

1901-2010

A Short History of M&I Materials Limited and its Heritage: 1901-2010

“Electrical insulation is the magic key which controls many doors with the main object of ‘keeping electricity in its proper place’.”

Stanley Mohr, Managing Director of
The Micanite & Insulators Co. Ltd.

“Today the far-seeing industrialist no longer relies solely on the accumulated knowledge of the workers in his own factory, or even those in his own industry ...but he sets up organizations for scientific research.”

Sir Arthur Fleming, Director of
Metropolitan-Vickers Research Department

Laying the foundations

The story of M&I Materials Limited begins in **1901** with the foundation of the Mica Insulator Company Ltd. The firm was established by twin brothers Arthur and Edward Berkeley, in order to manage the distribution of mica products in Europe. 'Micanite' (*the name given to the sheet material derived from mica*) was already readily available in the United States and Arthur Berkeley had been impressed by the Micanite products he had seen on display at the Chicago World's Fair. Recognising the market potential back home, the brothers built a small manufacturing facility in Stoke Newington, London. Growing demand led the company to move production to a larger plant in Stansted, Essex, before settling at the Empire Works site on Blackhorse Lane in Walthamstow. In 1906, the firm became known as The Micanite & Insulators Co. Ltd. and became more frequently referred to as simply 'M&I'.

At the time, Micanite had to be painstakingly constructed by hand by brushing shellac

varnish over mica splittings that had been laid out. This created a mica sheet that was then dried and pressed before being trimmed and cut to size. Electrical insulation products such as Micanite tubes could be produced in this way. Engineers soon recognised the uses of mica insulation in switchgear. Notable customers included British Thomson-Houston, the General Electric Company and Metropolitan-Vickers, a company that would contribute much to the M&I Materials story.

Throughout its first two decades of trading, the company established itself as a key player in the electrical insulation market through its Micanite manufacture, as well as the production of insulating cloths, tapes, and high-voltage bushings for pylons.

Another important newcomer during this era was the British Westinghouse Electrical & Manufacturing Company, which was founded in 1899 by US industrialist George Westinghouse and renamed the 'Metropolitan-Vickers Electrical Company' in **1919** following a takeover by Vickers Ltd.

Based in a large heavy engineering facility at Trafford Park Manchester, 'Metrovicks' became a household name during the first half of the twentieth century and the company's manifold achievements could fill several volumes. Its apprentice training schools would provide a model for many successors, the transformers it supplied would pave the way for the installation of the National Grid and most significantly for M&I Materials, its research department would produce a wealth of engineering innovations, some of which are still in production today.



The Micanite and Insulators Co. Limited
Stansted factory

The development of Apiezon oil

The Metropolitan-Vickers Research Department was established in **1917** by Arthur Fleming, who at the time was the head of the company's Transformer Department. The department was created as a means of testing and developing manufacturing materials, and by the mid-1920s, researchers had already developed induction furnaces that revolutionised alloy steel manufacture, a variety of new testing apparatus and special alloys that could withstand the combination of high pressure and temperatures of a gas or steam turbine. Perhaps the most notable development of this period came in **1926** with the discovery of low-vapour pressure oils by research engineer Cecil Reginald 'Bill' Burch, that he christened 'Apiezon' (*from the Greek for 'low pressure'- a testament to Burch's passion for classical literature*).

Apiezon originated as a solution to a conundrum that was posed to Burch by electrical engineers: to see whether the strength of pressboard would improve when impregnated with transformer oil in a perfect vacuum rather than the crude vacuum that they were able to achieve. Burch described this as a 'bloody silly experiment' on the basis that the transformer oil would distil away before such a low pressure could be obtained. Burch overcame this problem by catching a fraction of the oil used in rotary vacuum pumps, a fraction that could withstand boiling at extremely low pressures. By substituting this fluid for mercury in a mercury diffusion pump, it was found that the same low pressure could be achieved without the need for liquid air and without the oil 'cracking'. Further experimental work led Burch and colleague F.E Bancroft to develop the oil-operated diffusion pump. Burch carried on with his new vacuum distillation method, but hit trouble when the pump failed to function when he tried to produce the same oils a second time. After some dismay, he soon discovered

that the gas flame he had used for his second attempt was too diffuse and the problem was thus solved.

In **1929**, Associated Electrical Industries (AEI) was created, amalgamating Metrovicks with its main UK rival, British Thomson Houston and other electrical companies. Metrovicks became a subsidiary of AEI trading in its own name. However, little changed for those working within the Research Department. By this time, Metrovicks was halfway towards producing Apiezon pumps commercially. One prototype was purchased by the physicist John Cockroft (*who would later make history by splitting the atom*) for the 'bargain price' of fifty shillings. Apiezon stills also found use in pharmaceuticals, as they allowed vitamins A and D to be distilled with far less decomposition than previously achieved. British Drug Houses eventually bought the patent for a pharmaceutical Apiezon still for £300,000 (*almost fifteen million pounds in today's money*).



Allegedly on Cockroft's recommendation, Apiezon oil was incorporated into a paste that became known as Apiezon Compound Q and could be used as a temporary vacuum seal for apparatus such as high-power radio valves, x-ray tubes and vacuum furnaces. Apiezon was also developed into wax sticks, providing an easily-removable vacuum seal or mounting medium. In 1933, Apiezon Products Ltd was established as a joint venture between AEI and The Anglo-Saxon Petroleum Co. Ltd (*part of Shell*). Metrovicks continued to manufacture Apiezon with Shell selling the products through its worldwide distributor network.

In 1934, Metrovicks patented the process of vacuum distillation, a technique that combined two fields that had previously been kept separate. In Burch's words, this was due to the fact that 'No chemist knows how to make a vacuum and no vacuum worker has been interested in distillation'. Apiezon was patented in the same year, and although Burch continued to develop new innovations and procedures,



it remains the product with which his name will always be associated.

Burch was certainly known as something of a character within the Research Department, and frequently clashed with the Time and Wages Department due to his irregular work patterns; often working late into the night and arriving late the next morning.

Nevertheless, the quality of Burch's research spoke for itself, eventually earning him a Leverhulme Research Studentship at Imperial College in 1933.

