A History of Avdel

75th Anniversary

1936 - 2011

From Spitfires...

...to the latest technology
Avdel founder Mr. Stanley T. Johnson
In 1936 from a small shed in Godalming Surrey Stanley Thomas Johnson started a business called Aviation Developments. The company was established to manufacture & supply riveting technology, to a number of industries, but primarily for the rapidly developing Aviation industry. At that time aircraft constructed using wooden materials could no longer meet the demands put upon them and wood was in the process of being replaced by more compact, stronger, aluminium structures.

Initially these structures were assembled using solid rivets that were slow to install, requiring two operators with access to both sides of the components to be assembled.

Working with the pioneering UK Aviation Engineers of the time one of Aviation Developments Engineers, Jacque Chobert, invented a radical new riveting technology, the Chobert® riveting system.

Initially Chobert® fasteners could only be installed one at a time. Aviation Developments Engineers soon recognised this limitation and set about developing a tool capable of installing multiple fasteners before requiring reloading. This represented the company’s first steps in what we currently recognise as providing a total system solution to our customers i.e. both fastener and installation tooling.

The Chobert® system allowed rivets to be installed by a single operator using a hand tool accessing one side of the riveted joint - significantly reducing both assembly times and costs. The concept of assembly from a single side of the application became generically known as blind fastening. This advanced system was quickly adopted by the UK Aviation industry and proved invaluable in building more than 20,000 Spitfire fighter aircraft over a period of eight years that were key to the success of the Battle of Britain.
The Chobert® design gave birth to a business philosophy that became deeply embedded in the company’s culture - that of working with customers to find new and innovative products to solve the ever changing and more demanding assembly requirements.

During the late 40’s and 50’s the global aviation industry moved into the jet age and sales of the Chobert® increased as it became an industry standard fastening technology. As well as expanding both the range and sales of the Chobert® system the company developed engineered fastener and assembly solutions for other industries.

A new product range for Aviation Developments was Pip® Pin.

Aimed specifically at the Aerospace industry, many versions of these quick release pins were available including: detent pins, ring pull pins, T handle, L handle single action release, double action release, ground handling and accessories such as lanyards. Applications included Ejector seats, ground support equipment, engine cowlings, weapon systems safety locking pins, marine rigging etc.
Press shop, St. Albans, July 1941

Parkway offices, July 1941

Drawing office, Woodfield Road, July 1941
Members of Aviation „Keep Fit“ Class, March 1942

Staff, Woodfield Road, July 1941

Workers, Woodfield Road, July 1941
By the 1950’s the company was focusing on providing new value added assembly solutions, this “systems” approach created greater optimisation and provided customers with a single source for dependable fasteners and installation tooling.

The two part Avdel® breakstem aerospace rivet was introduced offering improved rivet strength, different head configurations, diameters and material options. When installed the stem breaks above the head and is machined off. When painted countersunk forms of the rivets where almost invisible. These fasteners were used in many areas of the aircraft including ailerons, flaps, engine pods, elevators, rudders, tail planes, fins, doors & floors.

To support the Avdelok® range two placing tools were introduced the 720 tool, a pneumatic tool for smaller diameter products and also the more powerful Hydro-Pneumatic 722 tool for diameters up to 3/8”.

A new high strength aerospace fastener was added to the range in the 50’s, Jo-bolt® - a unique three piece fastener suitable for airframe assembly. This product was later specified in other industries such as high strength areas of train carriages.

Avdelok® is a tamper proof fastener and this benefit proved successful in construction of security fencing. The 721 hand powered tool followed permitting rapid assembly of fencing, on site, away from any form of power supply.

The late 50’s saw the introduction of Avdelok® structural fasteners together with a range of pneumatic & hydro-pneumatic placing tools. Working with fencing manufacturers looking to speed up assembly of rail style fencing, Avdel recommended the use of 3/16 and 1/4 diameter Avdelok® as a replacement for nuts, bolts and washers.

