

BILSTEIN

SHOCK ABSORBERS
Made in Germany

“Innovation
through
involvement”

BILSTEIN®



With precision German Engineering
and Australian Technical knowledge,
a combination which has proved to be
successful

WORDS BY IAN GLOVER PHOTOGRAPHY BY OFF-ROAD IMAGES

Travers Wood at the dyno workstation testing a shock with the SPA Dynamometer

Dynamometer





Typical components. Body, shaft, snap rings, seals, pistons, shims and teflon ring (black piece in bottom of pic)

Sometimes, very rarely, the name of a product becomes synonymous with its intended function, assuming a generic status for all other competitive products. Over the years, we've seen 'Eskey' become the term for coolboxes and 'Hoover' become a verb meaning 'to vacuum'.

And while only the most fanatical devotee would claim that suspension is 'Bilstein', no-one (who hasn't been living under a rock for the last half century) would deny that when you say 'Bilstein', shock absorbers immediately spring to mind.

Bilstein is a part of huge European conglomerate Thyssen Krupp, which is involved in extremely diverse activities ranging from iron and steel manufacture to elevators and shipping – a far cry from Bilstein's earliest product.

Way back in 1873, August Bilstein started producing fittings and furnishings for windows and doors in the small German town of Altenvoerde. In 1919, his son Hans took over the business, and eight years later, the company diversified into its first association with the automotive

industry by manufacturing car bumpers, later mass-producing chrome-plated bumpers for Audi and Daimler Benz. Shock absorber manufacture did not begin until 1954, after adoption of the gas-charged canister ideas of French scientist Bourcier de Carbon. (Again, sound familiar?)

Three years later, Bilstein dampers helped provide big limos from Mercedes with well-mannered ride and handling, and because shock absorber development always took place in close cooperation with automotive clients, the firm soon turned into a giant. In 1962, a burgeoning race support program began, and in 1988, as an extremely attractive acquisition, Bilstein became a totally owned subsidiary of the Thyssen Krupp Automotive Group.

For military history buffs, this has some interesting symmetries. Though founded in 1811 as a high-quality steel manufacturer and owning the first registered trademark in Germany (three rings, in 1875), the name 'Krupp' predominantly conjures up images of the great field guns of WWI and II. Prior to the introduction of modern recoil-absorbing guns, field pieces had to be put back into position after every shot, but in 1897, the French changed all that.

While automotive engineers at Peugeot and Panhard et Levassor were busy looking at suspension systems for horseless carriages, military engineering boffins developed the 75mm gun, which used a hydraulic cylinder beneath the barrel. It enclosed a piston connected to the gun so that at recoil, it was dragged through the cylinder, its movement



The working piston is prepared with a teflon ring before assembly



The piston is placed in the gassing cap ready for the dividing piston



The dividing piston is placed into the gassing cap for correct placement



A wooden handle is used to guide the dividing piston into the gassing cap prior to gassing



The shock absorber is tested with a temperature sensor



Paul Joyner at the Bilstein gassing machine. The gassing cap is in position ready for the gassing process

resisted by oil. As it displaced oil, it built up pressure in a compartment of nitrogen gas, which also acted to brake the movement of the gun. Once the recoil movement stopped, gas pressure forced the piston head back into the cylinder and brought the gun barrel back into firing position. This revolutionary breakthrough in military technology obviously didn't remain a French monopoly for long!

However, back to Bilstein. The decision to go racing brought impressive results. Since 1970, when Bilstein-damped Porsches won Le Mans, a fine pedigree of success in competition has seen the high-pressure monotube shock

absorber largely dominate motor racing. The company also experienced great success in the States with off-road racing as well, in particular with the gruelling annual Baja event.



The dividing piston correctly positioned within the gassing cap

Sydney Shock Absorbers principal Allan Heasman first became involved with Bilstein around 1978, after being impressed by motorsport ads in US magazines. He cites the requirements of racing and fair dinkum four-wheeling as having remarkable parallels.

For the past five years he has supported legends like Formula 3 champion Peter Hackett and off-road buggy pilot Neville Boyes.

"In racing, any lag or lack of response to track conditions means a suffering in steering response and handling," Allan explains. "But with their heavy springing, 4WDs also require immediate damping response, because any lag creates a vibration in the spring, which then goes through to the chassis."

