



# Elektrotechnik Karl-Heinz Mauz GmbH

**LSF-S1609A-IPX7** (Artikel-Nr. 106122)

**EKULIT**

<b>1. Product Outline</b>	
1-1. Scope	This specification is a typical speaker unit for telephone handset
1-2. Dimensions	As shown in figure 1
1-3. Net Weight	Approx 1.5 grams
1-4. Operating Temperature Range	-30°C to +70°C without loss of function
1-5. Storage Temperature Range	-40 °C to +85 °C (Note: Return to ambient room temperature before using)
<b>2. Electroacoustic Characteristics</b>	
2-1. Test Setup	Measuring instrument as shown in Figure 3
2-2. Impedance	AC: $7 \pm 15\%$ ohm ( at 2 KHz, 2V input )
2-3.Sound Pressure Level	$93 \pm 3$ dB SPL /2.2Vrms/10cm at 2kHz in 1cc box Speaker shall be mounted in a baffle with minimum dimensions of 80cm x 100cm. See Figure 5.
2-4.Frequency Response	See Figure 6, Table 1 Test at 2.2 Vrms/10 cm with the speaker mounted in 1cc measure box in a baffle.
2-5.Bass Resonance Frequency	$850 \pm 20\%$ Hz in 1cc box
2-6. Input Power (Rated./Max.)	Rated Power: 0.7W (in 1cc box) Maximum Power: 1.0 W (in 1cc box)
2-7.Rub and Buzz:	The input power shall be set at 0.7W. Using an audio oscillator, sweep from 500 to 6kHz with the speaker mounted in 1cc measure box and in a baffle. There shall be no buzzes, rattles, nor spurious noises.
2-8.THd	See Figure7 , Table 2 Test at 2.2Vrms/10 cm with the speaker mounted in 1cc measure box in a baffle.
2-9.Polarity	When a DC source's "+" polarity is attached to speaker's "+" polarity, "-" polarity is attached speaker's "-" polarity ,the membrane will move forward .

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3. General Reliability	
3-1 General	After any following tests the response at 2 KHz shall not deviate more than $\pm 3$ dB from the initial value
3-2 Temperature Shock Test	<p>Temperature: <math>-40^{\circ}\pm 3^{\circ}\text{C}</math> <math>\longleftrightarrow</math> <math>+85^{\circ}\pm 3^{\circ}\text{C}</math> Cycle: 10 cycles            Duration: 1 hour 1 hour (recovery 2 hours)</p> <p>(30minutes) (5minutes) 1 cycle (5minutes)</p>
3-3 Static Humidity Test	<p>Temperature: <math>+50^{\circ}\text{C}\pm 3^{\circ}\text{C}</math> Relative Humidity: 92%~97%RH            Duration: 96 hours (recovery 6 hours)</p>
3-4 Vibration Test	Secure device using a fixture appropriate for this test. Fixture shall be capable of mounting on vibration table. Vibrate from 10Hz to 2000Hz, 1 octave per minute, 2mm displacement $\pm x$ , $\pm y$ , $\pm z$ directions with 15 g's force for 2 hrs per each plane.
3-5 Drop Test	Drop samples 1.5 meters three times in each direction along each of the three mutually perpendicular axes for a total of 18 shocks. (Samples shall be mounted in a 100g fixture)
3-6 Operating Life Test	1cc box; $25^{\circ}\text{C}$ ; Pink noise; 20Hz-20kHz; 0.7W; Crest factor 3-4; 96H
3-7 Rated Sweep Power Test	1cc box; $25^{\circ}\text{C}$ ; Rated Power(0.7W); 650-1050Hz; 1 sec; 12 H
3-8 Max Power Test	1cc box; $25^{\circ}\text{C}$ ; Pink noise; 20Hz-20kHz; 1.0W; 1 sec on/60 sec off; 60 cycles
3-9 High Temperature Test	$85 \pm 2^{\circ}\text{C}$ ; 96H; 2H Recovery time
3-10 Low Temperature Test	$-40 \pm 2^{\circ}\text{C}$ ; 96H; 2H Recovery time
3-11 Waterproof Requiremer	IPX-7 Test Condition: Depth of water: 1 Meters Time of duration: 30 Minutes
3-12 Air Leak Test Conditions	Air pressure 10KPa, Back side pressure 1.0Kg, Continuous time 7 Seconds, Less than 1 SCCM