As the years have passed, the Apiezon production method has fundamentally remained the same. The current Apiezon stills date back to 1954. If Burch were to wander into the production area today, he would find little that was unfamiliar, apart from an automated tube-filler (*previously, filling tubes with precisely 25g of grease had required a steady hand*). Yet, while technology has advanced, so to have the uses for Apiezon and the current range of applications would exceed the inventor's wildest dreams. As a testament to the product's reliability, testing by the Hughes Aircraft Company would later show that Apiezon could withstand laboratory conditions that literally turned competing vacuum lubricants into brown sugar. Clients such as NASA, NATO and the UK military have all made full use of Apiezon's sealing properties. The fruit of Burch's research has truly lived on.

“We were the Rolls-Royce of electrical insulation companies.”

Cameron Haworth, retired Commercial Director of M&I Materials Ltd.

Developments in Walthamstow

During the ‘roaring twenties’ M&I made considerable improvements to its Micanite manufacture. The first steps were made towards mechanising the mica laying process, by dropping mica splittings through a tower onto a mesh screen. This produced the thicker Micanite sheets, while thinner sheets could be produced with hand-operated machines that used air suction. Bushings manufacture also developed rapidly, and by the end of the 1920s M&I were manufacturing units for a working voltage of 132 kV. The association of M&I with the newly formed Associated Electrical Industries Ltd (AEI) led to discussion over the future of the

Walthamstow plant, culminating in its extension and the provision of new machinery that increased production to provide for existing customers and for the needs of other AEI companies.

An article in *The Model Engineer* in **1938** gave a glowing report on the activities within the M&I plant. A visit to the Walthamstow factory was described as ‘a good insight into the most modern methods of manufacturing all kinds of insulating materials’. At the time, the Blackhorse Lane plant was the largest factory in the world dealing exclusively in such materials, and covered an area of six acres. The insulators produced were ‘used in every important electrical industry in the country’ as well as shipping large quantities to the Continent. Overall, *The Model Engineer* praised M&I for providing ‘all modern requirements in any branch of electrical engineering’. As well as being machined into paper, Micanite was also by this time being formed into three-dimensional shapes such as flanged rings for commutator insulation.

Considerable skill was required during this process in order to ensure a uniform thickness in the finished product. Electrical testing formed another important part of the factory and contained equipment for dealing with potentials of up to half a million volts. All products had to pass testing appropriate to their grade and quality.



Products manufactured during the late-1930s, including punchings, end rings, Empire tapes and Paxolin laminates

The birth of Metrosil

Meanwhile, the high-voltage department of Metrovicks Research, housed within the distinctively shaped 'elephant house', was also making progress in the field of electrical insulation. Building on earlier research carried out in the United States into non-Ohmic conductors made from silicon carbide, the department worked on developing a solid dielectric that would resist fatigue under high voltages. In a **1936** training guidebook for summer school instructors, research engineer A.K Nuttall described experiments that had been carried out to analyse the behaviour of oil-impregnated pressboard and porcelain under surge conditions. Trial and error eventually led to the development of high-voltage resistors that became known as 'Metrosil' (*a combination of the company name and 'silicon carbide'*). In **1937** Metrosil units began to be mass-produced for the first time within a small section of the research laboratory, under controlled conditions. As demand picked up, production was moved to the more

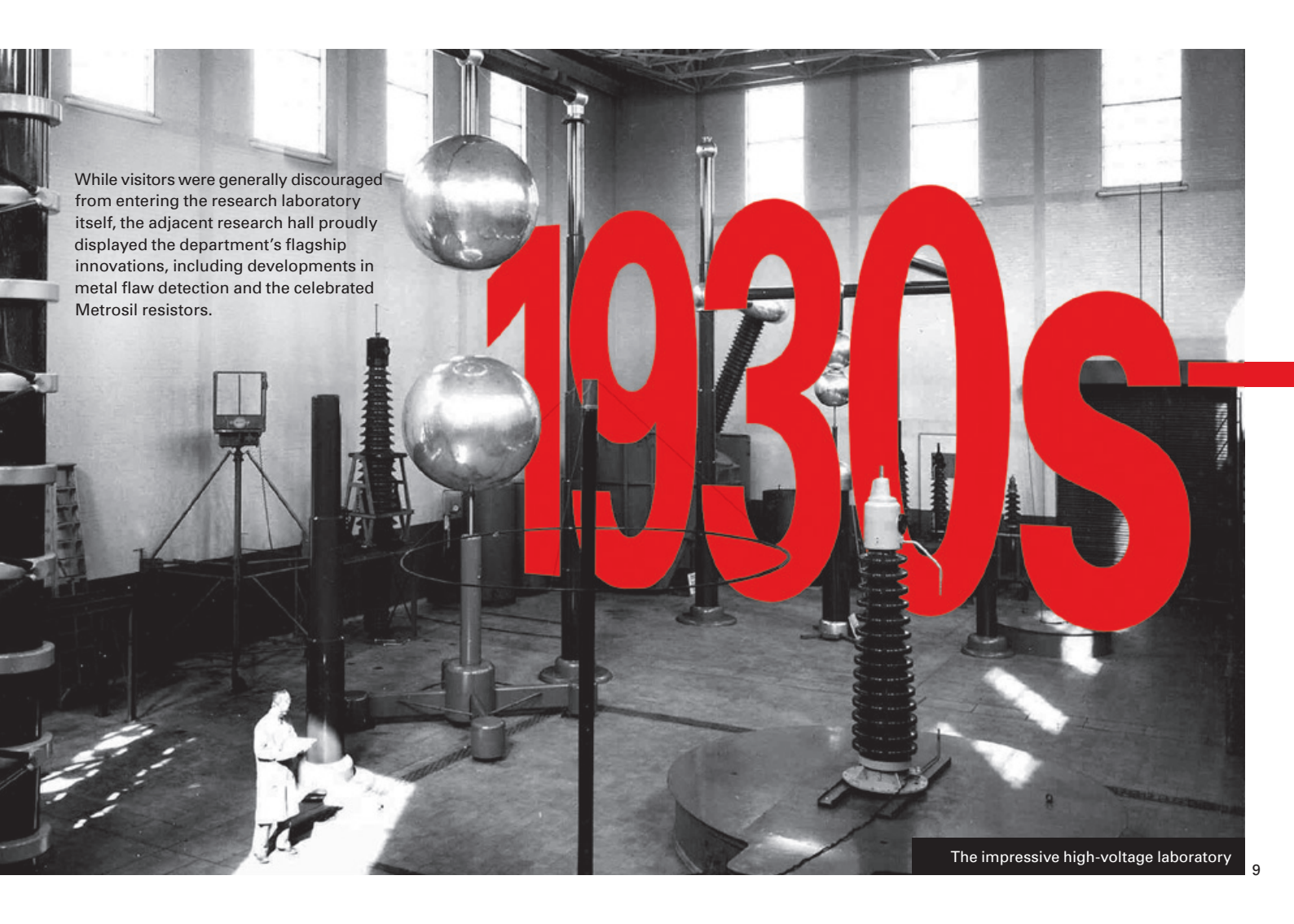
spacious surroundings of the S&T building at the Trafford Park site.

