

ESS

TEMPEST

sound as clear as light



# Tempest



# TEMPEST LS 5 AND TEMPEST LS 8

## THE LOW FREQUENCY DRIVERS

The low frequency transducers used in the LS 5 and LS 8 loudspeakers utilize a permanent magnetic circuit that critically damps the drivers' moving assembly to make possible a flat frequency over an extended range. Special high temperature epoxy resins are used when turning the voice coil to insure increased power handling capability. Cone stocks have been analyzed with an eye to selecting highly damped pulp for maximum quieting; and frequency response characteristics have been chosen that create a seamless transition between the woofer and the high definition "Power Ring" Heil air-motion transformer. The result: clean, crisp bass without obscuring the great clarity and detail of the Heil midrange/tweeter.

## PASSIVE RADIATOR

The 10" passive radiators on ESS Tempest speakers are driven by the motional energy of the woofer. The passive radiator works in the same way as a port except that the velocity of the pas-

sive diaphragm is much lower than that of the air noisily moving through a typical port. Low frequency noise and distortion are considerably lower when using a passive radiator system than when using a ported system.

As a result one achieves quiet, augmented bass response in the deepest regions, around 35 Hz, without the usual windy boom caused by a port. Timpani emerge from total silence with thunderous impact.

## FREQUENCY DIVIDING NETWORK

Optimal performance and power handling of the drivers used in your ESS Tempest speakers is assured not by the typical 6 or 12 dB per octave crossover slope so commonplace in other systems, but by a complex and sophisticated 18 dB per octave crossover specially tailored to complement the woofers. Rugged, high quality components integrate the woofer and the Heil air-motion transformer at a crossover point of 2400 Hz, providing absolute freedom from phase interference in the mid-range. In addition, all LS series speakers contain a linear "shelf" Environmental Equalizer control for continuously variable attenuation or accentuation from 2400 Hz to beyond audibility.

## CABINETRY

Tempest bookshelves are designed with an eye to preserving the clean, warm simplicity of golden oak set off by deep sable brown. Selected white oak veneers, hand oiled to a silken finish, accent the rich grain of this fine oak.

Beauty was not the sole end in mind. Augmented deep bass response was achieved both by adding a passive radiator and by designing a narrow but deeply drawn cabinet possessing great interior volume while preserving a slender silhouette.

Tempest bookshelves are outwardly characterized by functional design, strong structure, and superb finish. These obvious signs of excellence are matched by totally responsive, spectacular sound. Transients are crisp and clean etched, bass deep and full bodied. Midrange clear and detailed. The musical effect is total.

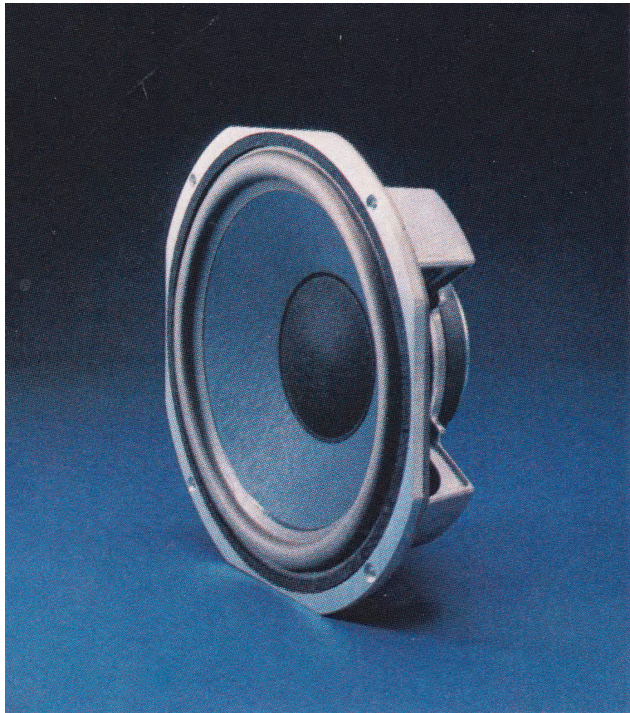
When you want the convenience of a bookshelf with that extra margin of performance. Tempest.



