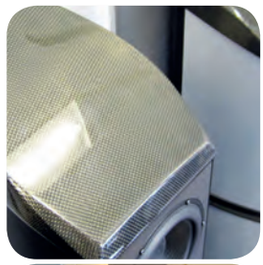
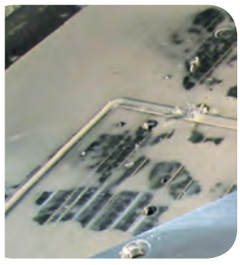
THE INSIDER
WILSON BENESCH



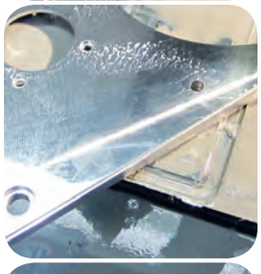


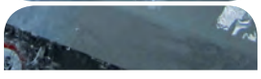


The team outside their Sheffield headquarters; Craig, Christina and Luke Milnes





Material world

Wilson Benesch is a British hi-fi manufacturer with a difference, setting great store by the processes used to make its unique products, says ***David Price***

This might sound a little simplistic, but it's not so wide of the mark. There are two ways to survive in the audio industry – an easy one and a not-so-easy one...

The former is simple; catch on quickly to what customers appear to want and give it to them fast. Don't obsess on the quality, it's all about the feature count. And fancy adverts and sharp-suited PRs don't come cheap, so best save a few bob on making the kit in the most inexpensive way possible. Follow the fashion of the moment and the audio market is there for the taking – or so the theory goes!

The latter is a tad more tricky. Indeed it's not recommended for those after instant returns on their investment. Design things that are intrinsically right, build them beautifully and trust that discerning people want to buy them. It's a tough and tortuous path to take, one with many twists and turns. I think you can guess which path Wilson Benesch chose...

Established in 1989, there are two Directors, Craig Milnes, Design Director and Christina Milnes, Managing Director. A true family affair, son Luke Milnes now works as Marketing Manager. Along with fifteen designers, CAD Engineers, Machine Technicians and Speaker Technicians (many of whom have been at the company for most of its 23 year history), the other vital ingredient is the city that the company chooses for its home. As the saying goes, you can take Wilson Benesch products out of Sheffield, but you can't take Sheffield out of Wilson Benesch!

"It's a world leading centre of excellence in materials technology, with manufacturing expertise and a skills base that dates back to the first days of the Industrial revolution", says Christina. "By way of example, today, Rolls Royce, large sectors of the nuclear industry and Boeing Aerospace have major Research Centres here. It's a major university city, with excellent locally trained staff and collaborations under the Knowledge Transfer Partnership (KTP) with the Universities." Craig is a little less expansive, "WB is made in Sheffield and belongs here", he intones.

Along with the city, the other key constituent of Wilson Benesch's unique DNA is research and development. Some hi-fi companies make do with a man in a box room with a screwdriver, hacksaw and a bit of four by two. Not so here, though. The company has invested vast sums in researching different ways to do things, and different materials to do them with. Indeed Wilson Benesch's whole story is dominated by its work with novel, often exotic materials.

For example, back in 1990, the first Wilson Benesch turntable sported what's said to be the world's first advanced composite carbon fibre chassis. When most rivals were using pressed steel or plain wood, WB used an ultra-light material that didn't store energy, had controllable resonances and was super-strong. Craig Milnes, a qualified engineer who then studied fine art, knew this all too well.

"Much like a musical instrument we proved that whatever the material was that was selected to make the record player, it would be heard. To reduce this noise or distortion to its lowest level our work pointed to the need for low mass and high stiffness. On paper there was no option but to find out more about carbon fibre", he told me.

"In retrospect it all seems obvious and we are still astonished that no one else had done anything in this field. Low-mass and high-stiffness equals the highest first resonant frequency; add to that a plethora of other benefits like massive levels of self-damping and the ability to control the direction of energy flow through the material, and you are in a different world of opportunities that transforms the way you design. We are now living in the age of advanced composites and they are going to transform every product on the planet."

Given the suitability of carbon composites for front ends, it logically followed they'd be ideal for loudspeakers too. So what followed next, 1994's A.C.T. One loudspeaker, used 'Advanced Composite Technology'.