Supplied as silicon carbide discs, Metrosil marked a significant departure from existing understandings of resistant materials. Ohm's law saw current as directly proportional to voltage, whereas doubling the voltage applied to Metrosil increases the current twentifold. It is widely believed that Metrosil was the first resistor to function as a Voltage Surge Diverter. Interestingly, Metrosil also employs mica components, which are placed in the spark gap between units to prevent such surges. Metrosil units were initially applied in lightning protection but product development gradually led to a variety of applications including surge diverters for telephones, radar equipment and relays. They were also found to have a variety of technical applications in exciter discharge systems, transformer tap changers and rectifiers. As the world's power infrastructure developed, so too did the applications and utility of Metrosil.

The Metrosil production line contained an interesting oddity that remains in place to this day. The K-press machine dates back to **1939**, raising suspicions that it is a converted arms press that was originally intended for wartime use.

Empowered by the success of Metrosil, the Metrovicks Research Department launched further investigations into other electrical insulation materials, leading to the manufacture of a range of insulating varnishes, as well as special priming and finishing paints. If Apiezon was the 'eureka moment' of the 1920s then Metrosil was certainly the main success story of the 1930s. The drawing record kept during this period reveals that draughtsmen were involved in a variety of other projects, from the ambitious (*a 46-ton magnet for Liverpool University*) to more simple pleasures (*a picture-postcard stand, a laboratory bench*).

The high-voltage department was to enjoy greater research possibilities with the provision of a 2 million volt impulse generator and a 1 million volt 50 cycle set.



While visitors were generally discouraged from entering the research laboratory itself, the adjacent research hall proudly displayed the department's flagship innovations, including developments in metal flaw detection and the celebrated Metrosil resistors.

1930s

'Throughout the war we kept ourselves tolerably cheerful.'

M&I 50 Years Folio 1951.

Wartime concerns

By the time that Metrosil production had begun in **1937**, preparations for war had already commenced in earnest at Metrovicks. Searchlights, automatic pilot systems, radar and gun mountings had all entered into production under government rearmament contracts. It was during the build-up to the war that Metrovicks showed its first commercial interest in producing tungsten alloys. Tungsten carbide was thought to be a particularly useful alloy due to its potential uses in armour-piercing projectiles and in tools for lathes. This would lead to the foundation of Metro-Cutanit Ltd as a joint venture between Metrovicks and Cutanit Ltd., based near Warrington. Cutanit had an established expertise in alloys, having bought and marketed sintered carbides since the early

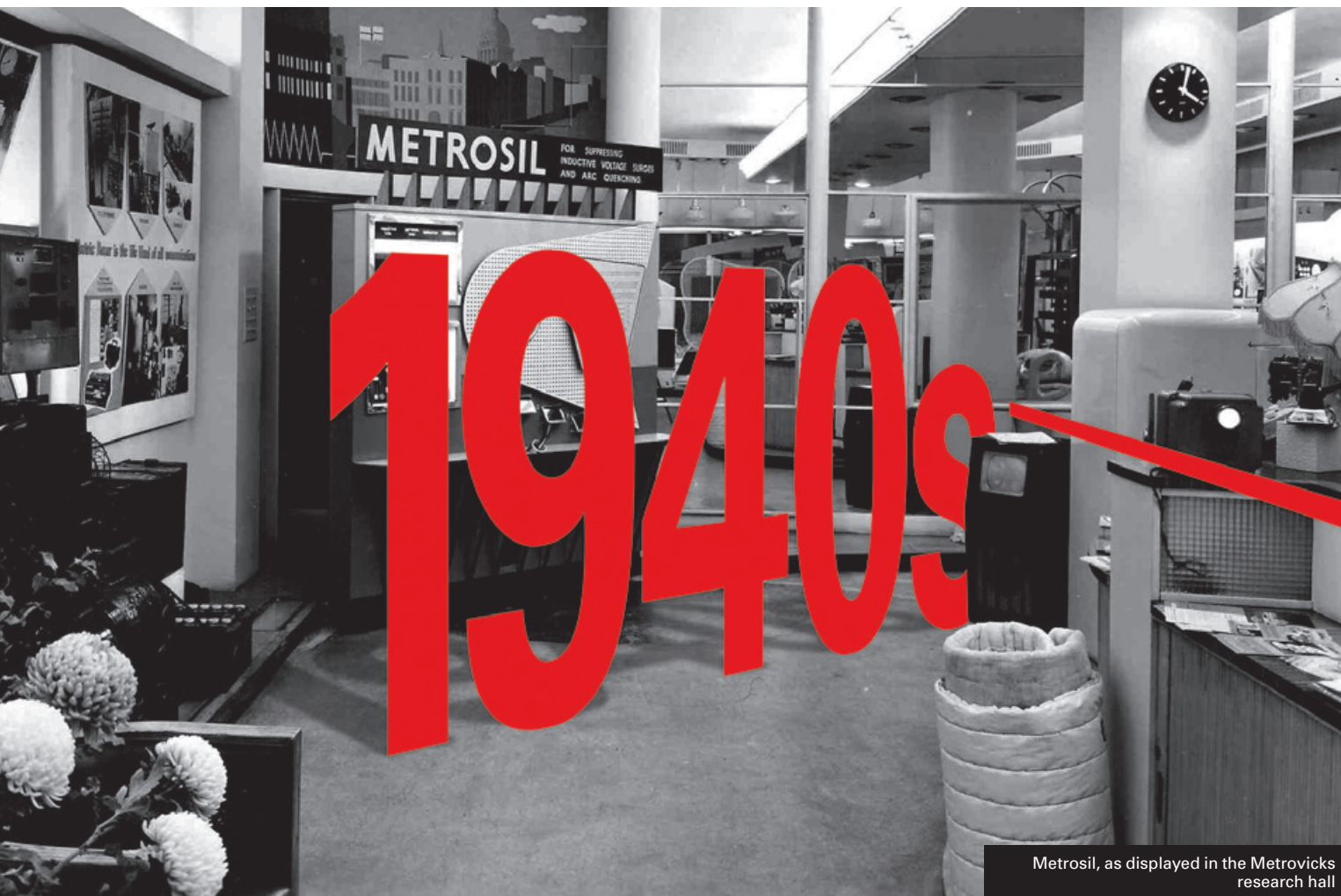
1930s and being credited for inventing the throwaway tip cutter. Metrovicks Research had already worked with Cutanit, designing for them (*among other things*) outlet filters and pressure moulds.

