

**PAPER 2A: TECHNOLOGY**

*For information only, not to be translated: The text is an extract from an article on high performance composites by Dale Brosius, which appears on the website of Composites World, and deals with the application of carbon fibres in high-performance audio equipment. Translate for readers of a similar publication in your target language.*

**TRANSLATION TO BEGIN HERE:**

**Carbon fiber raises consumer performance index**

**Music to the ears - and more**

5 Since the invention of the compact disc, the music industry has trumpeted the advantages of digital music. "Analog is history," the refrain went. In recent years, more and more audiophiles are rediscovering vinyl and tape, and the subtleties digital music can never duplicate. To appreciate these differences, higher quality equipment is required to play and broadcast it, and this is most significant in the choice of speakers.

10 Carbon fiber has found application in the cones of many high-performance speakers, either as a paper or light woven fabric. But Wilson Benesch Ltd. (Sheffield, U.K.) has taken carbon fiber to an entirely new level. Founded in 1989, the company's first products included a carbon-fiber turntable and a torsionally stiff carbon-fiber tone-arm. Building on this technical success, Wilson Benesch introduced the first of its line of  
15 speakers in 1994, relying on carbon fiber's structural properties in the external housing of the speaker to provide improved damping and sound quality, giving buyers a purer listening experience. Distinguished by a curved two-piece cabinet featuring high-gloss, woven structural carbon fiber composite, the A.C.T. One (A.C.T. stands for Advanced Composite Technology) struck a note with music purists worldwide and was selected as  
20 the reference loudspeaker by a number of audio equipment reviewers. The A.C.T. One was followed in 1997 by the slightly larger A.C.T. Two and several other speaker models, all incorporating carbon fiber in the structural cabinet. In 2002, Wilson Benesch developed an all-new speaker, named simply the A.C.T., to replace the One and the Two. The A.C.T. incorporates significant advancements in its construction.

25 Standing 1080mm (42.5 inches) tall and weighing 78kg (172lb), the A.C.T. relies on a lightweight composite and a heavy metallic structure to achieve the proper balance of strength and performance, explains Wilson Benesch director Andrew Scholey. Within the carbon composite housing, a rigid, welded steel backbone and hybrid steel/aluminum baffle rigidly support the speaker cones to minimize vibration. "The stiffness and damping characteristics of carbon-fiber composite provide a low degree of  
30 'colorization,' or the vibration typically seen with a wood-based speaker housing," Scholey emphasizes. The result is a cleaner replication of the musical performance.

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**DT/2006/ENGLISH/ PAPER 2A (Technology) cont.**

35 Scholey says, "From our inception, we have produced the majority of our parts ourselves, and in so doing, have complete control over the quality." The A.C.T. housing is comprised of a 15mm/0.59-inch-thick foam core encased by 2x2 twill woven fabric skins infused with epoxy resin. A skin thickness of 2.5mm (0.100 inch) yields a sandwich structure with exceptional stiffness-to-weight characteristics.

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