Expansion of the group followed with several new facilities established in Europe, USA and the Asia Pacific region (Australia & Japan) whilst a network of authorised distributors and concessionaires in over forty countries helped to ensure a truly global reach.
In 1961, to reflect its broadening product portfolio and cross-market / industry capability, **Aviation Developments** changed its name to **Avdel®** and opened its new manufacturing facility in Welwyn Garden City, Hertfordshire.

Through the 60’s & 70’s manufacturing was evolving rapidly utilising many new materials such as plastics, thin gauge steels, composites, titanium etc. Avdel moved quickly to develop new fastening methods for these new materials.

One of the first products developed by Avdel was the **Avex® multigrip breakstem rivet**. It was introduced to the market with the compact 734 hydro-pneumatic hand tool. The world’s first multigrip fastener quickly became a flagship product for Avdel that would remain unchallenged across automotive, industrial and electronic market.
Avex®, the first multigrip breakstem rivet became a flagship product for Avdel sectors for the next 20 years. Today, almost half a century on, Avex® remains a preferred assembly solution for many thin sheet metal applications.

In 1966 Avdel adopted Speed Fastening® as the family name for the expanding range of hollow bore style rivets based upon the Chobert® design. The Grovit® fastener featuring grooves on the body was developed by Avdel for blind hole applications in wood, plastics, fibreglass and aluminium. Avlug® represented the first Speed Fastening® product designed specifically for the electronics industry. It delivers hi-speed installation, is easy to solder and provides a rigid terminal post designed for use as a test point or for wire wrapping. The installed bore diameter

Plating and finishing shop 1966

New developed in this decade

Avex® multigrip breakstem rivet

734 hydro-pneumatic tool

Grovit® speed fastener for blind holes

Avlug® solderable terminal posts

Nutsert® blind threaded insert
of one size of the product allows connection of a standard miniature jack plug to the circuit. The Avlug® rivet embossed rolled shank ensures secure placement in the PCB. Avlug was used extensively in the manufacture of televisions for the consumer market.

Development of aircraft such as Concord presented new challenging requirements in designing a fastening method capable of coping with the extreme loadings and high temperatures that have to be sustained during supersonic flight. Working with the Concord design team Avdel developed a special Titanium Avdel® rivet, a hundred thousand of which were used in the construction of each aircraft.

As Avdel® rapidly expanded, becoming a preferred supplier of fastening solutions for many global businesses, the Nutsert® threaded insert opened a new sector of the business. The Nutsert® created a blind threaded fixing in thin sheet materials replacing weld nuts.
Whilst working with the truck and trailer sector during the 70’s Avdel Sales Engineers identified that there was an opportunity to develop a blind structural fastener with an exceptional grip range capability that could significantly reduce assembly times and simplify the repair of damaged trucks and trailers. The result was introduction of the world’s first blind structural fastener Monobolt®.

Avdel developed fasteners for the truck and trailer sector

Typical repair times for truck & trailers tumbled from 50 hours to just 2 hours! Wider applications for this product were soon identified in ship building, bridge construction, shipping containers etc.

When our Sales Engineers showed this new product to the aerospace industry it generated a lot of interest. Avdel Engineers took the Monobolt® principle and came up with an Aerospace derivative and MBC® was launched into the market and used by Aircraft Manufacturers.

The first and most successful of a new generation of speed fastener products was the Briv® with its large diameter low profile head, hi-clamp capability and bulbed tail. Briv® was highly suitable for assembly of plastic, composite and passive materials used in computers, and both passive and active electronic devices.

To reduce assembly times a range of multi-head riveting machines, using standard hand tools mounted in a frame were introduced. Machines subsequently used specially designed slim hydro-pneumatic modules designated as Hydra®, that achieved closer centre distance between fixings. These soon became popular with customers looking to reduce assembly costs as well as improve assembly quality. These machines are capable of placing multiple Breakstem, Speed and Threaded products simultaneously and they can use the fastener as a means of

New developed in this decade

- Monobolt® blind structural fastener
- Briv® speed fastener with high clamp load
- Multi-head riveting machine
- Avtainer® fastener for trailers
- Avseal® sealing plug
- Hexsert® insert with hexagonal body
- T-Lok® rivet for wood applications

Managing Director John C. Marley 1974
locating the parts to be assembled. Machines include Poka-Yoke features such as part detection, clamping, and auto-sensors that ensure that all fasteners have been installed into the assembly.

