introduced by the horn is high enough that considering improvements in the mechanical aspects of the driver in order to reduce its distortion is not necessary, since these improvements will not be appreciated by the end user due to the horn's distortion, that would mask these improvements [2]. Other, however consider that nonlinear distortion and its sources are an essential factor to take in account in the design process of compression drivers, since it is not only produced by the waveguide or the horn.

Historically can be said that there have been three main approaches to assessment of nonlinearity: identification models, measurement models and perceptual models [3]. The identification methods try to obtain as much data as it is possible about the system with the purpose of being able to predict the system behavior with an arbitrary signal. This first approaching way to the problem is outside the focus of the present work.

The second approach could be denominated measurement methods. The objective is to obtain symptoms of nonlinearity through measurement protocols such as Total Harmonic Distortion, intermodulation methods, weighting high order harmonics or the use of the coherence function.

Thirdly would be the perceptual methods. These methods are based on the simulation of psychoacoustic effects responsible of sound quality perception.

Moreover, there are other parameters that historically have been used to evaluate acoustic quality and have been of great relevance in the psychoacoustics field. Even though these parameters are not related to the distortion evaluation or measurement, they have been used to describe sound characteristics that, obviously affects sound perception. With an appropriate test signal, some of these parameters could being indicating particularities of each drive that could have any correlation with the perceived quality of these sources.

In the compression drives context there is a problem that has not yet been solved satisfactorily: does the distortion caused by the waveguide masks the intrinsic drive distortion?

This work tries to be an approximation to the sound quality evaluation of compression drives. This approach is realized from different perspectives: on one hand, an evaluation of the quality of these systems from the point of view of the psychoacoustic classic parameters described by Zwicker [4] will be done. On the other hand, a perceptual model described by Moore and based on the human auditory system will be applied. Both models will be applied in signals registered on different commercial models of compression drives. The work also includes the accomplishment of a psychoacoustic experiment in which a hearing will realize a valuation of perceived quality. Finally, one will try to establish a correlation with the information obtained in the three mentioned approaches.

2. CONCEPTS

The following is a brief description of the different parameters and measurements that we have applied in order to approach to the problem exposed in the above section.

2.1. Psychoacoustic parameters

The following parameters were used as they are described in [4].

2.1.1. Sharpness

Sharpness is a measure that quantifies the high frequency content of a sound. In this sense, a 'sharper' sound means that it has a great proportion of high frequencies. The measurement unit is the acum. Zwicker and Fastl define a sound of sharpness 1 acum as a narrow band noise one critical band wide at a centre frequency of 1kHz having a level of 60dB. Using Zwicker and Fastl's approach sharpness can be calculated as the weighted first moment of the specific loudness (N'). The calculation of a partial first moment at z is N'.z.dz. This partial first moment is then weighted by the function g'(z) to give g'(z).N'.z.dz. The sum of these weighted partial moments is calculated and divided by the total loudness:

$$S = c\frac{\int_0^{24bark} N' \cdot g'(z) \cdot z \cdot dz}{\int_0^{24bark} N' \cdot dz} \qquad (1)$$

Where c is a proportionality constant (c=0.11)

2.1.2. Roughness

Roughness quantifies the subjective perception of rapid amplitude modulation of a sound. The unit of measure is the asper. One asper is defined as the roughness produced by a 1000Hz tone of 60dB which is 100% amplitude modulated at 70Hz. For a tone with a frequency of 1000Hz or above, the maximal roughness of a tone is found to be at a modulating frequency of