## SPECIFICATIONS

FULL SYSTEM	LS 8
Power Capacity	100 Watts (clean power)
Nominal Impedance	6 Ohms
Dispersion	120° horizontal, 40° vertical
Crossover Frequency	2400 Hz
Efficiency	1 Watt input produces a sound pressure at a distance of 80 dB at 15 feet
Amplitude-Frequency Response	50 Hz to 20 kHz ±3 dB
HEIL AIR-MOTION TRANSFORMER	
Total Radiating Area	10.4 sq. in. (67.1 cm <sup>2</sup> )
Transformation Ratio	5.3 to 1
Magnet Assembly Weight	2V4 lbs. (1.02 kg)
Flux Density	6,000 Gauss
Square Wave Rise Time	15 Microseconds @ 5 kHz
LOW FREQUENCY DRIVER	
Nominal Diameter	8 inches (20.3 cm)
Flux Density	9,000 Gauss





## TEMPEST LS4

### LOW FREQUENCY DRIVER

The top of the line Tempest LS 4 contains a rigid, cast aluminum frame 10" woofer built by ESS. Its cone pulp is among the quietest available. Its open backed design allows the back wave to pass into the enclosure freely, thus avoiding the hard, metallic "ringing" so common to stamped frame woofers. Because the improved structural rigidity results in no lost energy through flexing, the sound is tighter and cleaner, and because the sound is free of ringing, it is also smoother and distinctly clearer.

### PASSIVE RADIATOR

By mounting the 10" passive radiator on the front baffle near the cast aluminum frame 10" woofer, the two drivers "couple" more effectively to mutually-reinforce each other. The increased incisiveness of the bass and overall sonic coherence of the trimline cabinet is immediately felt. Sudden bass attacks are tight, deep and beautifully imaged.

### CABINETY

The trimline floor-standing cabinet of the LS 4 is not only handsome, it is supremely functional. By providing more interior volume and by permitting the passive radiator to be front mounted,

LS 5	LS 4
140 Watts (clean power) 6 Ohms 120° horizontal, 40° vertical 2400 Hz 1 Watt input produces 95 dB of sound pressure at a distance of 3 feet, 81 dB at 15 feet 40 Hz to 20 kHz ± 3 dB	160 Watts (clean power) 6 Ohms 120° horizontal, 40° vertical 2400 Hz 1 Watt input produces 96 dB of sound pressure at a distance of 3 feet, 82 dB at 15 feet 35 Hz to 24 kHz ± 3 dB
10.4 sq. in. (67.1 cm <sup>2</sup> ) 5.3 to 1 2V4 lbs. (1.02 kg) 6,000 Gauss 15 Microseconds @ 5 kHz	10.4 sq. in. (67.1 cm <sup>2</sup> ) 5.3 to 1 V4 lbs. (1.02 kg) 6,000 Gauss 15 Microseconds @ 5 kHz
10 inches (25.40 cm) 9,500 Gauss	10 inches (25.40 cm) 11,800 Gauss

PASSIVE RADIATOR	LS 8	LS 5	LS 4
Nominal Diameter	10 inches (25.40 cm)	10 inches (25.40 cm)	10 inches (25.40 cm)
<b>CONTROLS</b>			
Environmental Equalizer	from 2400 Hz to beyond audibility	from 2400 Hz to beyond audibility	from 2400 Hz to beyond audibility
<b>DECOR</b>			
Finish	Oak	Oak	Oak
Grille Color	Dark Brown	Dark Brown	Dark Brown
Dimensions	22 in. H x 12% in. W x 10% in. D (55.9x31.1 x 27 cm)	24Ve in. H x 14 in. W x 14 in. D (61.3 x 35.6 x 35.6 cm)	35 in. H x 12V2 in. W x 12Ve in. D (88.9x31.75 x 30/8 cm)
<b>WEIGHT</b>			
(Including Packing)	30 lbs. (14 kg)	36 lbs. (17 kg)	48 lbs. (22 kg)

Specifications derived from anechoic chamber tests using B & K equipment at California State University, Sacramento.



### FREQUENCY DIVIDING NETWORK

The frequency dividing network of the LS 4 takes advantage of the increased quietness and clarity of the pulp material used in the cast aluminum frame woofer. As a result the LS 4, as opposed to the LS 5 and 8, has a slightly fuller and warmer sound with no loss in clarity or increase in coloration when driven hard. In addition the linear shelf control on the LS 4 provides excellent ambient equalization by means of its variable attenuation or accentuation from 2400 Hz to those higher frequencies whose absence is felt even if their presence is not heard.

important improvements in deep, fundamental bass output have been realized. The slender pedestal improves bass response by raising the woofer off the ground and most importantly, naturally and unobtrusively permits the tweeter to radiate at ear level — its optimum location.