Indeed, its development was part funded by HM Government's Department of Trade and Industry, as had been the turntable and tonearm. Around a year of work from "numerous engineers from a wide variety of technologies including advanced composites engineering and acoustic design", yielded serious results. Although not so unusual looking now (a testament to its futuristic design), it was the first speaker to use a sloping top to reduce room interactions, as well as being the first to exploit a curved advanced ▶


Yesterday and today: Wilson Benesch bought its first lathe in 1990...

composite structure based upon carbon fibre.

"Aesthetics is an important engineering concern because if it doesn't look right, it usually isn't right," said Craig. "The curve is simple geometry that imparts benefits to all structures, but especially ones made in advanced carbon composites. It is incredibly important in acoustics, of course, and we have avoided flat panels in our high-end designs from day one", he adds.

Curve form

This set the blueprint for a range of loudspeakers that continues to this day, along with the bespoke drive units that they house. In 1999, WB applied for SMART funding to develop a new driver; one of the reasons they succeeded in their application was their investment in manufacturing.

"It's impossible to get anyone to make these kind of components at a commercially viable price, which is why you don't see carbon fibre systems everywhere. The process sees design as the left hand and manufacture as the right; only when the two work together do you function optimally", says Craig.

Christina adds that it's, "all about being in control... quality, consistency, lead times, material costs, everything is constantly under scrutiny. Having this degree of control allows us to deliver something that is unique and represents outstanding value for money".

A two year, £250,000 programme resulted in the Tactic drive unit, born out of the need to create a "multi-role" driver that could be used both as a midrange drive unit, a bass unit and/or part of an clamshell Isobaric bass array. It sported a special Isotactic Polypropylene cone material, developed with physicist Professor Ian Ward of Leeds University. This new driver quickly started appearing in a range of loudspeakers, such 1999's Actor and Orator which used more affordable MDF in an innovative way, introducing curved cabinets. Meanwhile the Bishop speaker used an array of four Tactic drivers in Isobaric formation.

The A.C.T. Two that followed used the company's own drivers in the One's striking cabinet architecture. Soon after, the Discovery

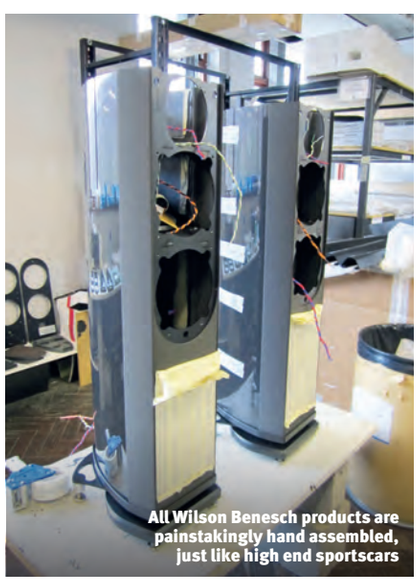
... but nowadays state-of-the-art CNC machines are used

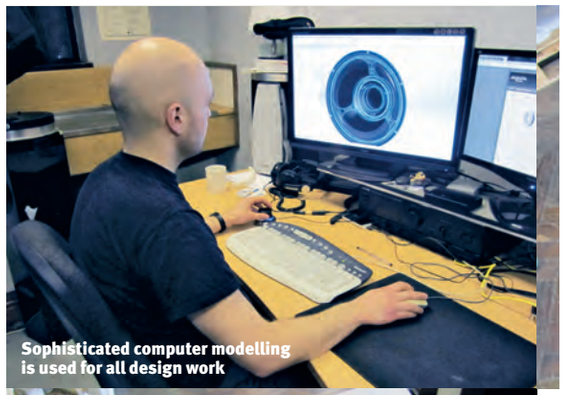
The curve form was until then the stuff of science fiction, only otherwise seen on F1 racing car tubs!

brought the driver in Isobaric form to a compact standmounting chassis. 2002's Arc was smaller still, while the A.C.T. abandoned MDF for steel and carbon fibre to produce a large floorstander of striking style and sonics. Wilson Benesch were on a run, and the curve form later that year brought the company up to its modern idiom, with a single curved carbon fibre monocoque; this was until then the stuff of science fiction, only otherwise seen on F1 racing car tubs!