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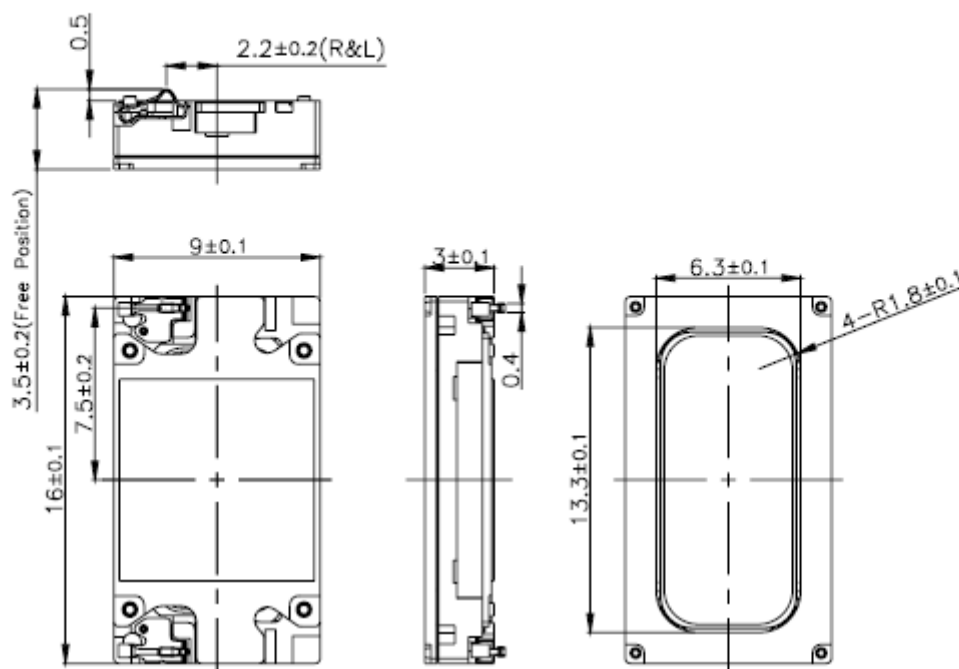
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## 4. Mechanical Layout and Dimensions

### 4.1 Mechanical Layout



**Notes:**

1. General unless otherwise noted  $\pm 0.15\text{mm}$ .

(Figure 1)

9	Spring	SUS301 3/4H	2	
8	Cover	PPA	1	
7	Voice Coil	SDHT 2DS	1	
6	Dome Type	AL	1	
5	Diaphragm	PEEK	1	
4	Pole Piece	SPCC	5	
3	Magnet	N48H	5	
2	Yoke	SPCE	1	
1	Frame	PPA	1	
No.	Part Name	Material	Q'TY	Remark

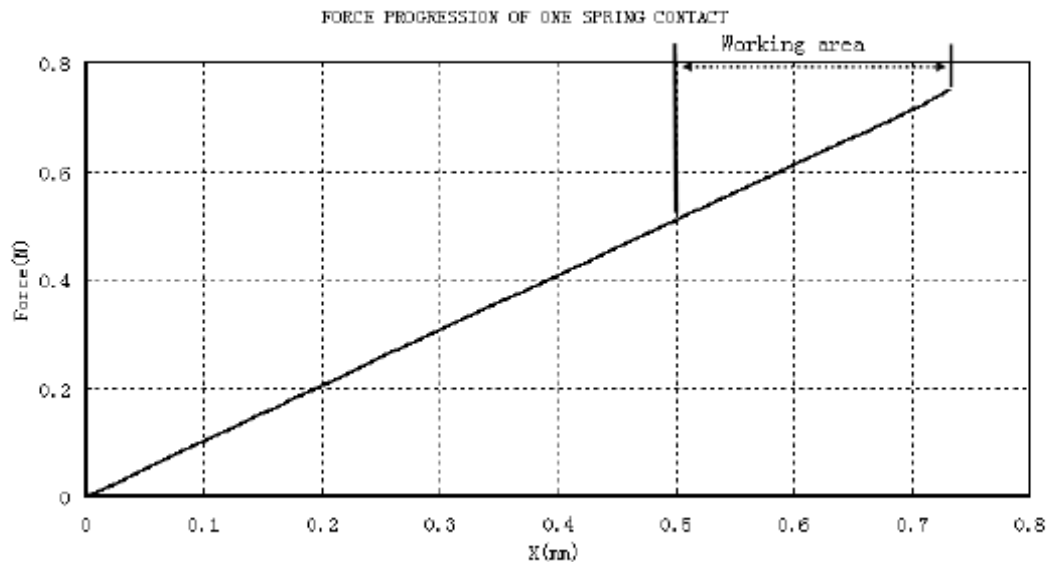
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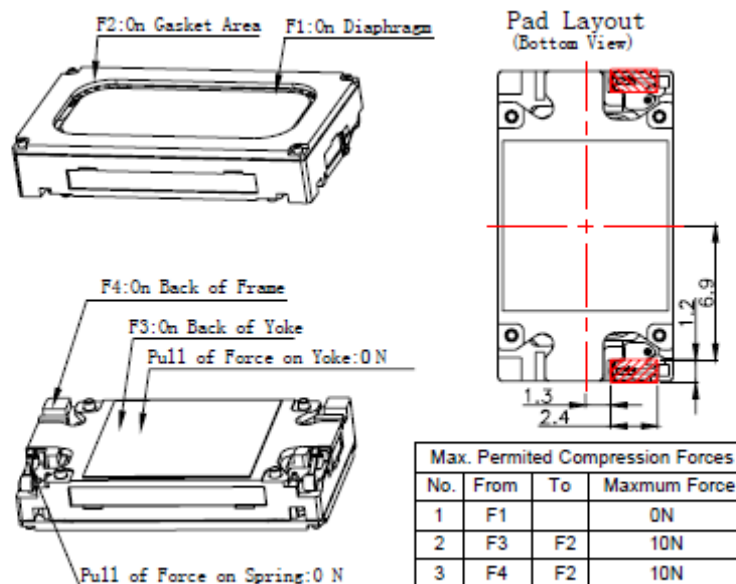
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### 4.2 Force Diagram