Form and function. The ideal harmony. The Tempest trimline 4.



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## INTRODUCTION

The Tempest line of clean, contemporary loudspeakers in golden oak by ESS are simply superb instruments. Functional by design and modest in size and cost, they possess the obvious mark of excellence — great reserve potential. They are by turns subtle or spectacular as the need requires. All incorporate the revolutionary Heil air-motion transformer; all reproduce sound with the drama, dynamic range and tonal clarity characteristic of Heil air-motion transformer systems; all are serenely beautiful in repose, thunderous in performance. In sum, they are true ESS systems, crafted to exacting standards of excellence.

With proper care they will last a lifetime.

## THE HEIL AIR-MOTION TRANSFORMER

Why has the Heil air-motion transformer been called by critics around the world, "superior," "the first real breakthrough in loudspeaker design in fifty years," "authentically . . . revolutionary"? The answer lies in its solution to those cone resonances popularly called "cone break up" or "overhang."

Conventional cone and dome drivers are highly susceptible to cone resonance. Driven at certain frequencies, a cone begins to resonate and change shape "in sympathy" with the input frequency. When another signal is introduced at the same time, as is always true in a musical signal, the resonating diaphragm tightens up like a rubber

band stretched between two points. This forces the frequency to rise in pitch, creating "masking" sounds other than those created by the musical signal.

This problem of "overhang" is severe in cone speakers because their mass is huge and because the driving force exists only at the center. Poor control inevitably results. Finally, because the cone "pushes" air like a piston it can only drive air as fast as it moves itself. The result is high inertia — that tendency of moving objects to continue moving in the same direction — hence, high overhang.

The diaphragm of the Heil air-motion transformer avoids these pitfalls by virtue of its low mass — hence low inertia — and by locating the driving force not in the center, as in a cone or dome, but by distributing it uniformly over the Heil diaphragm's entire surface.

Moreover, unlike cones which must move as far as the air they "push," the Heil pleats "squeeze" air out five times faster than they themselves move. This increase in the ratio of air motion to pleat motion of 5 to 1 is a "transformation" of energy. Hence the name Heil "Air-Motion Transformer."

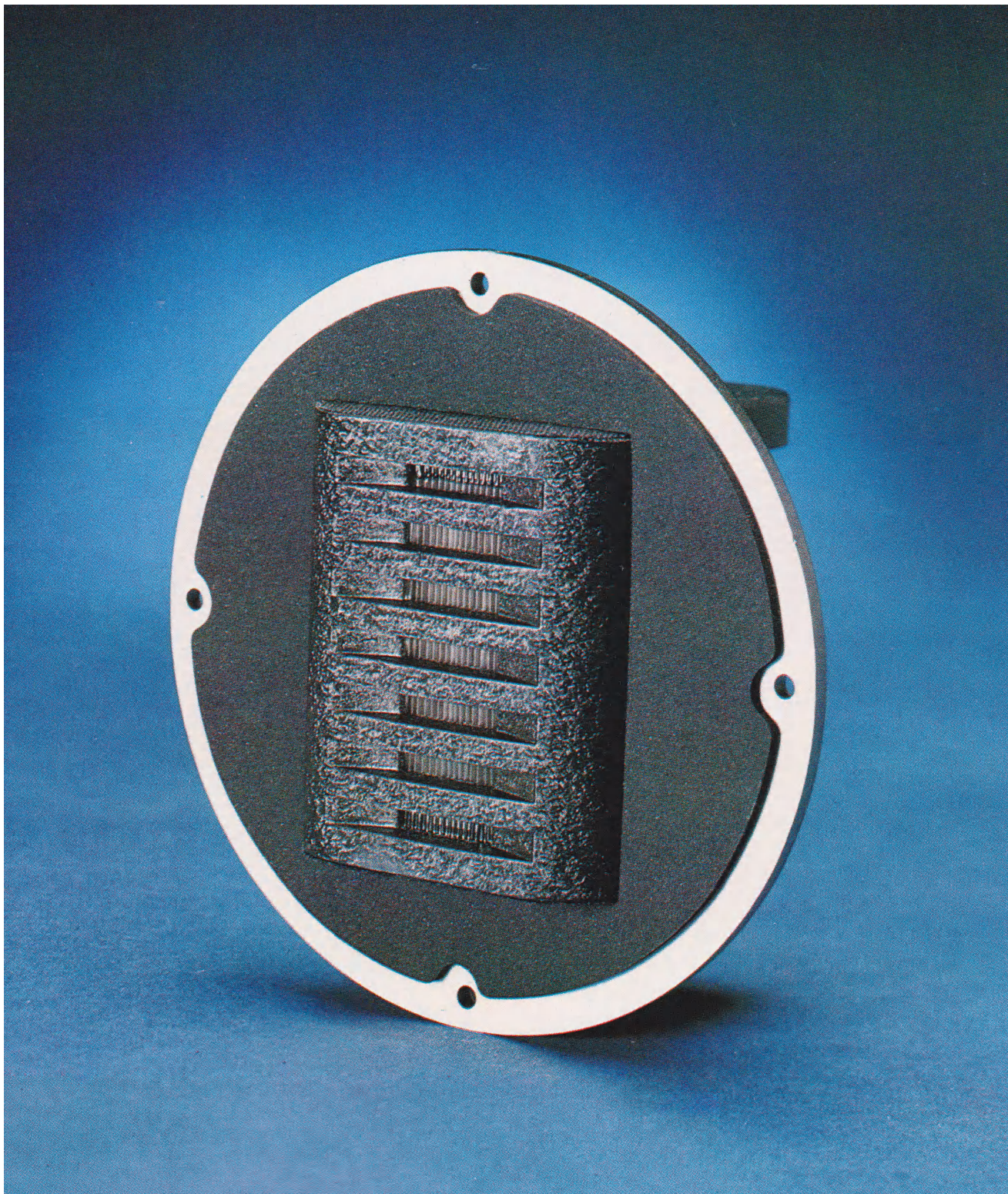
Because this "transformation" drastically reduces the effective moving mass of the Heil diaphragm, the Heil builds up only a fraction of the momentum or inertia generated by conventional one-to-one drivers. The Heil transfers energy to the air efficiently at all frequencies without those "masking" distortions caused by overhang and cone break-up.

