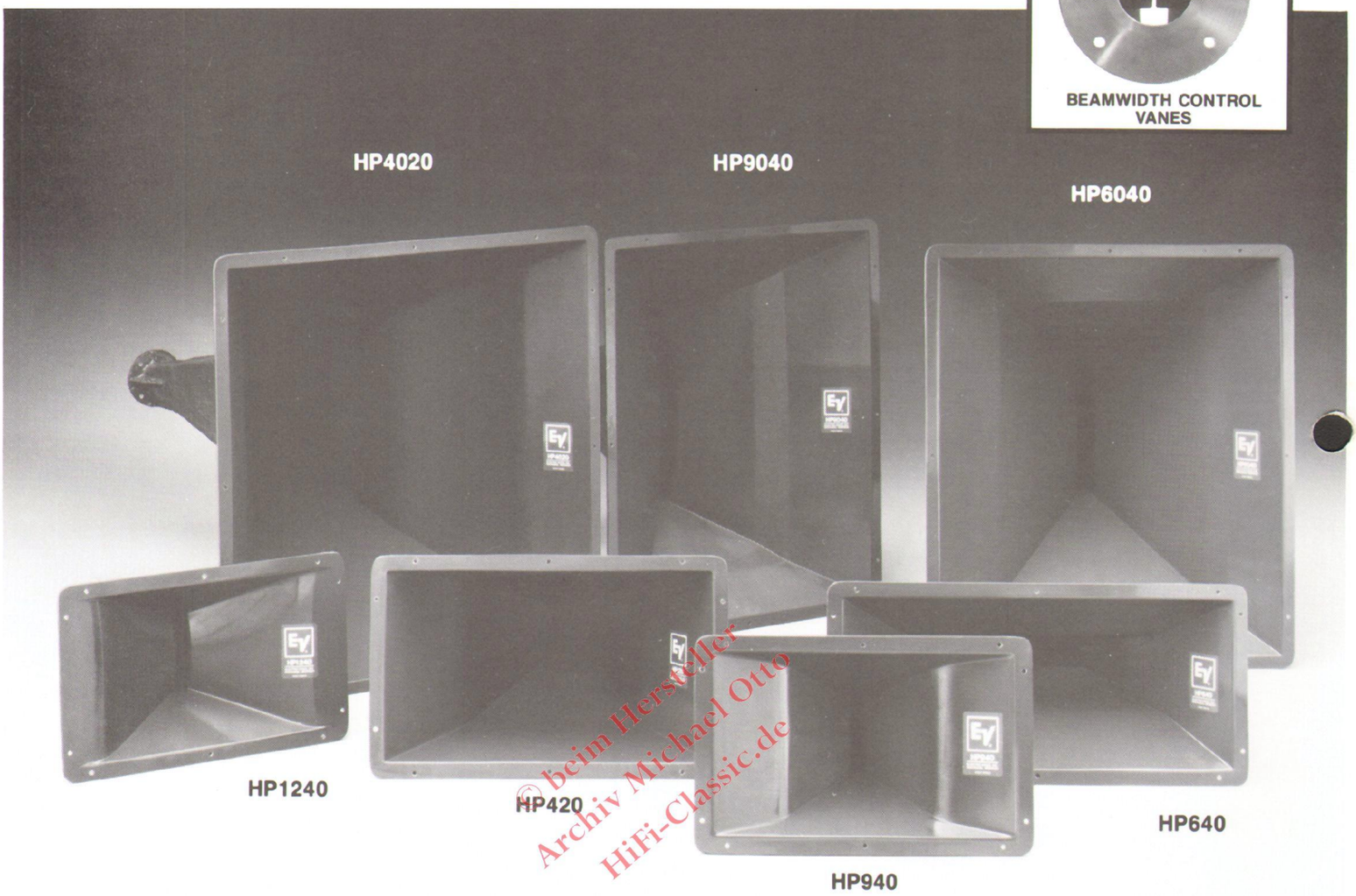
Electro-Voice®

Professional Sound Reinforcement HP Horns DH Drivers

HP Horns



Specifications:[1]	HP420	HP640	HP940	HP1240	HP4020	HP6040	HP9040
Horizontal Coverage Angle, 6 dB Down — Average:	40° (+20°, −10°) (650-20,000 Hz)	60° (+10°, −10°) (500-20,000 Hz)	90° (+20°, −10°) (500-20,000 Hz)	120° (+20°, −40°) (500-20,000 Hz)	40° (+20°, −10°) (500-20,000 Hz)	60° (+10°, −10°) (500-20,000 Hz)	90° (+10°, −10°) (500-20,000 Hz)
500 Hz:	80°	68°	98°	102°	57°	60°	89°
800 Hz:	50°	51°	83°	80°	45°	50°	93°
Vertical Coverage Angle, 6 dB Down — Average:	20° (+10°, −10°) (2,200-20,000 Hz)	40° (+20°, −10°) (1,500-20,000 Hz)	40° (+20°, −10°) (1,200-20,000 Hz)	40° (+20°, −10°) (1,500-20,000 Hz)	20° (+20°, −10°) (500-20,000 Hz)	40° (+10°, −10°) (500-20,000 Hz)	40° (+10°, −10°) (500-20,000 Hz)
500 Hz:	105°	105°	105°	110°	35°	51°	51°
800 Hz:	82°	80°	85°	85°	30°	41°	40°
Directivity Factor R_θ (Q), Average:	47.5 (+26.1, −23.3) (1,250-20,000 Hz)	20.6 (+11.3, −2.6) (1,250-20,000 Hz)	11.8 (+3.7, −3.0) (1,250-20,000 Hz)	8.4 (+2.7, −1.9) (1,250-20,000 Hz)	50.9 (+9.5, −13.0) (1,250-20,000 Hz)	25.8 (+17.9, −5.9) (500-20,000 Hz)	12.1 (+4.6, −3.7) (500-20,000 Hz)
Directivity Index D_I, Average:	16.8 dB (+1.9, −3.0 dB) (1,250-20,000 Hz)	13.1 dB (+1.9, −0.5 dB) (1,250-20,000 Hz)	10.7 dB (+1.2, −1.3 dB) (1,250-20,000 Hz)	9.24 dB (+1.2, −0.9 dB) (1,250-20,000 Hz)	17.1 dB (+0.6, −1.7 dB) (1,250-20,000 Hz)	14.1 dB (+2.3, −0.7 dB) (500-20,000 Hz)	10.8 dB (+1.4, −1.6 dB) (500-20,000 Hz)
Lowest Frequency for Full Driver Loading:[2]	400 Hz	400 Hz	400 Hz	400 Hz	200 Hz	500 Hz	500 Hz
Sound Pressure Level on Axis at 1 Meter, 1 Watt into 8 Ohms (with DH1 or DH2 driver):[3]	114 dB	112 dB	110 dB	108 dB	115 dB	113 dB	111 dB