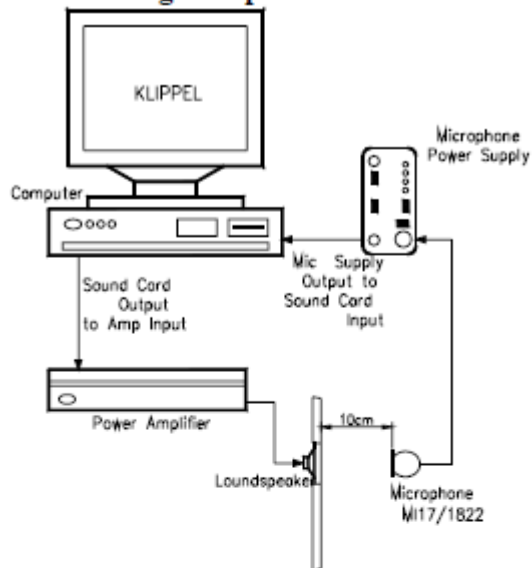
(Figure 2)

### 4.3 Permitted Force to Speaker



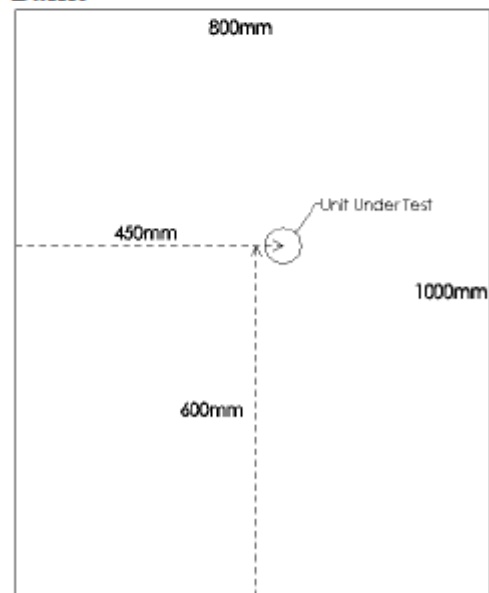
(Figure 3)

### 5. Measuring Setup



(Figure 4)

### Baffle



Spaker Baffle  
(Figure 5)