## THE MIDRANGE/HIGH FREQUENCY DRIVER

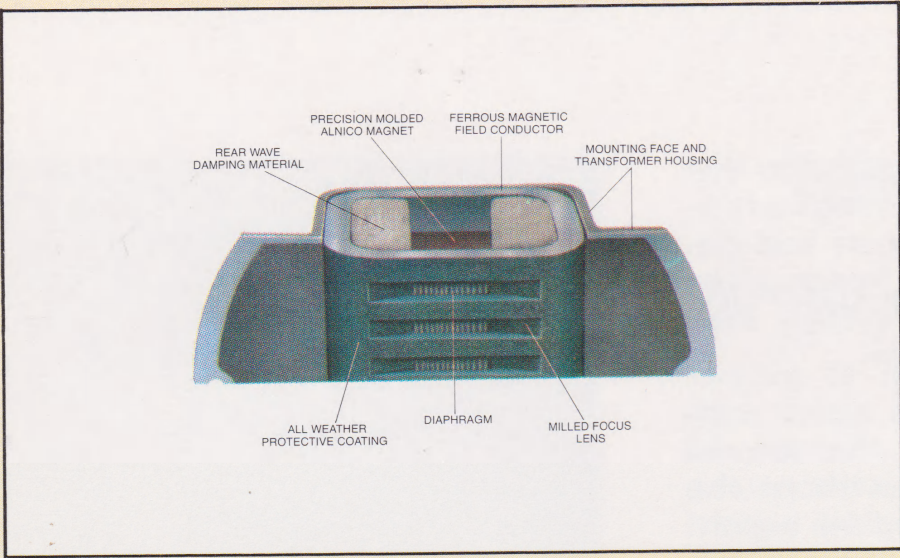
The "Power Ring" Heil Air-Motion Transformer used in the Tempest line of ESS loudspeakers is a front-radiating air-motion transformer capable of reproducing frequencies down to 2400 Hz.

It has the effective area of a six inch midrange folded into a small, narrow pleated configuration. As a result the "Power Ring" has the dynamic range and transient reserve potential of a large driver, with the spectacular dispersion of a small dome tweeter.