At the same time, Metrosil manufacture was increasing to meet the wartime demand, reaching production levels of as high as 25,000 units per week. The discs had a variety of military uses, such as within the commutators and generators of naval vessels. Meanwhile, research activities within the department were scaled back and many projects were microfilmed or scrapped altogether, in stark contrast to the eclectic variety of projects that had been pursued in the thirties.

However, the increased government interest in Metrovicks also brought unwelcome attention from Germany. Just one month after war had been declared, the Trafford Park works were photographed by the Luftwaffe and individual buildings were identified with remarkable accuracy. The first bombs fell

on the factory on the 22nd December **1940**, causing severe damage to the works area, while an incendiary attack the following night allegedly destroyed the first Avro Manchester Bomber to be completed (*some say this is untrue and that the first finished 'Manchester' was actually hit by a furniture van!*). A severe blow was thus dealt to Metrovicks' nascent aircraft production line.

Despite this severe setback and rumours abounding that the works were 'done for', the roofless machine shops were soon covered and production reached 80% of normal levels just four weeks after the bombings had taken place. A royal visit from the King and Queen in February **1941** brought a further boost to morale. While Metrovicks continued to benefit from government contracts to produce aircraft for the war effort, the ongoing demand for Metrosil ensured that the research department also took positive momentum into the post-war period.



Metrosil, as displayed in the Metrovics research hall

In Walthamstow, M&I was also diversifying as a result of the necessities of war. The company's Paxolin brand found new applications as a durable and weight-for-weight stronger alternative to aluminium that could be used in aircraft instrument panels, aerial masts and special types of bomb cases. As war loomed, the Air Ministry had selected M&I to produce waterproof wood laminate (*'Tego'*) for aircraft propellers. The company formed the subsidiary British Tego Gluefilm, devoted to providing a ready domestic supply of a product that had previously only been available from Germany. Such was the demand for this material that M&I were able to install a second Tego plant in Walthamstow followed by two more at Stevenage. At peak demand, all plants were operating a 24-hour day and were producing 350 miles of Tego per week.

Due to its precarious location in the southeast, M&I soon found itself under threat from enemy activity. While workers toiled in the Walthamstow factory, air battles raged in the skies above.

By night, the Works' shelters provided a welcome sanctuary from the London blitz to employees and their families. During the final two years of the war, the threat was confined to flying bombs and long-range rockets, which struck the factory several times. Nevertheless, the company proudly recalled that its workforce remained united during these testing times.



Aerial view of Empire Works, a target for enemy activity

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“Going into the Metrovicks research laboratory was mind-boggling. The number of Nobel laureates, BScs and professors... products such as Apiezon and Metrosil grew out of that atmosphere.”

Dr Peter Dawson, Product Group Director.

The post-war boom

In the short-term, both M&I and Metrovicks research enjoyed a ‘boom’ in the post-war period, although changes were afoot for both companies. While Metrovicks reconverted to non-military production (and notably, a works bomb shelter found peacetime use as a bowling alley!) there was much discussion about the direction that future research activities should take.

In Walthamstow, additional demand for electrical insulation stimulated the business and M&I enjoyed the privilege of being the sole provider of mica paper to the UK market. At the time M&I had a superb reputation within the electrical industry, and officially joined the AEI group in 1958, having already produced components for the group’s subsidiaries since the late 1920s.

Metrovicks becomes AEI

Metropolitan-Vickers had been a large subsidiary within the AEI group since 1929, and in **1947** the research department at Trafford Park was brought under the AEI name. Furthermore, it was decided to combine the research departments of Metrovicks and British Thompson-Houston, which some likened to ‘finding oneself in bed with one’s greatest rival’. Nevertheless, the newly renamed AEI Research Laboratory expanded its scope, with advances in radar and broadcasting.

Part 4

50s

The **1956** Metrovicks Gazette proudly announced the accomplishment of AEI's readjustment programme, with the installation of a new two-storey block of metallurgical laboratories and new laboratory facilities within the welding electrode factory. Notable research and development was carried out within the field of powder metallurgy, more specifically with hard carbides and the production of vacuum cast metals and alloys. Development work carried out within Metro-Cutanit into the preliminary manufacturing processes of metal powder led to plant modifications that increased production capacity.

In **1959**, AEI decided to do away with the Metropolitan-Vickers name altogether and incorporate it into a universal AEI brand. It was not without some regret that the parent company dispensed with a name that had become synonymous with excellence in research and manufacture. AEI's Director of Personnel and Central Services expressed this sense of regret in a company pamphlet:

'In the end, after much heart-searching, we decided, in the latter part of 1959, to let the grand old names go into oblivion, and start the new year of 1960 as AEI.'

The new era of AEI did not begin well. AEI struggled with falling profits in the early 1960s and the high cost of research work meant that activities began to be scaled back drastically. Director of Research Professor T.E. Allibone described this trend of 'storms succeeding sunshine' as typical of industrial research departments of the time.

M&I moves north and combines with AEI Research

In **1967**, AEI (*and with it, M&I, the AEI Research Laboratory and several other firms*) was acquired by the General Electric Company (GEC) for an agreed fee of £120 million, with the industrialist Arnold Weinstock assuming control of the group and all its subsidiaries. The new owners took the decision to close M&I's Walthamstow plant and move its

production to the Trafford Park site. During GEC's restructuring programme, Trafford Park became a repository for a variety of industrial activities such as die-casting, the AEI Research Laboratory, copper alloys, as well as Metrosil and Apiezon production. Meanwhile in 1971, 50% of the share capital of Apiezon Products Ltd. was transferred from AEI to M&I. Shell would retain the remaining 50% share until an M&I buyout in 1988.