Construction:	Polyester resin and glass-fiber laminate integrally molded to a die-cast zinc throat section						
Throat Diameter:	49 mm (1.9 in.)	49 mm (1.9 in.)	49 mm (1.9 in.)	49 mm (1.9 in.)	49 mm (1.9 in.)	49 mm (1.9 in.)	49 mm (1.9 in.)
Color:	EV charcoal grey	EV charcoal grey	EV charcoal grey	EV charcoal grey	EV charcoal grey	EV charcoal grey	EV charcoal grey
Dimensions — Height:	36.7 cm (14.4 in.)	33.0 cm (13.0 in.)	33.0 cm (13.0 in.)	33.0 cm (13.0 in.)	83.8 cm (33.0 in.)	81.3 cm (32.0 in.)	81.3 cm (32.0 in.)
Width:	61.0 cm (24.0 in.)	71.1 cm (28.0 in.)	53.3 cm (21.0 in.)	53.3 cm (21.0 in.)	81.3 cm (32.0 in.)	71.1 cm (28.0 in.)	67.9 cm (26.8 in.)
Depth:	74.9 cm (29.5 in.)	43.7 cm (17.2 in.)	28.4 cm (11.2 in.)	26.4 cm (10.4 in.)	125 cm (49.3 in.)	80.8 cm (31.8 in.)	80.8 cm (31.8 in.)
Net Weight:	5.90 kg (13.0 lb)	4.31 kg (9.50 lb)	3.18 kg (7.00 lb)	3.18 k (7.00 lb)	12.2 kg (27.0 lb)	9.07 kg (20.0 lb)	9.07 kg (20.0 lb)
Shipping Weight:	8.16 kg (18.0 lb)	5.90 kg (13.0 lb)	4.08 kg (9.00 lb)	4.08 kg (9.00 lb)	18.1 kg (40.0 lb)	14.1 kg (31.0 lb)	14.1 kg (31.0 lb)

1. All acoustic measurements made in an anechoic environment with indicated bands of one-third-octave pink noise, unless otherwise noted.
2. The DH2 driver must be crossed over at 800 Hz or higher for full power capacity.
3. Band-limited pink noise, 500-5,000 Hz.

Electro-Voice Reinvents the "Constant-Directivity" Horn

In 1974, Electro-Voice introduced the HR9040, the world's first "constant-directivity" horn—a horn which, for the first time, provided truly uniform coverage angles over a wide frequency range. The resulting series of HR horns forever changed the design philosophy of high-frequency directivity-control devices in the professional audio industry.

