

## **Audio & Home Cinema Speakers Buyers Guide (1291)**

The truth is that countless factors and attributes determine how well speakers will produce sound. Choosing a speaker system merely on appearance or name brand recognition may be the worst mistake a consumer can make when they are evaluating new speakers. Don't be fooled by a speaker's appearance. It is what's inside that matters regarding sound quality.

### **Types of Speaker Systems**

Audio & Home Cinema Speakers come in various types to suit various budgets and needs. It is a matter of personal taste and preference as to the choice of a speaker system and of course a matter of how much a person wants to spend. Woofers are usually between 6 ½ inches and 15-inches and are designed to produce frequencies from 20 - 500 Hz. Midrange drivers are usually between 2.5 inches - 6 ½ inches in diameter and designed to reproduce frequencies between 200Hz and 4KHz. Tweeters are usually between ½ inch to 1-inch and are designed to reproduce frequencies between 2KHz to above 20KHz.

***Two-way systems*** – This type of speaker system consists of one “woofer” and one “tweeter.” If purchasing a two-way system, it is best to limit the size of the woofer to under 7-inches to achieve the best audio sound. Anything larger will reduce the clarity of the sound. Many two-way systems offer high quality sound with just 6 ½-inch woofers.

***Two & half way system*** – Two and a half speaker systems were recently introduced to the hi-fi market. This system is comprised of two bass/mid-bass drivers (top and bottom woofer), identical in design and size and one tweeter. The bottom woofer is crossed over to produce sound frequencies of below 2000 Hz (hertz). This cross over at different frequencies acoustically enhances the overall base response. The top woofer is crossed over to produce midrange frequencies between 200Hz - 4KHz.

***Three way systems*** – Three-way speaker systems are comprised of one woofer crossed over to produce bass frequencies, one mid-range driver crossed over to produce mid-frequencies and one tweeter crossed over to produce high frequencies. This structure can achieve full frequency response at very high fidelity with little or no need for an added powered subwoofer. However, a two-way “book shelf” system is far better than a cheaply made three-way system in the same price range.

***Cubed Systems*** – These are very popular systems even though they may be the least accurate and worst sounding of all speaker systems. Because the speakers are well marketed, most consumers are not aware of this fact. They are basically a two-way system with an unpowered bandpass (subwoofer) that does not produce bass frequencies that quality subwoofers are designed for (90Hz and below). Try to refrain from purchasing them.

## **Drivers (cone materials)**

Various materials can be used to manufacture loudspeaker cones. It is solely dependent on three factors: driver implementation, desired frequency response and budget.

High Frequency Drivers (dome tweeters) – These are made from metallic (Aluminum, Titanium), fabric (Silk, Mylar's) or paper.

**Metallic:** Very detailed but may tend to be bright sounding with certain electronics and doesn't account for high frequency resonant modes inherent in metallic dome designs.

**Fabric:** Offer more of a reserved sound with less emphasis on brightness and more emphasis on producing a smooth sound.

**Paper:** Avoid paper drivers for tweeters because paper is not an appropriate material for accurate high frequency reproduction of sound. They tend to suffer from large breakup modes causing higher sound distortion.

## **Horn loaded Tweeters**

Horn loaded tweeters are drivers to be used as mid-ranges or tweeters or both. They are best suited for concerts and movie theatres because of their extremely high efficiency and dispersal patterns. Unfortunately they are not best suited for two-channel or multi-channel surround systems. There are instances however when horn loaded speakers when mated with warm-sounding electronics give off excellent, non-abrasive sound.

## **Electrostatic Speakers**

These are tall thin planar metallic membranes that operate in with regards to "like" electrical charges that repel one-another and "unlike" electrical charges that attract one-another. They are basically a stretched thin plastic membrane on a rigid frame, coated with a low-mass electrically conductive substance. Manufactured into two stiff, flat electrodes (stators), they are insulated to prevent electrical discharge. The downside to electrostatic speakers is that:

- They are not very efficient and they require a lot of power to operate correctly.
- Poor base response
- Most require a subwoofer to reproduce the entire audible frequency spectrum.

Their advantages are:

- They image better.
- They create a more open and expanded soundstage.

## **Passive Radiators**

Similar in appearance to an ordinary driver but it has no magnets or voice coil. High compliant devices that sports similar cone material and surround that is present on regular drivers. Some advantages include:

- The absence of port noise.

- Better sounding bass than a ported enclosure.

Some disadvantages include:

- Difficulty in tuning.
- Extra required baffle area for the radiator.

### **Driver Baskets**

Budget and design goals are the only limitations when constructing driver baskets. They can literally be made from various types of metals. Cheaper to design, steel baskets may have disadvantages when constructed. The driver magnetic strength could be compromised due to the basket's magnetic properties, which will cause the motor structure to be less powerful and will weaken response time and increase overhang distortion. Better-designed cast baskets do not suffer from the previously mentioned disadvantages.

### **Crossovers**

This is the “brains” of a loudspeaker system. Designed to optimized driver performance, they assure the right blending of drivers in the cabinet. This has a direct impact on the fidelity of sound, which can be achieved.

### **Enclosures**

There is a variety of enclosures for various systems. They include acoustic suspended, infinite baffle, bass reflex, transmission line and cabinets.

***Acoustic Suspended*** – Sealed enclosures that rely on the back wave energy of woofers to radiate in the cabinet to produce bass frequencies. Unfortunately they decrease efficiency, linearity, and bass output.

***Infinite baffle speaker*** - The woofer uses its own suspension to control the cone. They do not give a good transit response.

***Bass Reflex*** – They have a port or passive radiator to tune a cabinet to a specific frequency. They have an advantage over acoustic suspended speakers because they increase efficiency and bass output. On the negative side, they may sacrifice accuracy in bass response.

***Transmission Line*** – They are designed with the driver is at one end of the enclosure, with an internal path which consists of a series of bends or curves that lead to a port at the other end of the enclosure. This produces a phase shift in the back waves that reinforces bass at low frequencies. Unattractive features include large enclosures, but low-end response of these systems is legendary. A small trade-off is a decrease in power handling but the drivers may respond at the lowest frequency capabilities.

**Cabinets** – Cabinet enclosures are one of the most important attributes for sound quality if a speaker system. For instance, internal bracing controls cabinet resonance. Unwanted resonance is avoided based on the quality of materials used in the cabinet's construction. MDF is preferred over particleboard because it is easy to work with and is made of higher density wood fibers. The speaker cabinet should be at least ½ inch thick with emphasis on the thickness of the front baffle when possible. To help deaden the sound in the cabinet, dampening material should be used. The finish of the cabinet plays no role in the overall contribution of sound quality of a loudspeaker system.

### **Pricing**

Expect to pay £381.49 for a home cinema system, £35.96 for a home theatre 5.1 system and £50.64 for a home compact Hi Fi system. Prices may vary according to the type of system purchased.