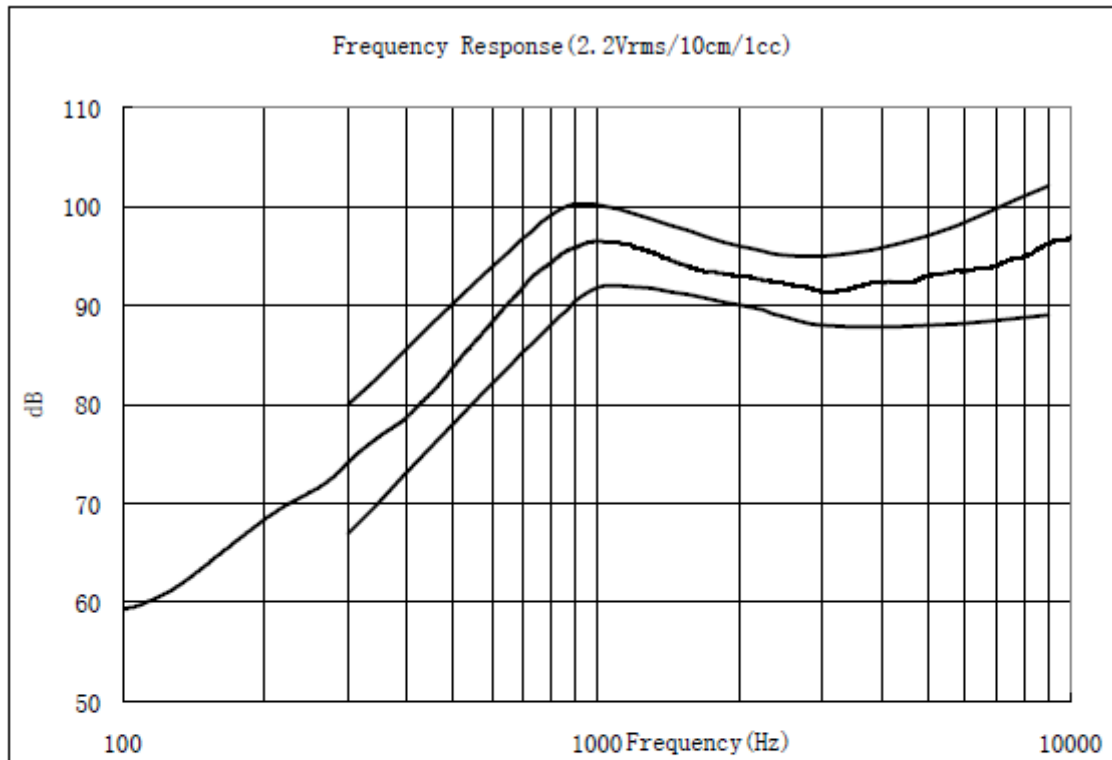


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## 6. Frequency Response



(Figure 6)

Table 1: Tolerance Limits Date for FR

Frequency(Hz)	Upper Limits(dB)	Frequency(Hz)	Lower Limits(dB)
300	80	300	67
800	99	800	88
1050	100	1050	92
2000	96	2000	90
3000	95	3000	88
5000	97	5000	88
9000	102	9000	89

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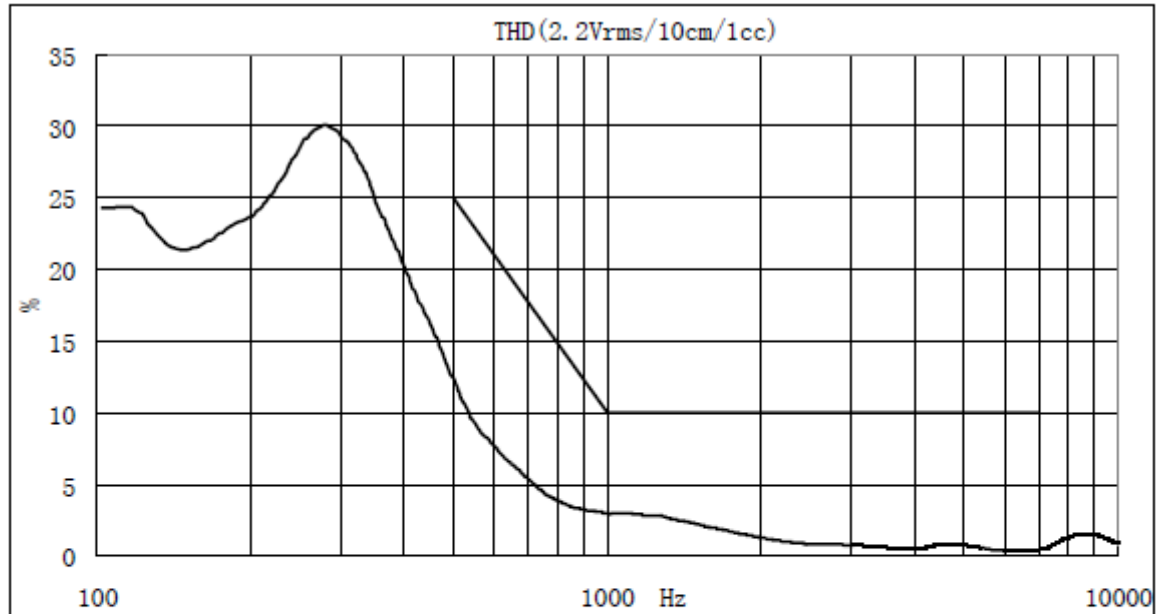