Now EV introduces the TransPlanar™ high-frequency horn, a "second generation" design that redefines constant directivity. With a patented blend of flared and conical surfaces and the precision of directivity-optimized size, the new TransPlanar HP line offers the most uniform beamwidth control in the industry. Three "large" HP horns maintain rated beamwidth control down to 500 Hz in both the vertical and horizontal planes. The four "small" HP horns maintain horizontal beamwidth control to 500 Hz and, with smaller, more convenient vertical dimensions, exhibit vertical control to 1,500 Hz.

HP for "Horn Perfect"

TransPlanar™ Design. Constructed of a non-resonant, fiberglass reinforced composite, all HP designs feature a smooth transition from radial to planar surfaces. This unique joining of curved and straight-sided geometries results in unusually smooth frequency response, optimal driver loading, uniform coverage to 20,000 Hz and extremely convenient mounting.

Directivity-Optimized Size. The HP horns have mouth sizes only as large as needed to maintain the rated coverage angles down to the low-frequency limits described above. This permits both compact cluster design and exceptional directivity control. *No other horn line is designed with this fundamental criterion.* Other constant-directivity horns may be larger than they need to be—or not large enough—and an optimum combination of size and directivity control is not possible.

Beamwidth-Control Vanes. Cast into the metal throat section of every HP horn, angled waveguides restore full coverage patterns above 10,000 Hz, correcting the problem of high-frequency beaming found in other two-inch-throat constant-directivity designs.

Two-Inch Exits. The HP throat section terminates in a flanged, two-inch exit with a four-bolt mounting pattern, the "standard" format for many applications.

Flat-Front Mouths. All HP horns have a flat, predrilled mounting flange which greatly simplifies installation in both cabinets and component clusters.

Integral Metal Throats. The 2-inch, die-cast metal throat is captured in the horn's fiberglass sidewall during the manufacturing process, giving the HP horn and throat assembly the strength of unitized construction. Encapsulating the throat in this manner eliminates the cost and inconvenience of bolt-on throat sections.

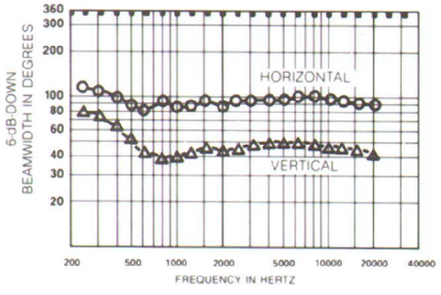
20,000-Hz Dispersion with Beamwidth-Control Vanes

One problem with a 2-inch throat for high-frequency horns is the beaming, or narrowing of coverage angle, that occurs above 10,000 Hz. This is a consequence of a physical law that states: as the effective area of the sound source increases in size, the dispersion angle of that source decreases. However, *the unique beamwidth-control vanes (photo insert) in HP horns totally eliminate high-frequency beaming,* providing uniform dispersion to 20,000 Hz.

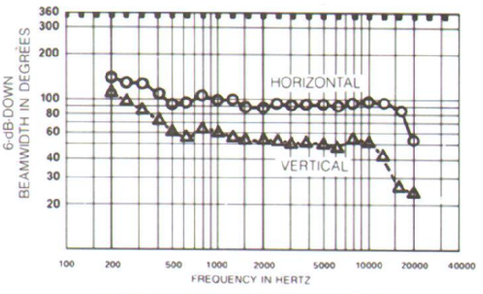
The **vertical** beamwidth curves, below, depict the effect of the vanes for the HP9040. Note that the beamwidth of the EV horn remains uniform beyond 10,000 Hz while the competitive 2-inch-throat horn suffers from beaming.

The superior **horizontal** beamwidth frequency curve of the HP9040 results from the use of a smaller, curvilinear feed-slot aperture.

BEAMWIDTH vs. FREQUENCY



EV HP9040



ORDINARY 2-INCH-THROAT HIGH-FREQUENCY HORN

"Contractor-Friendly," High-Performance DH Drivers

With the new DH1 and DH2, EV introduces both "large" and "small" high-frequency drivers with "standard" two-inch exits. This uniformity allows direct use of either driver (no adapters needed) on any Electro-Voice HP series horn.

Both drivers also feature EV's exclusive oversized screw terminals which secure two 12-gauge (or smaller) wires and provide maximum contact area for high connection reliability.

High Power Capacity with Highs

DH1. Like it's rugged predecessors, the DH1012A and DH2012, the DH1 driver features a one-piece aluminum-alloy dome and coil form drawn in a single operation. Advanced metal-forming technology developed at EV allows use of unusually thin, 0.002-inch-thick material. This unique construction provides a high stiffness-to-weight ratio for extended high-frequency response and efficient heat dissipation for high power handling.