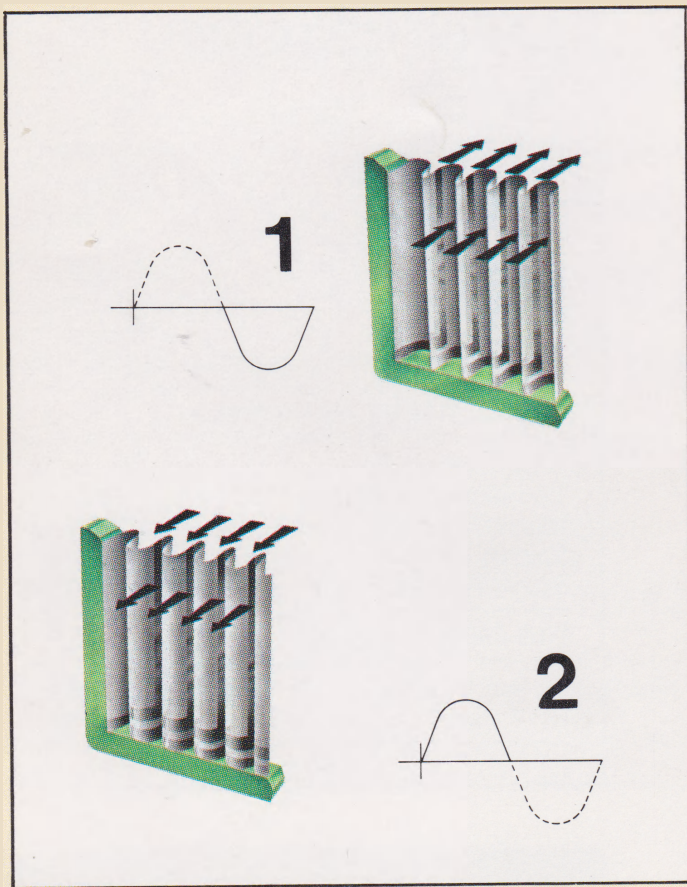
The Heil thus maintains a solid expanse of stereo imagery to frequencies beyond audibility.



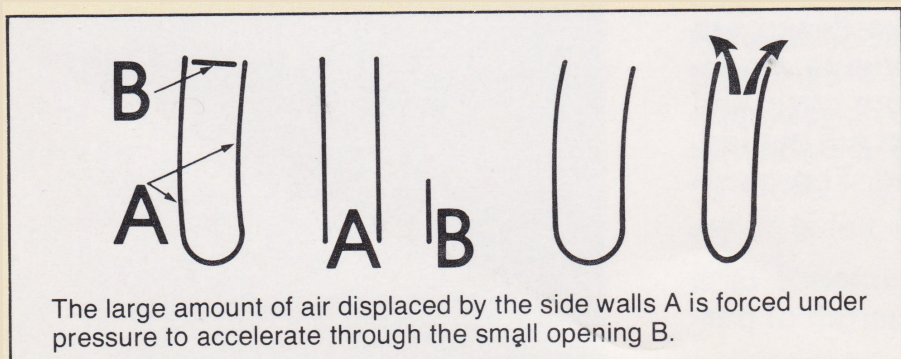
The Tempest loudspeaker includes in its design the latest developments in ESS technology. Frequencies above 2400 Hz are reproduced by a highly efficient front radiating Heil air-motion transformer known as the "Power Ring." The diagram below permits a closer look at the revolutionary design of this unit.



The unique action of the "Power Ring" diaphragm and the corresponding musical sine wave signals are pictured below. 1) As the sine wave signal rises the pleats contract toward the front forcing the air out under pressure. At the same time air is sucked into the pleats opening toward the back. 2) When the sine wave reverses, air is forced out in the opposite direction by the closing back pleats.