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## 7. Total Harmonic Distortion



(Figure 7)

**Table 2: Limits Date for THD**

Frequency(Hz)	Limits
500	25
1000	10
7000	10



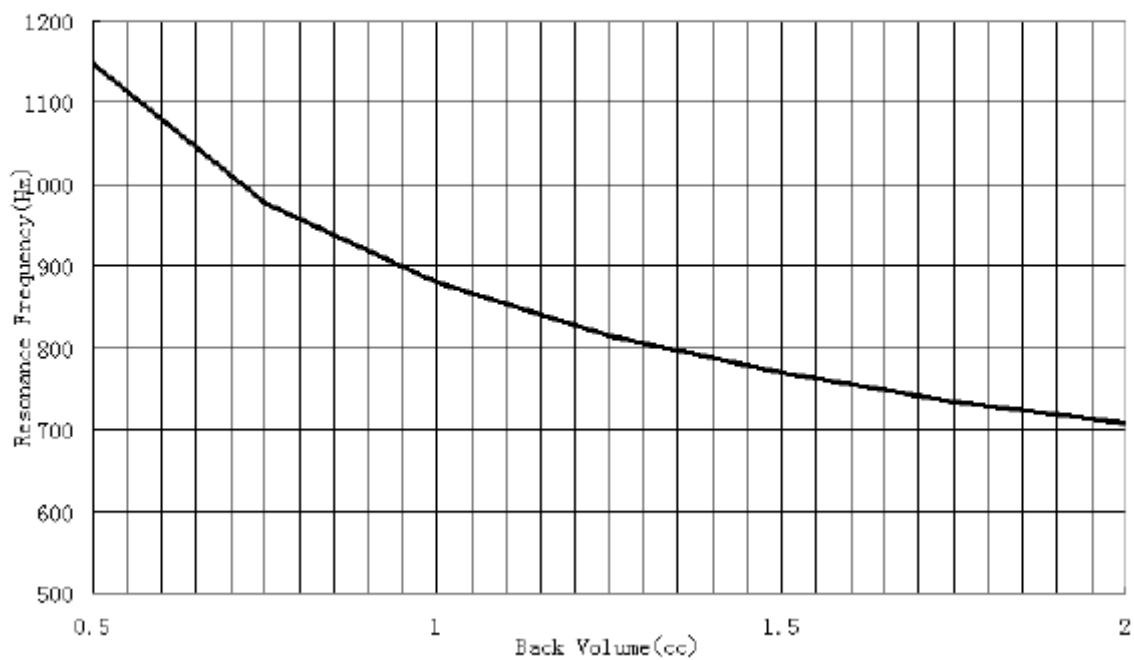
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## 8.1 Resonance frequency VS sealed back volume

The resonance frequency of the speaker box will vary with different sealed back volume.



(Figure 8)