As part of a product improvement programme Thin Sheet Nutsert® superseded the turned Nutsert®. TSN was the first insert to be manufactured using a cold part forming process. This manufacturing method reduced insert costs to our customer’s enabling them to be more competitive in their markets. This in turn realised ever increasing sales of the product.

During the mid 70’s trailer builders were looking to construction methods using composite materials. This created a challenge to Avdel design engineering to develop a fastener that had an ultimate tensile strength equal to the crushing load of GRP plywood board. The result of this development was the TIR approved Avtainer®.

Avdel opened a new manufacturing plant in Parsippany - Avdel Corporation located at 50 Lackawanna Ave Parsippany, NJ 07054. Avdel Corporation was incorporated on Thursday, May 15, 1975 in the State of CA.

In the late 70’s Avseal® was added to the portfolio, a breakstem based high pressure sealing plug developed to seal cross drillings in applications such as engine crankshafts, power assisted steering pumps & hydraulic manifold blocks. Avseal® is suitable for use in Steel, Iron & Aluminium.

Hexasert® was designed to offer high torque-to-turn and pull-out performance, particularly in soft metals - a blind threaded insert with a hexagonal body. Hexasert® can be used in very thin materials with quick and easy insertion and includes a near flush version.

T-Lok® was developed specifically for assembly of wooden garage doors and horse floats.
The early 80’s marked Avdel’s first developments of automated assembly machines with the introduction of the Rivmatic®, capable of installing Speed Rivets continuously from a bulk bowl-feed supply. Automation was a growth area in the 80’s and Avdel® created an Automation department to design and develop Modular Assembly Systems (MAS) for customers moving to automated assembly processes.

The Bulbex® breakstem fastener is designed with a split tail formation, providing a much larger blind side bearing area against the rear sheet. This also allows for a wide variation in material thickness and it is ideal for use with plastic and low strength material. A structural sealed version TLR® featuring a visible mechanical lock to give extra strength to the joint was also developed and used for roofing applications etc.

Viking® 360 – the first continuously fed breakstem machine facilitated high speed assembly of breakstem products. The placing head was suitable for operator free robotic assembly of parts on fully automated assembly lines. A twin head version of Viking® 360 was specifically built to automatically assemble trailer roofs drilling and installing 1/4 Monobolt® structural fasteners on a 50mm pitch along each side of a 14m trailer roof.

Rivscrew® is an innovative Speed Fastening® product initially developed for the electronics industry combining the speed of riveting with the removability of a screw allowing repair/component replacement. In the mid 90’s Intel specified Rivscrew® to assemble alloy heat sinks to the Pentium II processors. Avdel supplied approximately 80 four head Hydra® machines to assemble millions of Pentium II processors globally.

The Pick and Multi-Place (PMP) system was developed to allow robotic installation of Speed Fastening® products in any new developed in this decade

TLR® for watertight roofs

Bulbex® for plastic material

TLR® for roof and cladding

Rivscrew® removable rivet

Jo-lok® aerospace fastener

Hemlok® structural fastener

Maxlok® multi-grip lockbolt

Avinox® stainless steel rivet

Avsert® threaded stand-off pillar for PCBs
orientation. In excess of 11m rivets per annum were installed in a flexible assembly cell constructing air bags for several different automotive manufacturers.

Rapid developments in aerospace technology imposed exacting demands on design, production and safety standards. Jo-lok® was introduced to meet these standards as an improvement over Jo-bolt® offering resistance to vibration; fatigue, as well as clamp-up pre-load. The fastener was available in countersunk or hexagon head form and featured a unique tri-lobed friction locking feature between stem and body. Jo-lok® offered a 50% weight saving over a conventional nut and bolt assembly. Jo-lok® was widely specified on for example the Harrier Jump Jet, HS 146, radar installations and aero engines.