Exotic arcs

A new turntable arrived in 1999. Despite an apparently declining market for vinyl LPs, the company proved its commitment to the format with simple but elegant engineering in the Circle. The new A.C.T. 0.5 tonearm offered


All Wilson Benesch products are painstakingly hand assembled, just like high end sportscars


Sophisticated computer modelling is used for all design work


Superlative wood veneers are bought in from a local ex-Bentley supplier

a more affordable pick-up arm package and the Ply brought carbon fibre to moving coil cartridges for the first time; all together the package was known as Full Circle.

In 2005 WB began working on its next, second loudspeaker drive unit. What was to become the Torus subwoofer in 2006, used a complex carbon Polyethylene Tetrafluoride technology capable of supporting one hundred thousand of times its own mass, it is claimed. The carbon was woven exclusively for Wilson Benesch to achieve the complex curve with fibre direction naturally orientated exactly according to stress lines.

It presaged another burst of activity on loudspeakers, which brought the Square series. Ironically, the exotic arcs of Wilson Benesch loudspeaker cabinets, along with those expensive materials and construction methods, alienated a number of potential purchasers in some of the world's more conservative loudspeaker markets.

For this reason, 2007's Square speakers attempted to give the super-clear, low coloration sound the company was famous for, but in a more conventional package. "It was a major design challenge," confesses Craig. "We went back to basics and accepted the limits that rectilinear geometry and traditional materials impose, but addressed problems in new ways as in the case of the energy absorber on the rear of the cabinet. We also applied engineering concepts to the internal walls; critical damping courtesy of visco elastically bonded metal damping pads of various mass."

The company invested in new CNC machines and a new technology called Resin Transfer Mould Technology. For this, WB turned to an enigmatic organisation called SCEPTRE which

Cross section shows unique construction of loudspeakers

Despite the use of high tech materials, the production process requires hands on attention to detail...

was set up during World War 2 to do applied research into advanced technologies. Wilson Benesch was the fourth company in the UK to invest in this new manufacturing technology. The other three were the Ministry of Defence, McLaren and Lotus cars. Wilson Benesch has spent the last twelve years developing this, and now claims to be one of the best in the world.

Having developed its own low bass and mid/bass drive units, it made sense for the company to fashion its own tweeter. Trouble was, the Scanspeak item used would prove hard to replace. In 2011, WB came up with the Semisphere. Craig says that the Scan designs had moved away from the sound that the company had always liked. "We accelerated our developments, and arrived at an elegant solution, which is a hybrid with some characteristics of a hard dome and some of a soft dome tweeter".

In 2008, the arrestingly beautiful Nanotube one tonearm arrived, using carbon fibre Nanotubes whose hollow cylinders of atoms are 50,000 times thinner than a human hair; they are said to have unique structural, electrical and chemical properties. An upgrade to the Tactic drive unit appeared soon after, offering stronger rare earth magnets for a sensitivity increase of 3dB.

The Geometry Series of 2011 (the Vertex standmounter and Vector floorstander) uses no internal bracing, which makes for a greater internal volume than would otherwise be available. It's only been possible due to the company's super-stiff monocoque structure and materials. With the new Tactic II mid/bass driver and Semisphere, it's the purest expression of the Wilson Benesch art.

The new flagship Cardinal loudspeaker launched later this year, will be Wilson Benesch's most important product to date. It employs "ground breaking, patent applied for technologies", Craig says. Signature carbon fibre structures will contrast with 30kg sections of several alloys, and the Isobaric concept will see a further incarnation "but like nothing anyone has seen before", he adds.

Every Wilson Benesch product I've heard presents music with startling clarity. It comes at you with blistering speed from a velvety-black backdrop. Dynamics are incredible and the detailing always surprises and delights. Now, having visited the company, met the people and taken a closer look at the materials and processes used, I can see why. ●

Exhaustive attention to detail makes for a superbly finished end product

HOMEWARD BOUND

Sheffield feels quite different to other great English cities. Partly because of its dramatic location, within the valleys of the river Don and its four tributaries, and partly because it's imbued with a profound sense of history. Famous for being the world centre of steel production in the 19th century, it still maintains a fondness for industry which simply passes by many other English cities. It's a suitably atmospheric background for the Wilson Benesch manufacturing facility.

Previously the headquarters of Bachelors Foods, the red brick factory building is a strange mix of faded Industrial Revolution-era glory and ultra high technology – thanks to the manufacturing processes that go on inside, including state-of-the-art CNC machines, an RTM carbon composite suite and the latest computer aided design systems. Every component is manufactured using high precision tooling and advanced moulding.