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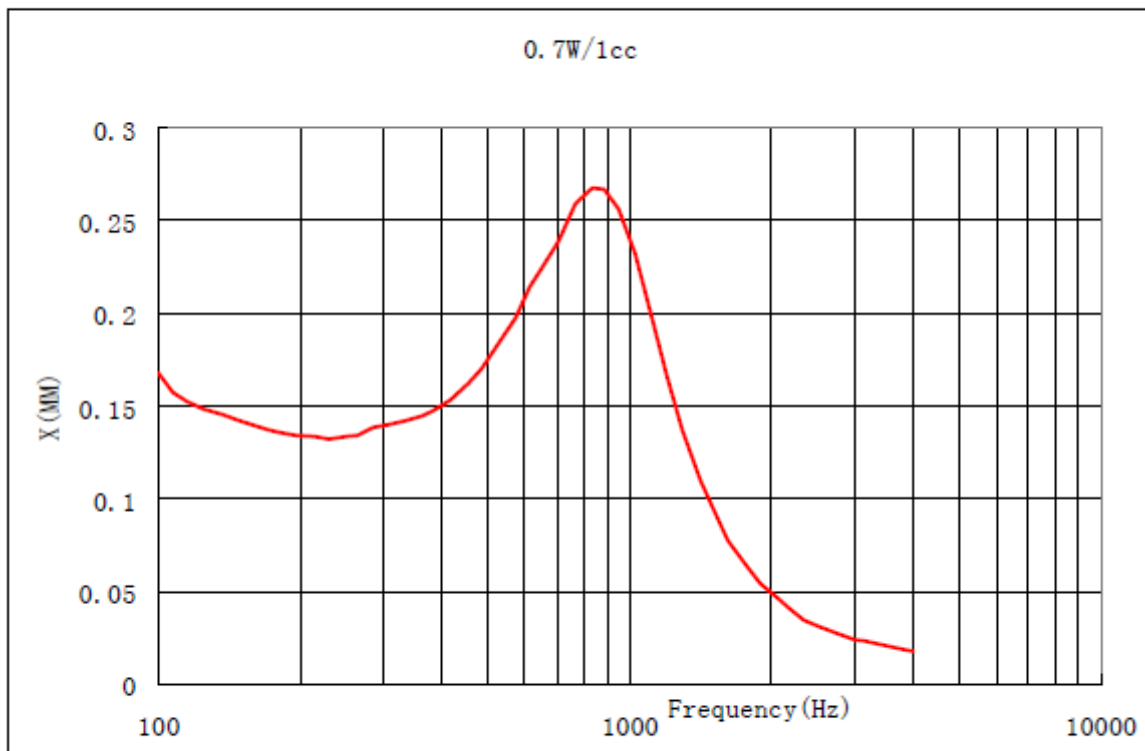


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## 8.2. Peak to peak excursion

Xp in different power input



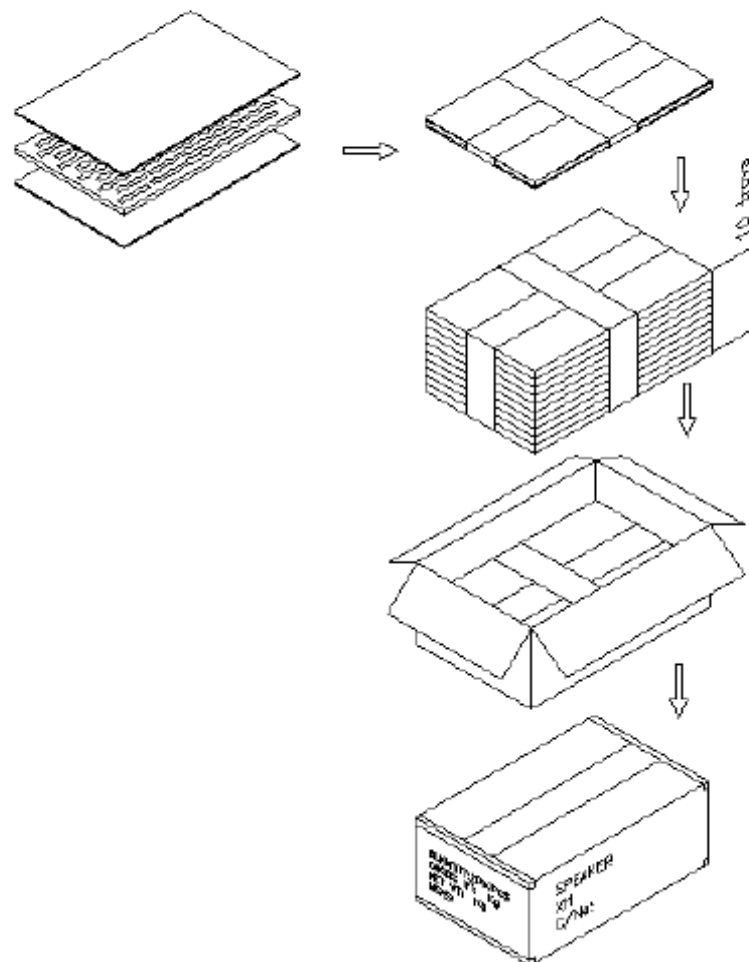
(Figure 9)

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## 9. Package

- 1、 100pcs of speaker in each tray
- 2、 20 trays in one carton
- 3、 Total:2000 pcs / 1 carton
- 4、 Gross Weight:5.0KGS
- 5、 Net Weight: 3.0KGS



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