For many working within the AEI Research Laboratory, their work altered dramatically. The department had always been a consumer of products, investigating new applications and developing new innovations whereas it was now a manufacturing department, combined with the production that had been moved up from Walthamstow. For the first time, M&I and the former 'grand old name' of Metrovicks research were working side by side on the same projects.



Production moves to the
Trafford Park site

“From small beginnings, Midel has developed into an internationally recognised and respected brand. During its 30-year life it has had to face up to stiff competition from much larger companies, which just goes to show that small can be beautiful after all!”

Malcolm Worthington, Commercial Director of M&I Materials Ltd.

Midel – the next innovation

By **1970**, the M&I production line from Walthamstow was absorbed into G-Aisle at Trafford Park. Despite the upheaval of the move, and the loss of some technology, as well as expertise (*only four of the original workforce moved up to Trafford Park*) production was transferred relatively seamlessly.

Even though the AEI Research Laboratory had been scaled down by GEC, this period saw M&I and the research laboratory combine their expertise to develop their first product in partnership- Midel transformer fluid.

Researchers had spotted the gap in the market for a transformer fluid that unlike existing PCB-based products, combined the necessary properties with an environmentally friendly formulation. Even as early as 1936, Metrovicks research engineer J.M Fleming had predicted the possibility of the scientific synthesis of a substitute for insulating oil. His experiments had centred upon the AEI product Pyranol, a mixture of trichlorobenzene and chlorinated diphenyls. Pyranol, he argued, was fireproof as well as having good electrical properties and a high dielectric constant. However, it also had well-documented health risks and presented a multitude of occupational hazards to workers. Pyranol was just one of many PCBs that were being manufactured worldwide and the race was on to find a non-toxic replacement. Yet, Fleming was

right to cite the potential of Pyranol as its use continued until **1977** when PCBs were officially banned in the USA by the Environmental Protection Agency, prompting European countries to gradually phase out their usage.

Midel originated from the same laboratory complex as AEI Paints, which had been expanded under Metrovicks following the successful development of Metrosil. Under the leadership of Fred Waddington, who was later awarded the Nelson Gold Medal for his services to industry, research scientists Tim Holt and Chris Livesey formulated a synthetic ester. Its name was derived by combining the M&I company name with ‘dielectric’, which denotes the fluid’s insulating properties. Midel was patented in **1979** but M&I lacked the capability to mass-produce the fluid themselves. For this reason, initially the multinational firm Ciba-Geigy was contracted to manufacture Midel on M&I’s behalf before M&I manufactured it independently using AEI’s expertise in the production of insulating varnishes and resins.



1970s

Metrosil metal spraying at the
Trafford Park site

Midel was first used in transformers built by GEC Broadstairs for the British Steel factory at Port Talbot. Initially the product was mostly used for transformer retrofilling and for a time M&I offered a retrofilling service, in partnership with Cleanaway, a specialist waste disposal company. The product was found to have better lubricating properties and greater moisture tolerance than mineral oil and silicone liquid. Midel's shelf life also exceeded researchers' expectations. In 1981, Midel was used in a train mounted transformer for the first time by the American Amtrak company. Subsequently, M&I also established clients for Midel in underground transport, notably London Underground and Hong Kong MTR.

Midel was initially manufactured in equipment designed to produce insulating varnishes on 3rd Avenue, within Trafford Park. The process was time consuming and it took two weeks to make the first batch. Subsequently the 3rd Avenue site was closed and the plant and equipment relocated to the main site, in an area known

as Y-building (or the "varnish plant" to some). Here, a production technique was developed that is believed to be unique to M&I making the process highly efficient and was instrumental in enabling Midel to be produced competitively and in volume.

For the period between 1982 and 2006 M&I had a license and also a distribution arrangement with BASF Lack & Farben (later known as Beck), which covered Germany and parts of Eastern Europe. Taking their lead from M&I's success with Amtrak, Beck developed the use of Midel by Deutsche Bahn, the German railway. Railways today remain an important market for Midel and are one of the applications for which Midel is sold around the world.

Production at Y-building ceased in 2004 and was moved to the new M&I factory in Hibernia Way. Here the process has been further improved through the introduction of computer control. Successive investment has allowed production to be expanded to many times its original level. Having

initially been sold in 200 litre drums the product is today regularly despatched by bulk tanker.

As well as expanding into the chemical field, M&I continued to push forward with its long-standing manufacturing activities. During the 1970s, M&I developed the capability to insulate much higher voltages required for the turbo-generators being employed in modern power stations. A new product, glass-backed 'MIMICA' emerged, as well as mica paper tapes that could be wrapped around copper wires in motors and generators to help protect wires from metal frames. However, competition was also growing and dwindling global mica supplies was leading to increasing research into glass insulation as an alternative. While M&I would maintain its mica activities into the nineties, demand would never reach the heights of the post-war period.

Despite these innovations, being a relatively small company within a larger business was not without its problems.

GEC took a budgeted profit from its subsidiaries regardless of their turnover. Arnold Weinstock required monthly meetings at head office as well as the submission of financial progress reports that took several days to prepare. The Guardian recalled Weinstock's unique management style: 'There was nothing dreaded more for a GEC employee than the managing director reaching them at home, late in the evening, after he had been scouring the accounts'. Securing investment from GEC for marketing initiatives or modernisation proved difficult and it was felt that M&I would be unable to fulfil its full potential while it remained within the parent company.

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1981 advert praising Midel as an environmentally friendly alternative to PCBs

“At the start the challenge was to change Wolfmet from a minor producer, unknown outside the UK. It’s taken 20 years and it’s given me grey hair, but we’ve done it. Nowadays it’s a truly international brand, recognised all over the World.”

Steve Jeffery, Export Sales Manager
at M&I Materials Ltd.

A move into heavy alloys

Metrovicks had been quick to spot the future significance of the heavy alloys market, having pursued the Metro-Cutanit project during the forties and fifties, as well as investing in research into powder metallurgy techniques. It was during the 1980s that M&I itself would become a

producer of heavy alloys, triggered by GEC’s acquisition of Elmet Alloys Ltd, a firm originally based in Grappenhall near Warrington. Specialising in copper and silver tungsten alloys used in switchgear contacts, Elmet had supplied many of the compound metals used by Metro-Cutanit. GEC moved Elmet into Trafford Park, where it initially continued to produce these alloys. However, M&I’s acquisition of the heavy alloys activity of two firms allowed it to take the Elmet brand into this emerging market. Firstly, in **1988** M&I acquired the High Density Metals division of Electro Precision Components Ltd., a subsidiary of the Birmingham Mint Group whose origins had been in with Johnson Matthey plc. M&I operated the business at its base in Wembley for a short time, before moving its activity to Trafford Park. Secondly came the acquisition in 1991 of the Tungsten Heavy Alloy activities of Osram Ltd., a subsidiary of GEC and the first firm to provide heavy metal alloys to the UK market.