Unlike the one-piece diaphragm and suspension of traditional drivers, the DH1 employs a separately formed polyimide suspension for extended flex life. The geometrically optimized pattern formed into this suspension, when combined with the extremely lightweight dome, further improves high-frequency performance.

DH2. The dome and geometrically optimized suspension of the DH2 are formed from a single piece of pure titanium. Titanium has one of the highest strength-to-weight ratios of any element, and affords the DH2 unmatched high-frequency response with no sacrifice in power capacity. A unique convex-drive phase plug further contributes to the excellent upper-octave response of the DH2.

Real-World Power Capacity. Both the DH1 and DH2 continue the EV tradition of withstanding "real-world" power tests. The DH1 has a long-term average power capacity of 40 watts at frequencies above 500 Hz. This rating uses band-limited pink noise with a 10-dB crest factor for a duration of 24 hours. This means that the DH1 can sustain transient peaks of 400 watts! The DH2 has a long-term average power capacity of 30 watts above 800 Hz and can sustain peaks of 300 watts.

DH Drivers

Maximum Efficiency

DH drivers are "maximum-efficiency" designs, maintaining 25% efficiency up to about 3,000 Hz. Some newer drivers sacrifice substantial mid-band efficiency (as much as 4 or 5 dB) in order to give the impression of having superior high-frequency output. Since the maximum energy of typical program material is predominately in the midrange, however, only maximum-efficiency designs like the DH drivers can minimize amplifier power requirements and maximize driver reliability.

DH1 versus DH2

The DH1 should be used when maximum power handling and/or a 500-Hz crossover point is required. The DH2 can be used with excellent results in systems that utilize an 800-Hz (or higher) crossover point and do not require the slightly greater power handling of the DH1.

Specifications:	DH1	DH2
Power Frequency Response:	500-16,000 Hz (essentially flat 500-5,000 Hz, with 12-dB-per octave rolloff to 16,000 Hz, rapid rolloff beyond)[1]	500-20,000 Hz (essentially flat 500-3,000 Hz, with 12-dB-per octave rolloff to 20,000 Hz, rapid rolloff beyond)[1]
Impedance — Nominal: **Minimum (on HP horns above 500 Hz):**	8 ohms 6 ohms	8 ohms 6 ohms
Midband Efficiency, Pink Noise Band Limited to Indicated Range:	25% (1,000-5,000 Hz)	25% (800-3,000 Hz)
Sound Pressure Level at 1 Meter, 1 Watt into 8 Ohms, on Axis of HP6040 Horn, 500-5,000-Hz Average, Anechoic Environment:[2]	113 dB	113 dB
Long-Term Average Power Capacity on HP Horns, Indicated Bands of Pink Noise, 8-Ohm Impedance Assumed — 24 Hours, 10-dB Crest Factor: **2 Hours, 6-dB Crest Factor:**	40 watts (500-20,000 Hz) 50 watts (500-5,000 Hz) 70 watts (1,000-10,000 Hz)	30 watts (800-20,000 Hz) 40 watts (800-8,000 Hz) 60 watts (1,500-15,000 Hz)
Recommended Minimum Crossover Frequency for Full Power Capacity (horn load permitting):	500 Hz	800 Hz[3]
Horn Throat Diameter:	49 mm (1.9 in.)	49 mm (1.9 in.)
Voice Coil — Diameter: **Construction:**	76 mm (3 in.) Edge-wound flattened aluminum wire on an aluminum form (integral with diaphragm dome)	51 mm (2 in.) Edge-wound flattened aluminum wire on a polyimide form
Diaphragm Construction:	2-mil aluminum-alloy dome with geometrically optimized polyimide suspension	Integral all-titanium construction with spherical dome and geometrically optimized suspension
Magnet Material:	Ceramic 5 (barium ferrite)	Ceramic 5 (barium ferrite)
Horn Mounting Method:	Bolt-on	Bolt-on
Color:	Black	Black
Input Connections:	Screw terminals (will accept 12-gauge pair)	Screw terminals (will accept 12-gauge pair)
Dimensions — Overall Diameter: **Overall Depth:**	21 cm (8.2 in.) 13 cm (5.2 in.)	17 cm (6.8 in.) 19 cm (7.4 in.)
Net Weight:	7.03 kg (15.5 lb)	6.35 kg (14.0 lb)
Shipping Weight:	7.48 kg (16.5 lb)	6.80 kg (15.0 lb)

1. This controlled rolloff is characteristic of *all* compression drivers. It results from the difficulty of reducing moving mass and increasing magnetic motor strength beyond a certain point.
2. Measured in the far field and calculated to 1 meter by inverse-square law.
3. The DH2 may be crossed over as low as 500 Hz with reduced power capacity.

Electro-Voice®

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