Large Flange Stavex® is an all-steel hi-clamping breakstem fastener and was developed and specified in the air-bag assemblies for safety restraint in passenger vehicles. Demands of quality and installation control in the air-bag application were met by Avdel and the fastener became a cornerstone of airbag assembly design that still remains in use today.

The Hemlok® fastener was developed in response for a requirement to secure a vehicle door hinge. It is a structural breakstem fastener with exceptional shear and tensile strength. The Hemlok rivet features an interference lock ensuring the strongest vibration resistant joints whilst the large blind side bearing area spreads the load and prevents creep.

The stainless steel breakstem provides excellent bulging tail formation and high shear / tensile strength as well as providing good corrosion resistance in applications subject to elevated temperatures. The Avert® Speed Fastening® system is a threaded stand-off pillar for PCBs. The internal threads permit rapid mounting of components to a PCB – replacing nuts, screws, spacers & washers. It is available in a variety of stand-off heights and will fit an array of board thicknesses.

Millions of Pentium II processors have been assembled to heat sinks with Rivscrew® speed fasteners

Avdel® 75 Years of Avdel
During the 90’s Application Engineers were introduced to enhance the link between Engineering, Field Sales Engineers & Customers to deliver the very best fastening solutions. Our Engineers have always taken a “we can do it” approach and relish the challenges of solving tasks considered near impossible.

With Application Engineering on board Avdel now offered customers the possibility of VA/VE, line walks and product tear downs to help improve assembly methods. As well as providing technical support, Application Engineering also assists in developing fastening system solutions (product & use recommendations) for customer specific applications.

Avseal® became Ford Motor Company preferred solution for sealing redundant cross drillings in their range of engines after rating the best performance in an evaluation of 19 different sealing methods. To support this application a new range of heavy duty Avseal® installation machines called Viking® II were developed having a minimum 10 year working life. Avdel worked with Ford simultaneous engineering teams to ensure seamless integration of Avseal® plugs into their engines. This sealing system is now used in the manufacture of all Ford car engines globally.

As a part of Avdel’s commitment to continually advance fastening technology an improved sealing plug, Avseal® II, was introduced in 2005 incorporating many new features and improvements over the original product.

In 1994 a new flagship range of breakstem placing tools was introduced branded Genesis®. The tools were designed using plastic mouldings in place of machined aluminium castings creating a lightweight ergonomic tool having a high power to weight ratio. The tool range was well received by the market winning awards for its design.

Working closely with Yamaha a stainless steel version of Monobolt® was developed specifically for to secure a motorbike exhaust system.

The Stavex® steel rivet is a multi-grip, high-strength breakstem fastener. Available in either steel or stainless steel, this blind rivet can replace several grip fasteners. With good hole fill and a large bulbing tail, this rivet is ideal for use on thin sheet materials.
Avibulb® bulbing rivets offer a high-strength fastening solution ideal for thin sheet metals. The steel Avibulb® provides excellent bulbing tail formation and high shear and tensile strength.

Product Teardown:
An organized method of disassembling a product to evaluate joint designs and assembly cost drivers. Focus is on total product cost. Utilize the principles of Design for Assembly and Design for Manufacturing. Outputs include a report and formal presentation at customer’s facility.
Customer needs are always at the forefront of the organisation’s business acumen with new product designs incorporating feedback from advanced market and customer needs analysis. Avdel’s market and customer driven approach to product design can be seen in the quick-release nose equipment on the nGenesis® range of placing tools, which helps to minimise service times, whilst the TX2000® ePower battery tool provides not only spatial freedom without hoses and cables, but also features a patented pulling system that enables more efficient operation and consequently more cycles per battery charge.

Always at the cutting edge of riveting technology Avdel is the market leader in employing advanced injection moulding techniques for the nGenesis® tool bodies using shock resistant fibre-reinforced grades of nylon incorporating “soft grip” contact features for comfortable handling. Avdel tools are renowned for their ergonomic and safety benefits.