These acquisitions triggered the emergence of M&I as a player in the heavy alloy market. Elmet’s copper tungsten activity would continue until it was sold off in 2000 to Vacuum Impregnated Products, another Warrington-based company specialising in electrical contact metals. Yet, it was in the field of tungsten heavy alloys that the most notable progress was made. M&I commenced production of tungsten heavy alloys in **1989**, which for the Elmet brand, marked a shift from producing alloys en masse to producing specific components. As M&I looked to market its new product abroad, an alternative product name was needed as an American firm was already registered under the Elmet name. ‘Wolfram’ is the Latin word for tungsten and is a more recognisable term for the metal in many European languages. The product name ‘Wolfmet’ was decided upon, arising from a combination of ‘wolfram’ and ‘metal’.

1980s



Wolfmet, a new name that would bring with it a host of new opportunities and a new era of production for M&I heavy alloys

Since its inception, Wolfmet has demonstrated a staggering array of applications. The first alloy produced was used in drop-weights by another GEC company, Marconi. Research and development of Wolfmet soon brought a variety of new uses. As with Midel, Wolfmet was able to provide an environmentally friendly alternative to a hazardous material. At a time where businesses were looking to phase out the use of lead, Wolfmet was marketed as a denser, non-toxic alternative for use in radiation shielding. It thus found use in apparatus such as vial shields and isotope containers. The alloy also proved to have several transport applications such as balance weights in aerospace and ballast for motor sport. Wolfmet's attainment of the AS9100 aerospace quality certification allowed its use in balancing components and vibration reduction. A 3-week tour to establish a network of agents across North America in 1993 ultimately led to the successful establishment of clients within the business jet industry. Its uses in nuclear medicine led to its application in multileaf

collimators for the shaping of radiotherapy treatment beams. In February 2001, M&I sold its first Wolfmet components for use in Formula One. Wolfmet is unique among M&I products in that it is chiefly a 'made-to-order' product, being manufactured according to the client's specifications. Engineers were soon able to use their expertise to assist clients with the design of components.



Wolfmet furnace in operation

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A black and white aerial photograph of the Trafford Park Works industrial complex. The image shows a dense arrangement of large industrial buildings with gabled roofs, surrounded by parking lots and smaller structures. A large, bold, red '90s' is superimposed over the left side of the image. A solid red horizontal line extends from the end of the '90s' text across the bottom of the image.

90s

“I had no doubts that we would succeed from day one. It was just a case of having the faith and the time to make it all happen”

Colin Salt, Chairman of M&I Materials Ltd.

“The business continues to build on its solid foundations as it goes from strength to strength, not just in the UK, but around the World.”

Giles Salt, Managing Director of M&I Materials Ltd.

A momentous decision

In **1989**, Arnold Weinstock agreed a merger between the power generation and transport arm of GEC and the French

company, Compagnie General D'Electricite (CGE), to form GEC ALSTHOM, and M&I became known as GEC ALSTHOM (M&I Ltd). M&I was the only UK-based company working within its Robotics and Materials division. During the early nineties, the newly formed conglomerate of GEC ALSTHOM began to move into large scale manufacturing activity rather than components. Six months of negotiations eventually led to a successful management buyout of M&I by the then Managing Director Colin Salt, on the 26th of February **1993**. It was agreed that the newly renamed M&I Materials Ltd. would acquire the Apiezon, Metrosil, Midel and Wolfmet products while the remaining Mica products would be sold off on behalf of GEC ALSTHOM.

As well as marking the beginning of new ownership, the buyout of **1993** has also been described as a turning point in terms of business outlook. Investment could now be channelled into new marketing campaigns, allowing the company to establish new clients abroad.

Modernisation could also take place, for example through the addition of a new computer system and new plant and equipment. This rejuvenation of M&I Materials and adoption of a long term strategy of investment and commitment to the future were key factors to the success of the business.

Continuing development

In **1993**, M&I Materials operated from the S&T building in the corner of the GEC Trafford Park site, with Midel being manufactured in the nearby Y building. At the time, there were 65 employees and in the year leading up to the buyout, sales were worth £2 million pounds. By contrast, in the year ended 31 March 2009, the business had 112 employees and sold just under £20 million pounds worth of goods.

Initially, M&I Materials worked directly with customers in the UK, and in Europe it continued to work with Beck who distributed Midel on M&I's behalf. This important relationship continued until

2006 at which point M&I Materials chose to develop the overseas markets on its own behalf and parted company with Beck. Since the turn of the century, already widely established in the traction and distribution transformer markets, further opportunities opened up for Midel as the fluid of choice in environmentally conscious renewable energy markets and in particular in 'wind farms'.

Wolfmet sales were initially focussed in the UK, and then increasingly overseas. To compete in the big tungsten alloy markets of aerospace and radiation shielding, M&I broadened its international scope across Europe and US, and developed its product offering through the introduction of full engineering solutions and an overseas network of agents was engaged to promote Wolfmet into these new markets.

New markets for Metrosil were opened up with the acquisition in **2001** of the Silicon Carbide Division of Devon-based Power Development, part of Spirent plc. The range of products and introduction to their

customers, gave M&I its first entry into China. The Chinese required exciter discharge units for the Three Gorges Dam project, the largest hydroelectric power station in the world. The purchase of this division and the global growth in power infrastructure have been key drivers in the development of Metrosil business which has grown from strength to strength.

The longevity of the Apiezon product has held strong and has become an international industry standard for those working with vacuums either in laboratories or in manufacturing. The purchase of the 50% of Apiezon Products Limited from Shell in 1988 was a key turning point in Apiezon's history at M&I, as it gave M&I the opportunity to market and sell the product directly. Also, in 1998, M&I Materials acquired Inland Vacuum Industries Inc, a firm that dealt in vacuum pump fluids and complemented the Apiezon range. Inland was based in Rochester in the US, and remained part of the group until **2007** when it was sold to Inland's management to support the development of M&I Materials

facilities in the UK. Inland continues to distribute M&I's products today.

