4.8 Infinite Baffle and Dipole Designs

Infinite Baffle (IB) and Dipole systems share one common trait: the driver is essentially operating on it's own. There's no real enclosure for the driver. The difference between the IB and Dipole is that for the IB, the backwave is isolated from the frontwave of the driver (think of a huge sealed box, of volume approaching infinity). For a Dipole system (where the baffle has a finite size), the backwave can interact with the frontwave, resulting in a reduction in frequency response.

The IB situation would be applicable when the volume behind the driver exceeds roughly 4 times the Vas, or 576 liters. At this point, the Q would be 0.418, extremely close the Qts of Shiva. While IB is traditionally defined as when Qtc = Qts, we believe that the system is essentially IB when Qtc is within ~10% of Qts. For Shiva, this means Qtc =< 0.418. IB really represents the low-Q end of the continuum of sub-0.707 Q sealed alignments, with corresponding properties.

For the IB installation, performance would be as follows:

Box volume	576 liters
Qtc	0.418
Fb	24 Hz
Anechoic F3	84.1 Hz
Anechoic F8	20 Hz
Anechoic >100 dB SPL	22.4 Hz
In Room F3	17.8 Hz
In Room F8	10 Hz
In Room >105 dB SPL	18 Hz

Table 7 - Infinite baffle alignment

Note that the anechoic F3 is much higher (two octaves) than the anechoic F8. This is indicative of a very low Q system. And the in-room response promises extremely good bass extension, with an apparent half volume frequency of 10 Hz. Of all systems given in this paper, the IB has the best bass extension.

To simulate the response of an infinite baffle installation, consider the system as a sealed box with Qtc within 10% of Qts. For Shiva, this translates to 576 liters, as noted above. Plotting the response of a Shiva in a sealed box of 576 liters, with a 4th order 80 Hz low pass crossover of Q=0.707, results in:

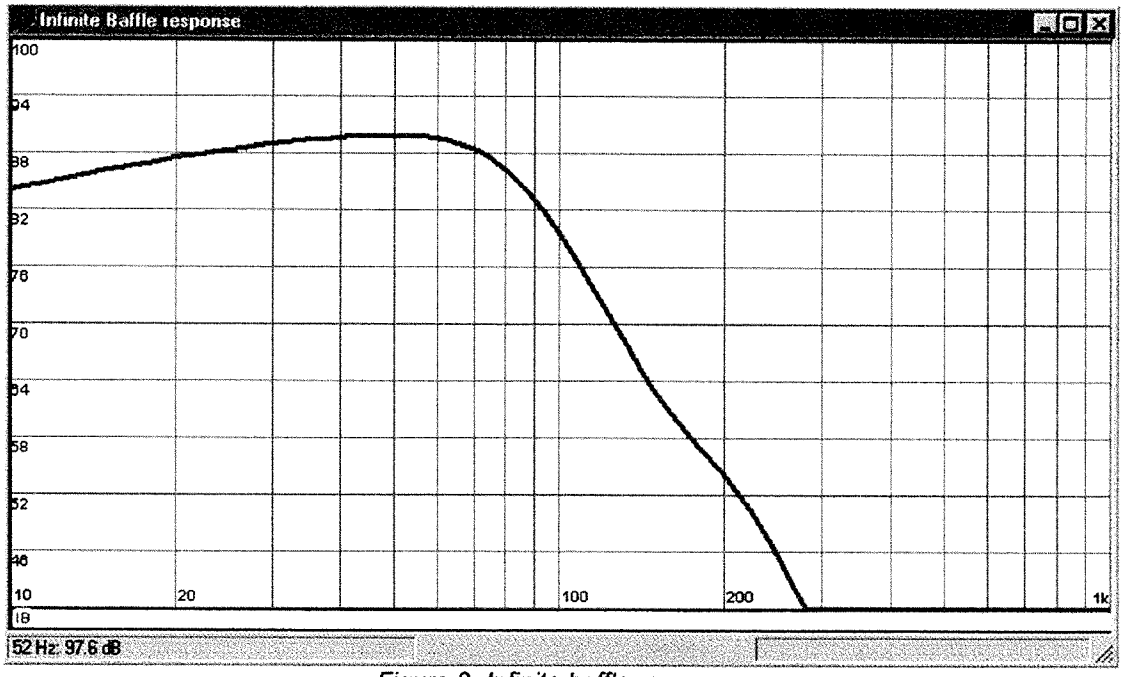

Figure 8- Infinite baffle response

As can be seen, deep bass performance is outstanding, with an F8 below 10 Hz. Additionally, maximum SPL output in-room is quite good. Overall, the IB system provides the deepest bass capability, with good max SPL, and if the size of the required enclosure can be accommodated, should be seriously considered.

For Dipole systems, prediction of F3 points becomes difficult due to dependence on a number of factors. The actual frequency response one gets is largely dependent upon the width of the panel in which the driver is mounted due to dipole cancellation causing a 6 dB rolloff dependent on this width, plus the in-room placement of the system. As such, we cannot offer predictions of response output.

Additionally, the maximum SPL one can achieve is also dependent upon the size and shape of the baffle, as well as the rolloff equalization typically used to compensate for the dipole cancellation. However, adherents of dipole installations are quite adamant about the type of sound this system produces, praising its natural "open" sound devoid of boominess.