And whatever your four-wheel drive damping or length requirement, Bilsteins can be tailor-made to suit. At Sydney Shock Absorbers' Sydenham factory, technical gurus Travers Wood and Paul Joyner run the lab that tests and even creates specialist shocks. It's spotlessly clean, bristling with high-tech equipment, computer monitors, graph printouts, CAD drawings of shocks, calibration gear and shelf after shelf of damper componentry.

Long-time Bilstein fan Michael Tsung, of Northshore 4WD, called by when we were inspecting the lab. He brought with him a used shock from an 80 Series LandCruiser that had done 100,000 kilometres, and it certainly looked like it judging by the stone blasting on the shock. On the test rig, incredibly, it demonstrated characteristics in damping and rebound as though new.

Though we've no intention of reviving the mono versus twin tube shock debate, it's worth pointing out a few things about Bilsteins at this point.

Where most shock bodies are cut from a piece of steel tubing, Bilstein uses a unique seamless extrusion process for greater strength and uniform 2mm thickness. The finished body is mated with a solid induction-hardened, chrome-plated and polished shaft, specially machined valving components and high quality seals. They're made to last. Significantly, Bilstein makes twin tube shocks for other applications, but not for high performance suspensions. Also significant is the lack of stone guards, again pointing to extreme strength and durability.

But the fact that the lab can make changes to existing shocks is very important. For example, the overseas spec for Prado shocks proved too soft for Aussie conditions. At this point, and also with unique Aussie-spec shocks for the 80 Series, GU Patrol, NM Pajero and 100 Series, Northshore 4WD's Michael Tsung became involved, jointly developing replacement dampers after many, many torture test kilometres.





The Bilstein gassing machine with cap and line in place ready for filling with nitrogen



Nitrogen filling the pressure gauge



The shock is charged with nitrogen. The seal has been placed on the shaft with a seal protector sleeve



The shock being filled with Bilstein oil ready for sealing and testing. Note drip tray to catch excess oil

Having a true 4WD enthusiast on the job always helps, and through his own experience and the driving habits of his customers, Michael knew exactly what potential buyers would want. The info on the revised valve coding was then sent to Germany for the record, and Aussie-spec Bilstein Prado shocks are sold in Malaysia, Indonesia and the Philippines.

In both theory and practice, fine-tuning a shock absorber for local conditions is almost infinitely variable. All Bilsteins contain oil, under pressure with nitrogen gas. Altering the shim stacks either side of the piston creates greater or lesser resistance to the oil as the stack moves through it. A thicker shim, for example, is more rigid to prevent the passage of oil, while the diameter of the hole in the shim influences the

amount of 'bleed' (bypass). This venturi effect obviously adjusts the rate, both of initial resistance to road shock and rebound control.

The diameter of the central piston is important too. The thicker the rod, the more difficult it is to control small bumps. Too much oil displacement by the rod means too much inertia to stop it going one way, then the other.

All this development comes at a price, and Allan Heasman is content to stay at the top end of the market. But as he points out, Bilstein dampers have earned their reputation as prestige high-performance products. If they hadn't, they wouldn't be fitted in the US as OE on BMWs, Ferraris, Porsches, Jaguars and Benzs.



The shock absorber in the dyno. Note different dyno adaptor pieces for different shock mounts in background

FURTHER INFORMATION

Northshore 4WD

79 Dickson Ave, Artarmon 2064

Phone (02) 9439 3585 Email: ns4wd@ozemail.com.au

Sydney Shock Absorbers

455-463 Princes Highway, Sydenham NSW 2044

Phone (02) 9516 1182 www.heasmans.com.au

Inline Steering

32 Yass Road, Queanbeyan NSW 2620

Phone (02) 6232 9955

Fulcrum Suspensions

28-36 Evesham St, Moorooka QLD 4105

Phone (07) 3892 9000

Autoride Suspensions

31 Beryl St, Balcatta WA 6021

Phone (08) 9344 1995

Thank you to Travers Wood and Paul Joyner at Sydney Shock Absorbers for their help in compiling this story



Bilstein

455-463 Princes Highway, Sydenham NSW 2044

Phone: (02) 9557 5930 fax: (02) 9550 3270

www.bilstein.com.au