

## Wharfedale E-70 Speaker System



FOR many years, Wharfedale was a household word among audiophiles. In the formative years of the high-fidelity industry this British loudspeaker manufacturer was noted for neutral-sounding speakers relatively free of the deliberate frequency-response exaggerations and aberrations that characterized many of the hi-fi speakers of the time. Now, after some years' absence from this market, the Wharfedale parent organization (Rank Hi-Fi) has begun to import a new generation of Wharfedale speakers into the United States. The top-of-the-line speaker is the E-70, which was tested for this report.

The E-70 is a large, floor-standing system with an open-mesh grille that is virtually as transparent to light as it is to sound. The four

drivers and the port opening are framed in bright metal rings, giving a visual effect more reminiscent of some recent Japanese speakers than of the Wharfedale speakers of earlier years. The E-70 is a three-way unit, with a single 10-inch woofer in a ported enclosure described as a "maximally flat fourth-order Butterworth system" that is said to be responsible for high efficiency and flat bass response. The crossover to the mid-range drivers (a pair of 4-inch cone speakers) is at 800 Hz, and there is another crossover at 7,000 Hz to a horn-loaded compression tweeter. Two front-panel knobs adjust the mid-range and tweeter levels from a nominally flat response (at maximum) downward in five steps of 1 dB each.

The Wharfedale E-70 is an 8-ohm system rated for use with amplifiers delivering up to 100 watts output. The "E" apparently stands for efficiency, one of the principal design aims for the system. It is rated to deliver a sound-pressure level (SPL) of 94 dB at 1 meter when driven by 1 watt, yet its rated frequency response is 50 to 18,000 Hz  $\pm 3$  dB. Obviously, this speaker would appear to require much less amplifier power than the usual acoustic-suspension design (or even most ported enclosures) for a given sound output. The veneered wooden cabinet is handsomely finished in oiled walnut, and matching grains are used on speakers bought in pairs. The enclosure is 32 inches high, 13½ inches wide, and 14 inches deep. Weight is about 70 pounds. Price: \$475.

● **Laboratory Measurements.** With both level controls set to maximum, the smoothed semi-reverberant frequency-response curve was flat within  $\pm 2$  dB over most of the range covered by the mid-range and high-frequency speakers. A slight rise above 10,000 Hz was the most significant departure from flatness. The bass response was measured separately at the woofer cone and the port, using close mike spacing, and the two curves were combined to generate a total bass-output curve. This proved to be exceptionally flat, with none of the bass rise in the 70- to 100-Hz range that mars the sound of so many speakers. Combining the bass and mid/high-frequency curves, we obtained a composite frequency response that was flat within  $\pm 2.5$  dB from 35 to 10,000 Hz, and nearly within  $\pm 3.5$  dB from 35 to 15,000 Hz.

The mid-range control (which is actually marked LOW) affected the response between 120 and 1,500 Hz, with a maximum cut in output of about 5 dB. The high-frequency control had a range of 5 dB also, affecting frequencies above 1,500 Hz. The flattest overall response

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was obtained when both controls were set to maximum.

Our live-room measurement gave a slightly higher efficiency reading than Wharfedale's already exceptional anechoic rating, and the 98-dB SPL we measured in front of the E-70 (it was being driven by 1 watt of random noise in the 1,000-Hz octave) represents the highest speaker efficiency we have measured to date.

The bass harmonic distortion at a 1-watt input was between 1 and 2 per cent from 100 Hz down to 36 Hz, rising to 7 per cent at 30 Hz. It must be remembered that the SPL developed by this speaker with a 1-watt input is greater than that of an acoustic-suspension speaker driven by 10 watts. We also measured the distortion with a constant-output SPL of 90 dB at 1 meter. The curve was similar in shape to that obtained at 1 watt, but higher in level. It was about 2 to 3.5 per cent down to 40 Hz and 8 per cent at 35 Hz.

The impedance of the E-70 was a minimum of 6 ohms in the 150- to 200-Hz range. Typically it was 8 to 10 ohms at most audio frequencies, rising to 25 ohms at the upper bass resonance of 70 Hz and to 35 ohms at the other bass resonance of 25 Hz. The tone-burst response of the system showed no significant signs of resonances or spurious outputs and was consistent with the flat, smooth measured frequency response.

The simulated live-vs.-recorded listening test confirmed the impression we had formed from general listening to the E-70. It produced a somewhat sharp and crisp sound, apparently a result of the strong high-frequency output above 10,000 Hz. The overall sound balance was good, and there were no obvious low-frequency or mid-range colorations. Nevertheless, the E-70 had a tendency to sound a little "hotter" than most speakers when reproducing programs having considerable energy in the highest audible octave.