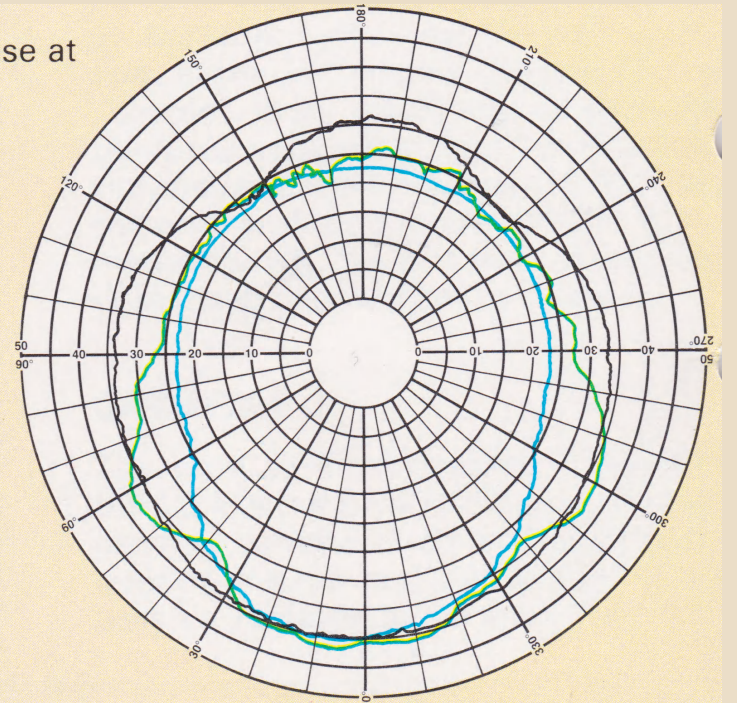


The pleat action and the resulting air movement are shown in detail from above. A large amount of air is forced out by side walls "A" through a small opening "B." Because the folds are 5.3 times as deep as they are wide, they force the air out with a five fold "transformation" or increase in air velocity.

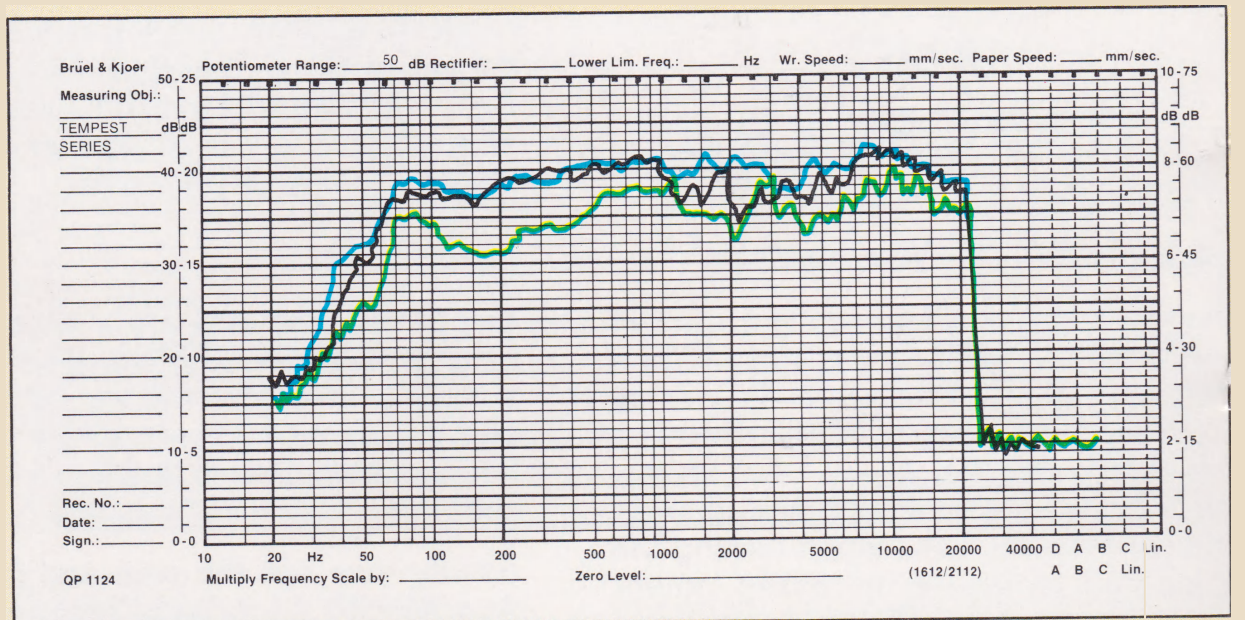


# Inside the ESS Heil air-motion transformer

Polar response at  
500 Hz  
5,000 Hz  
16,000 Hz



Typical polar response curves at a range of frequencies show a broad horizontal dispersion pattern. Because even the highest frequencies are dispersed over a large area, a full stereo imaging is assured at any listening point.

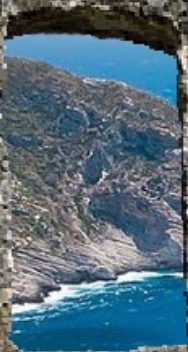


LS 5 LS 8 LS 4

Frequency response curves reproduced above show the linear and broad bandwidth that is the mark of Tempest loudspeakers.

# Loud and Proud

HIFIGOTEBORG.se a



*Sound As Clear As Light™*



WANT TO RELAX TO BEAUTIFUL  
MUSIC

**WELCOME**

WE HAVE GOOD HIFI AT YOUR  
SERVICE

PLEASE WAIT HERE & A MEMBER  
OF OUR TEAM WILL BE WITH  
YOU SHORTLY.

Or press finger HERE