By **2008**, M&I Materials had representatives, distributors and agents promoting its products around the world, selling to 55 countries, with nearly three quarters of its sales being made into overseas markets.

Further investment

In June **2003**, the firm moved premises to the current purpose-built site at Hibernia Way. As M&I was the last original building standing on the Trafford Park site, the move spelled the official demise of GEC's old premises and turned a decisive page in Manchester's industrial history. While the new factory was completed to schedule, the company had to wait 12 months for the power supply to be installed. Luckily, the same developer that was demolishing the old premises was involved in the construction of the new site so M&I was never without a home.

While only a stone's throw from the old GEC site, the new plant has the benefit of permitting all production to take place on the same level, as well as containing room for expansion.

With the increasing demand for products, investment has continued at a pace. New CNC machines, lathes, furnaces, presses, computer infrastructure and most recently a second Midel manufacturing line, have helped to strengthen and position M&I for further growth.

Recognition

In April **2009**, M&I Materials Ltd was awarded the prestigious Queen's Award for International Trade, a glowing testament to decades of research, development and hard work.

In February **2010**, M&I Materials was again rewarded for excellence with a visit from HRH The Prince of Wales. Selected because of outstanding achievement in export and manufacturing, M&I Materials was

honoured to be the only commercial business to receive a Royal visit on The Prince's **2010** tour of Manchester.

M&I owes its success to the countless men and women who built the company as it is today. A mica-layer in Walthamstow, a research engineer in Manchester, a metalworker in Warrington and many others all had a role to play.



Colin Salt and Steve Jeffery attend a reception for 2009 Queen's Award winners, hosted by Her Majesty The Queen

Today, the present generation maintains these high standards, by opening doors to new markets and continuing to develop truly global products. The M&I Materials story is one of a unique fusion of tradition and progress, and the story continues in the spirit of this rich heritage.