To our surprise, reducing the setting of the system's high-frequency level control did not change the essential character of the sound. In fact, we usually preferred to leave both controls at their highest settings. This can be

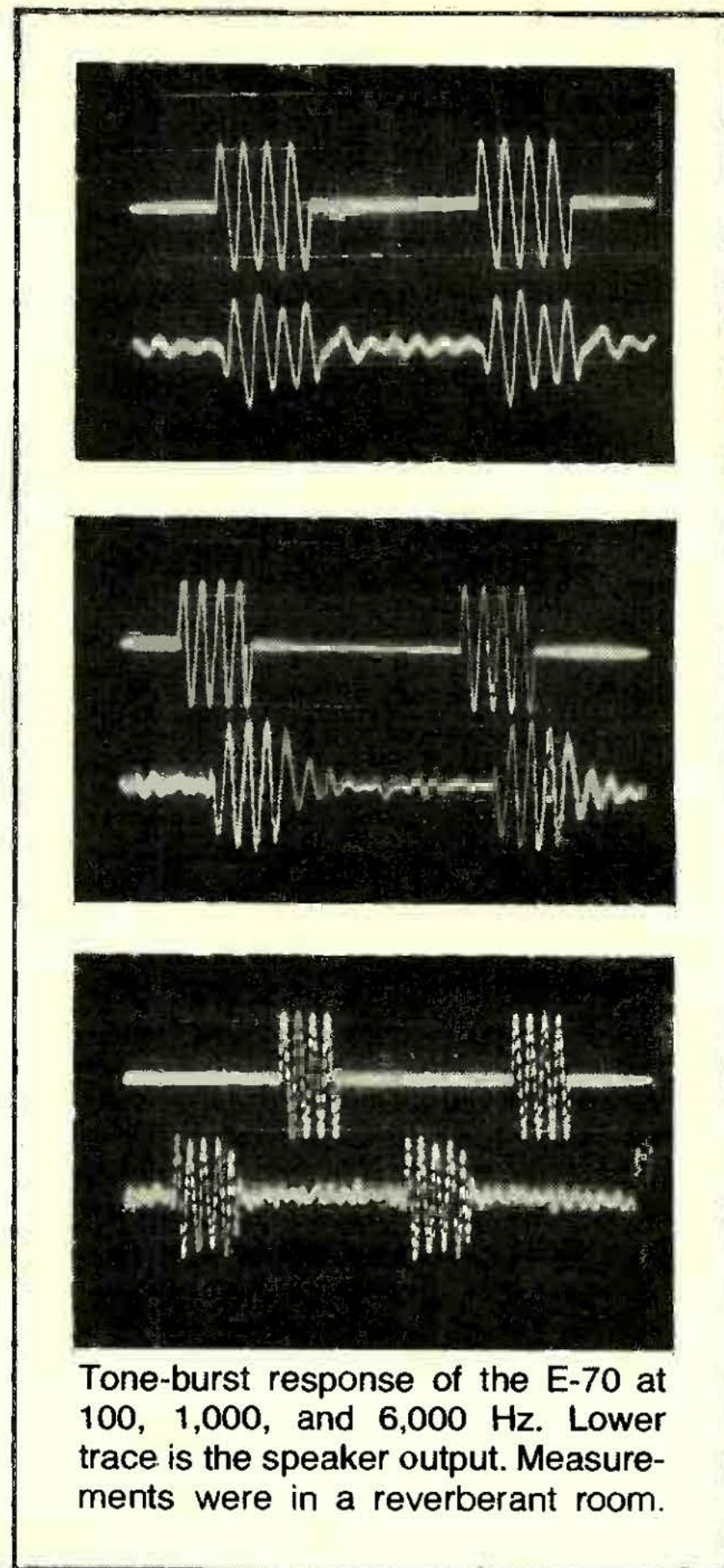
explained (we think) by the fact that the overall frequency response of the speaker is exceptionally flat with both controls at maximum, except for the rise above 10,000 Hz. The HIGH control introduces a downward slope in the response that negates much of the benefit of its inherently flat character. Perhaps an octave equalizer or a tone control capable of modifying the response only above 10,000 Hz would make a worthwhile improvement. We didn't try to equalize the speaker, preferring its sound "as is."

● *Comment.* We would have to agree that, in the E-70, the Wharfedale engineers have achieved their goal of very flat, wide-range, low-distortion performance in a speaker having unusually high efficiency. Certainly the efficiency is at least as high as that of any non-horn-loaded system for home use that we have used. Although we drove the E-70 from high-power amplifiers (200 watts per channel or more) much of the time, we also obtained excellent results with a car-radio amplifier delivering about 2 watts per channel!

The low-frequency response of this speaker, no matter what technical terms are used to describe its design principle, is as nearly flat as any we have seen. In fact, its overall measured frequency response and excellent high-frequency dispersion make this system one of the more outstanding ones we have seen in terms of meeting its design goals and specifications.

Our listening (and test) room is relatively well damped—not a "dead" room by any means, but far from "live" or bright-sounding. Speakers whose high-frequency output is at all lacking tend to sound dull and lifeless in such an environment. The Wharfedale E-70, on the other hand, is very close to ideal for our listening conditions. The sharp, almost analytical quality imparted by the high-frequency emphasis can be heard, but we did not find it unnatural or objectionable in any way.

The quality of the cabinet's walnut finish also deserves mention. It doesn't help the sound, but the manner in which the grains are



Tone-burst response of the E-70 at 100, 1,000, and 6,000 Hz. Lower trace is the speaker output. Measurements were in a reverberant room.

matched shows the care that went into the manufacture of the E-70 and explains some of its rather high price. The sound quality explains the rest!

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