Avdel delivers millions of lockbolts for thermo solar power plants

Avdel® fasteners are ideal for areas with restricted access. The Avbolt® features a mechanical lock creating a vibration resistant joint, preventing loose stems.

The Double Flush Chobert® rivet has a countersunk head for use in exceptionally thin sheet materials. Based on the Chobert®rivet design and developed specifically for use in electronics applications the “Double Flush” is placed into sheets that have countersunk bores on both sides. After installation, the placed rivet forms a flush fastening on both the front and rear of the application.

As greener energy sources are developed Avdel Application Engineering and Sales team worked with a thermo solar power plant in Spain specifying 3.4 million Avdelok® to assemble 7,500 parabolic solar collectors – the world’s largest plant of its type.

Avdel developed the Autoload feature for our Speed Fastening® system to increase blind fastening productivity by up to 75%. The Autoload system is ideal for high volume production environments, capable of delivering up to 48 fasteners per minute directly to the nosepiece of the assembly tool. When the fasteners on one mandrel are spent, the assembly tool automatically inserts a fully loaded replacement into the system.
In August 2010 the sale of Acument Global Technologies’ Avdel and Global Electronics & Commercial (“GEC”) businesses was completed. Infastech™ is a multinational company owned jointly through funds managed by CVC Asia Pacific Limited (CVC) and Standard Chartered Private Equity Limited (SCPEL) with ownership headquarters located in Hong Kong. CVC and SCPEL manage a diverse global portfolio of companies with total combined revenues exceeding USD 40 billion.

Infastech global headquarters is located in Hong Kong with revenues exceeding USD 450 million. Infastech is one of the world’s largest producers of engineered mechanical fasteners with an industry heritage dating back as far as 1922 and built around its lead brands of Avdel®, Elco® and iForm™ products. As an industry leader Infastech offers innovative fastening technologies to a diverse customer and market base including electronics, automotive,

— a process that takes six seconds instead of the conventional, manual-load system’s 20 seconds.

Currently in development is the new fastener generation that will revolutionise Speed Fastening®. NeoSpeed® features designed in compliance controlling installation loads, as it is more tolerant of application hole size, and also has a greatly increased grip range thus also permitting a reduction in customers Bills Of Material.

Avdel provides innovative and engineered fastening solutions to optimize customer’s total assembly costs. Other services include providing innovative business, engineering and logistics service designed to improve customer’s operations by optimizing total system cost.

The new corporate entity aptly named Infastech was formed and delivers innovative fastening technologies through a global network of Engineering, Sales & Distribution, Operations and strategic Distribution Partners.

NeoSpeed®: new generation of Speed Fasteners

Finite Element Analysis (FEA) in product development
The space frame of this Ferrari is assembled with more than 900 Fastriv® self-piercing rivets from Avdel.

Construction and industrial & commercial segments.

Infastech has Operations, Sales, Distribution and Engineering capabilities in Australia, China, Hong Kong, India, Japan, Malaysia, North America, Singapore, South Korea, Thailand, Taiwan and throughout Europe with more than 2,000 employees serving customers in more than 150 countries.

Today the Avdel group can support customer assembly requirements from the earliest stages of new product design by combining the latest engineering and design techniques with our 75 years market experience. Drawing on the expertise of our Engineers and the advanced testing capabilities of our facilities, laboratories and workshops, Avdel has the aptitude to employ cutting edge Finite Element Analysis (FEA) and modern design techniques to develop the right solution for our customers.

Avdel supplies solutions to many of the world’s leading companies, in industry sectors as diverse as automotive, electronics, construction and appliances. Avdel engineers continue to develop innovative assembly and fastening solutions to ensure that our customers are always able to meet the cost effective and quality manufacturing demands of an ever changing world.

New developed in this decade

- nGenesis® tool range
- TX2000® battery powered tool
- Avbolt® structural blind fastener
- Double Flush Chobert® for exceptionally thin material
- Autoload reloading system for Avdel Speed Fastening®
Avdel® 75 Years