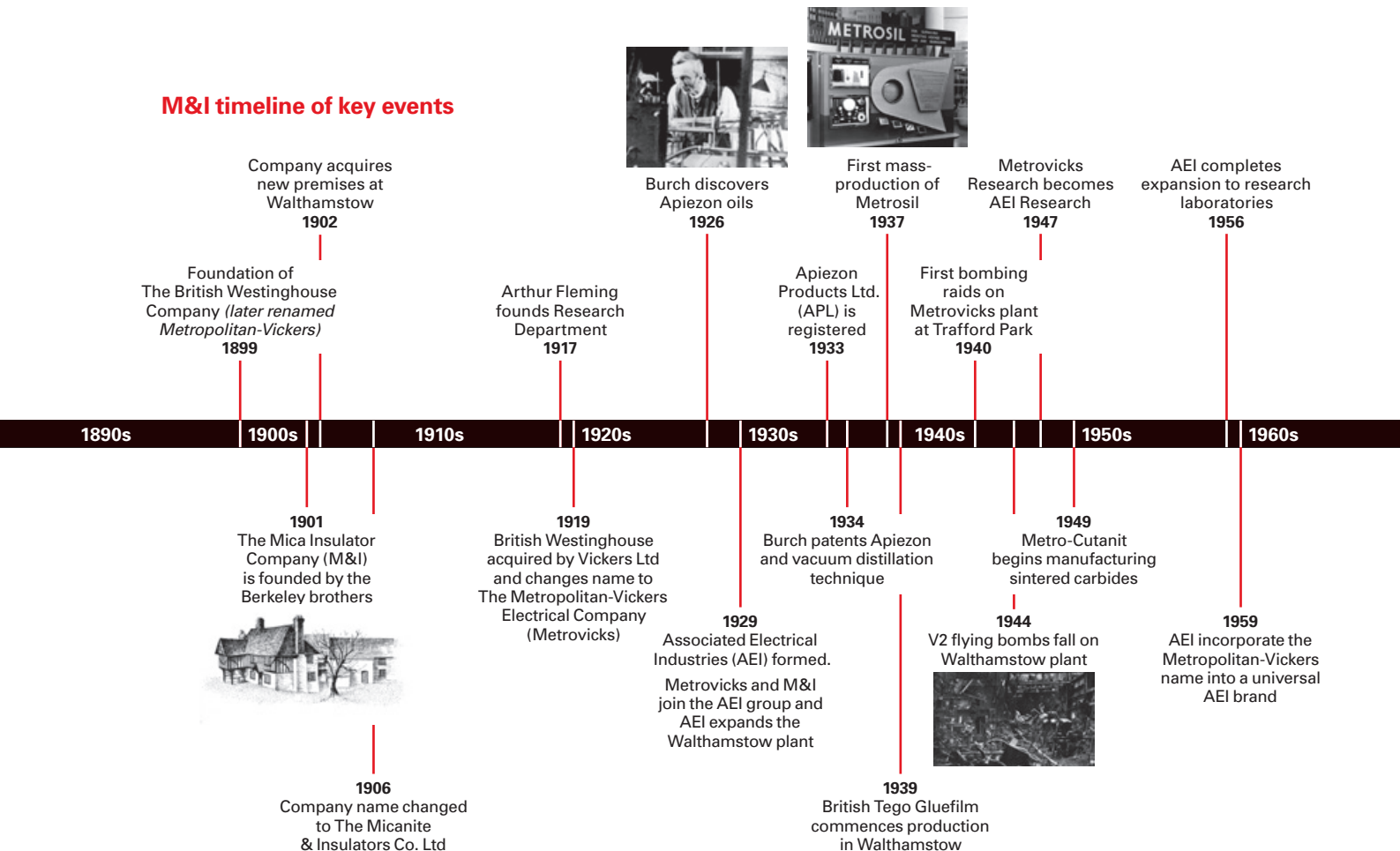


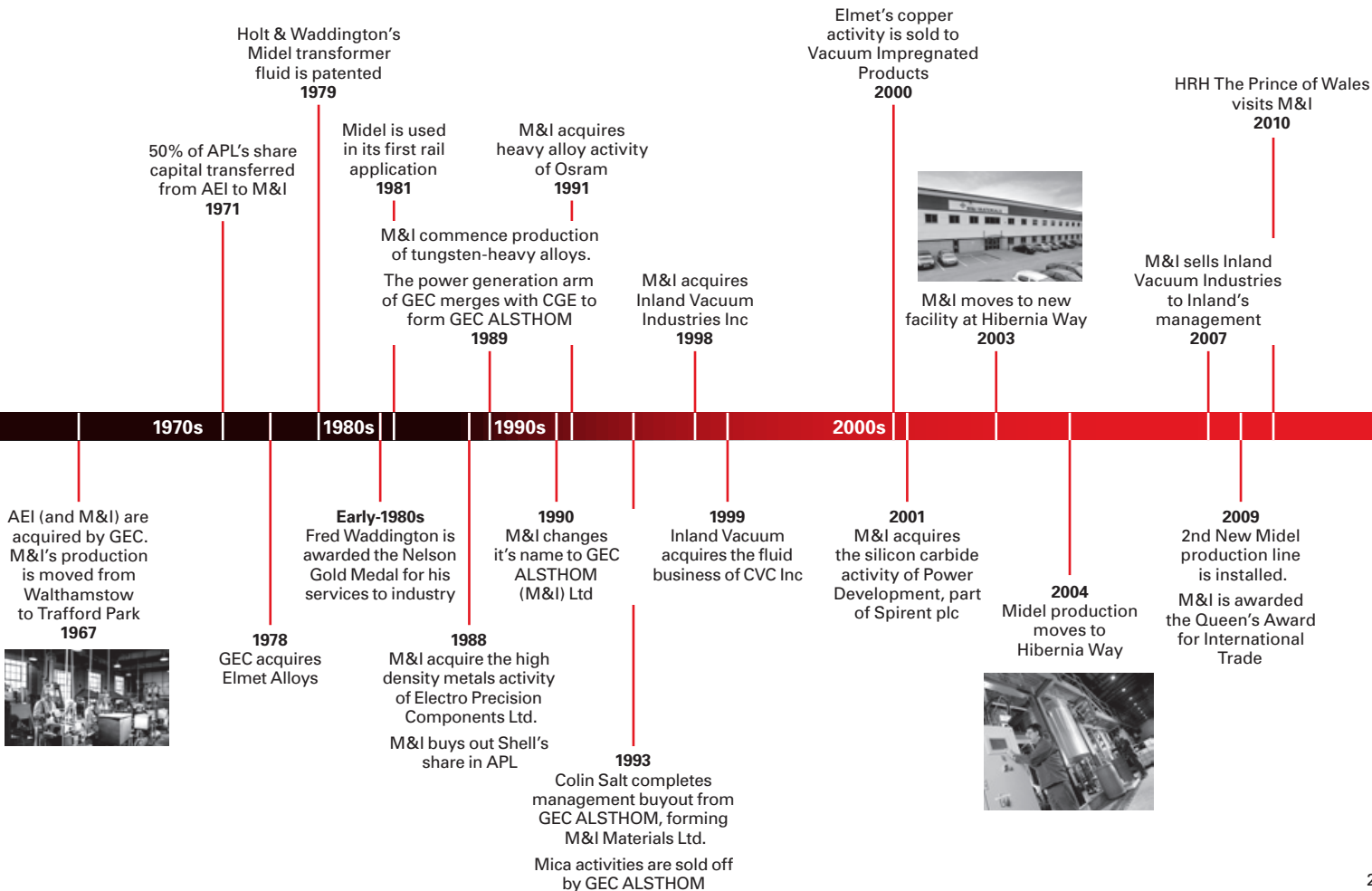
HRH The Prince of Wales congratulates the team at M&I Materials on their remarkable achievements



M&I Materials, Hibernia Way, opened for business in 2003 and 7 years later has grown into an award winning global success

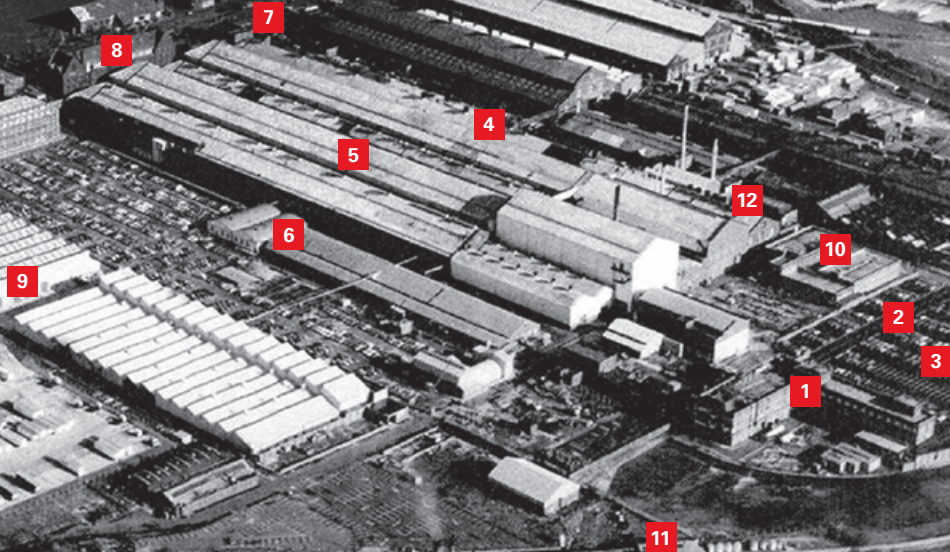
M&I timeline of key events





Trafford Park Works (during GEC ownership)

1. S&T building (M&I facility)
2. High voltage laboratory (demolished)
3. Research & Development
4. G aisle
5. Turbine assembly
6. Works canteen
7. Main entrance
8. Westinghouse building
9. Switchgear production
10. Training school
11. Y building (Midel facility)
12. A aisle (Mica facility)



Acknowledgements

I would like to express my personal gratitude to the staff of M&I Materials Ltd for their continuing help and guidance during the completion of this project. Thank you to all who helped with useful information, anecdotes or reminiscences. Thanks also to M&I Materials employees, both current and retired, for agreeing to meet with me and share their cherished memories.

While this history is by no means exhaustive, it is hoped that it will at least provide a record of the company's key milestones to celebrate the progress that has led to the achievement of the Queen's Award. It is also hoped that this document will evoke memories among those who shared in the company's colourful history. For those interested, more specific histories have already been produced regarding Metropolitan-Vickers as a whole, the Micanite & Insulator Company and British Tego Gluefilm, and more will no doubt be written.

Ravi Hensman, September 2009



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