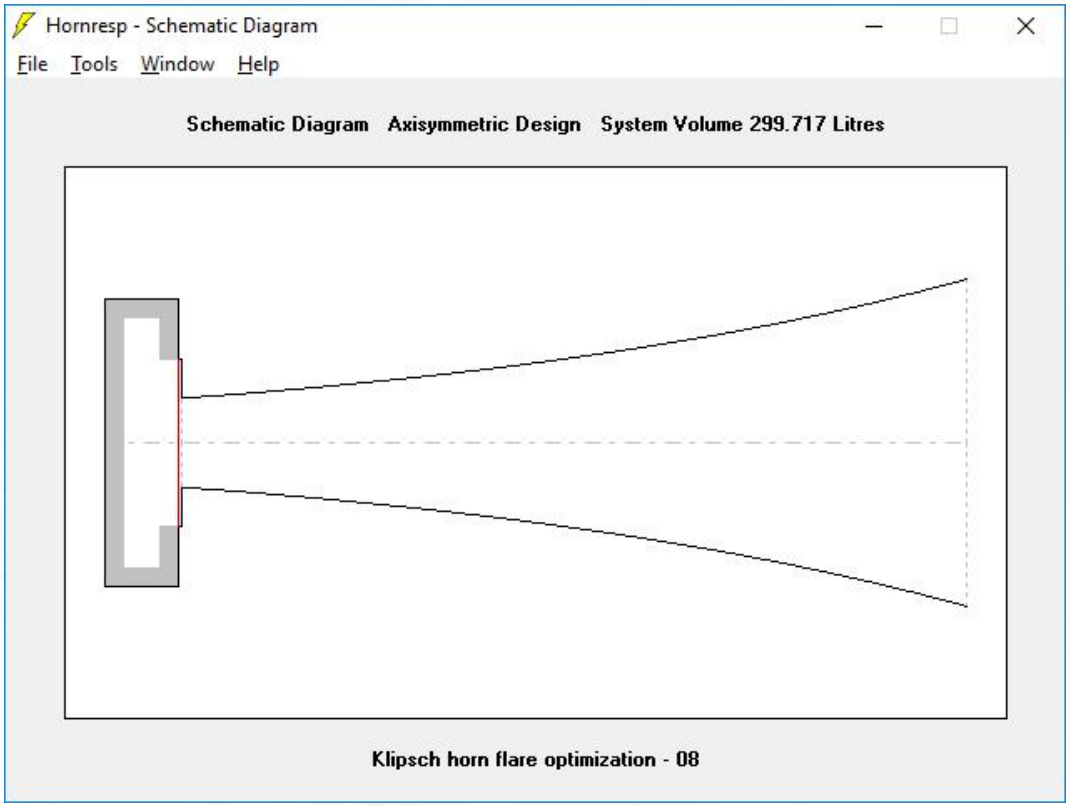
High Initial Flare #5 Shape



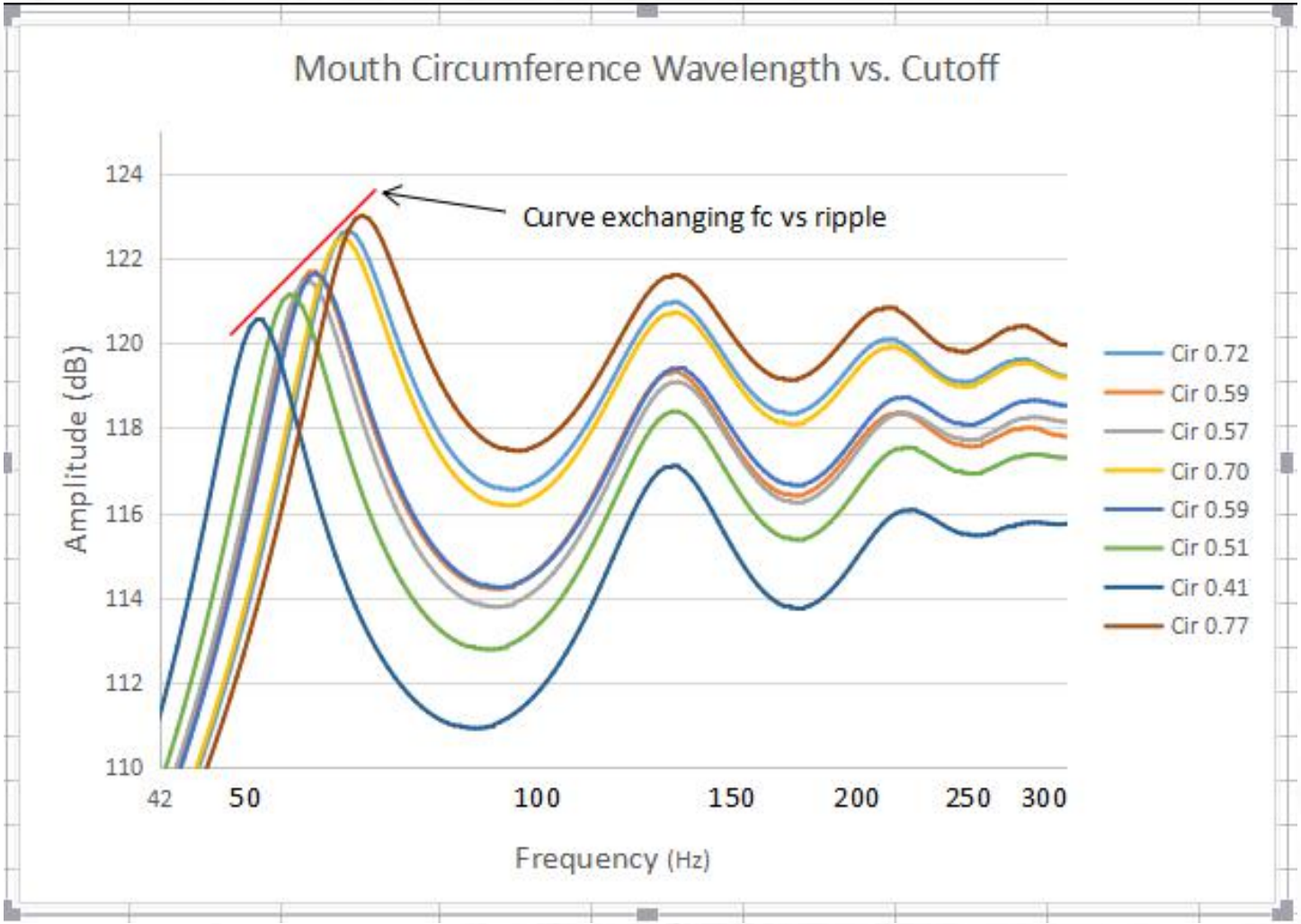
Full Exponential with Tiny Throat



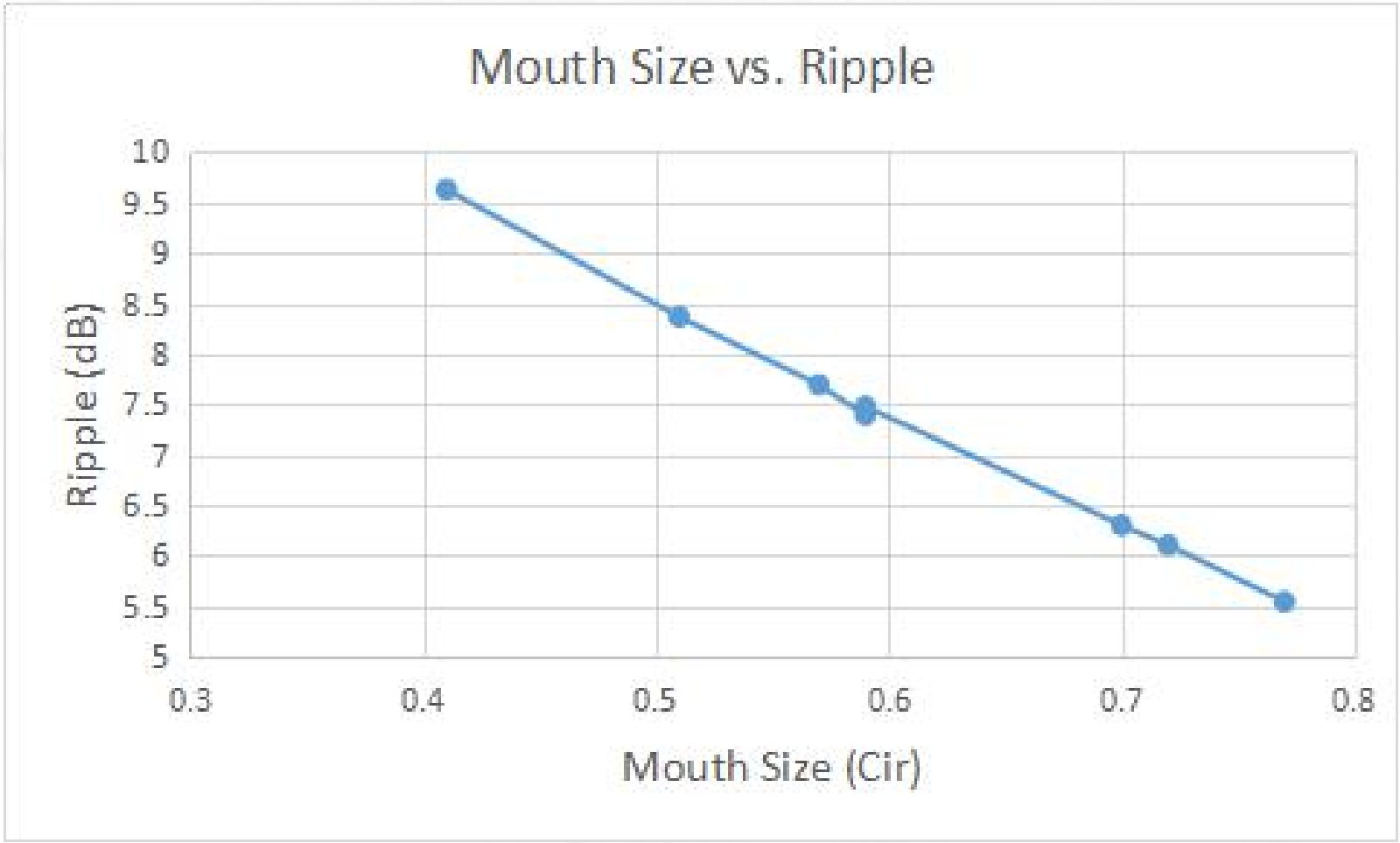
Full Exponential with Tiny Throat Shape



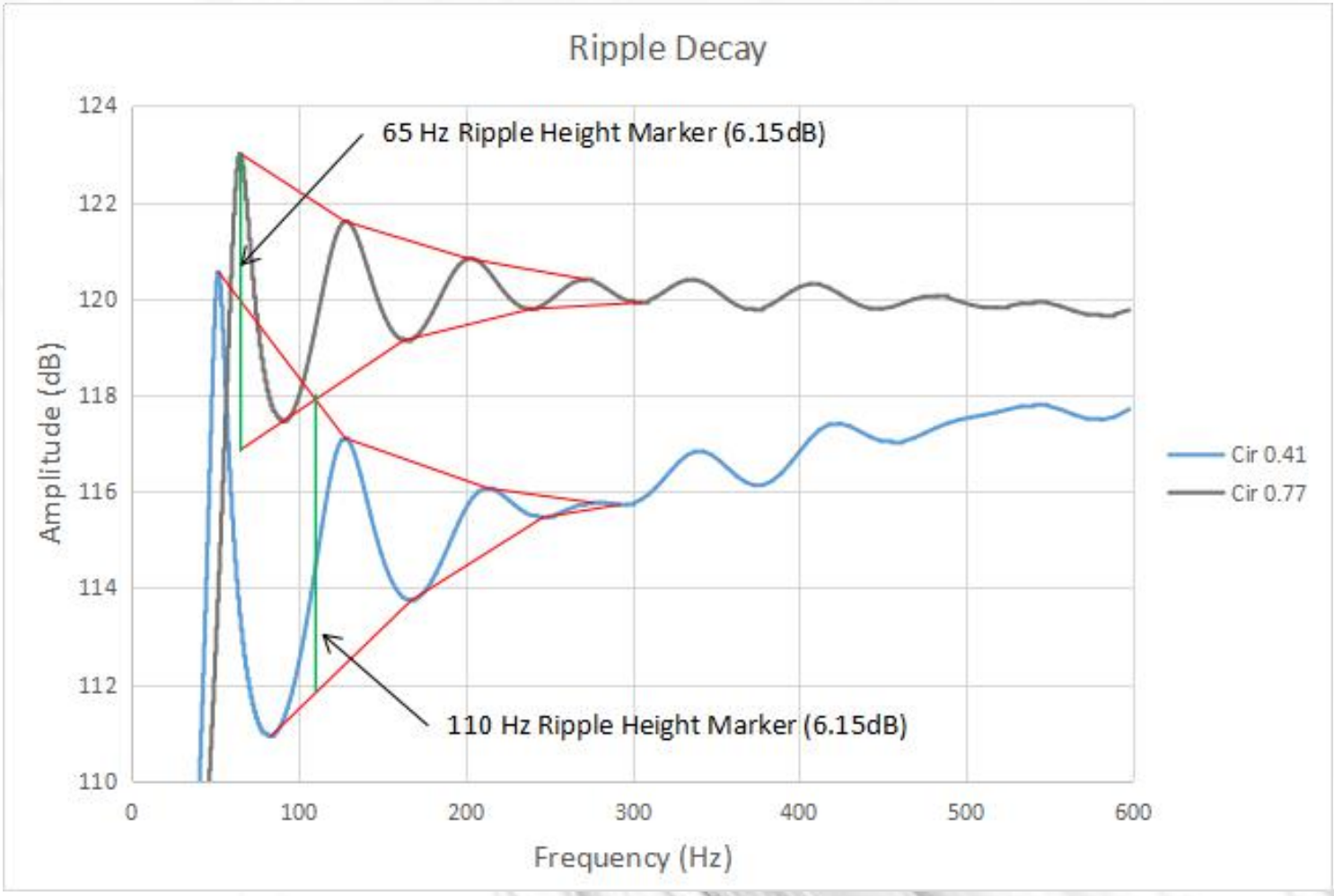
All eight curves are shown below. Notice that curves that rise to a lower “fc”, also have higher ripple. There is a linear relation between low ripple and larger Cir as indicated by the short red line.



Here is the relation between Mouth Size (Cir) and Ripple (dB).



Shown below is the amount of ripple present for horns with two effective mouth sizes relative to fc. Notice that the ripple stability for Cir 0.77 = 65Hz and Cir 0.41 = 110Hz.



Conclusion - High Initial Flare

After modeling several examples of corner horns that have an initial flare close to 100 Hz, it appears these shapes all produce acoustic responses with less damping, and rise to their fc quicker, but also take longer for the SPL curve to go asymptotic.

The classic exponential horn shape is better damped, has a higher fc, but assumes a flat response quicker.

The classic exponential shape has the highest efficiency.