MPE
Quality, Reliability, Performance

# Company Bulletin

for EMC, EMP & TEMPEST Protection

Issue 13

## MPE PEOPLE

### Apprenticeship first for MPE


**In a first for MPE, during 2016 MPE took on two Production Apprentices, Dylan Cassidy and Ben Meadley. These three-year apprenticeships have been undertaken in conjunction with Knowsley Council and the North-West Training Council. Now Dylan has been honoured with the North-West Training Council's prestigious "First Year Electrical Apprentice" award. This was presented to him by the Rt Hon George Howarth, MP for Knowsley, during an official visit to MPE on August 11th.**

**Click for more details**

### Spotlight on John Lindsay

**As one of MPE's Design Engineers, John Lindsay is responsible for the design and development of new and existing products at MPE. As part of the design process, he conducts component evaluations, builds and tests prototype circuits and develops and keeps up-to-date datasheets, bills-of-materials, test plans and specifications. Following graduation from the University of Liverpool with a Master of Physics (MPhys) with Honours in 2009, John started working at MPE in 2011 as a Junior Design Engineer.**

**Click for more details**

## MPE TECHNOLOGY

### Individual element HEMP filters

**MPE's 800A and 1200A HEMP filters have always been modular, with line-replaceable individual elements, but now the company has expanded its existing, well-established HEMP range to provide 6A to 400A filters in modular as well as integrated form. This is to satisfy recent market requests, and in particular to address certain US specifications and applications. Based soundly on the same field-proven designs and components as in MPE's integrated HEMP filter ranges, the new range provides both 2-line and 4-line variants. Filters are offered with both Standard and Extended (TEMPEST) insertion loss performance.**

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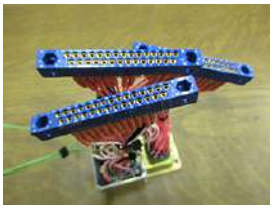
### Manufacture outside the box



**MPE is commonly associated and respected for its traditional boxed filter and feedthrough solutions. What is less commonly known is that MPE also regularly uses the same manufacturing skillsets and techniques to deliver solutions outside of these traditional product ranges. Whilst still providing the same high-performance EMC or EMP filtering, some solutions manufactured and delivered by MPE are dramatically different – mechanically or electrically – in their design. One such recent example, pictured opposite, is a filtered cable harness loom, produced and delivered for the Indian Air Force (IAF).**

**Click for more details**

## MPE DISTRIBUTOR NEWS

### MPE speaks out at IEEE EMC conference

**Building on its previous presentation during the EMC Europe event in Gothenburg, in April MPE again had the opportunity to present to the IEEE community, this time at the Combitech test house premises located in Växjö, Sweden. The conference was held by the Swedish chapter of the IEEE EMC Society. MPE's participation was organised by its Swedish distributor, Jolex AB of Värmdö. April's conference focussed on the topic of recognising and dealing with the TEMPEST threat in Sweden. John Jephcott of MPE delivered a presentation entitled "Integrated Protection of C4I Equipment and Facilities".**

### Celebrating Electrade's silver anniversary

**July 1st 2017 saw MPE's distributor in Germany, Electrade GmbH, reach the 25th anniversary of its incorporation, a significant milestone in any company's history. Established in 1992, Electrade – based at Gräfelfing, 1km west of Munich, and with offices in Frankfurt-am-Main and Hannover – handles sales of high-technology products such as electronics materials, connectors, sensors, transducers and instrumentation from leading manufacturers that neatly complement MPE's solutions in many areas. So, to mark this silver anniversary, Electrade celebrated with its staff and key supply partners.**

**Click for more details**

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# MPE APPLICATIONS

## EMC suppression for wiper solutions

**Worcester-based PSV Wipers Ltd (PSV) has been supplying high-quality windscreen wiper systems for specialist vehicle manufacturers since 1980. One such application is the British "Ocelot" light protected patrol vehicle (LPPV), where PSV worked closely with MPE in the design and implementation of a wiper solution with integral EMC suppression. Following a detailed design process, MPE provided a custom 7A, 28V DC, four-line filter to PSV, ensuring that the wiper motors were compliant with the stringent EMI/RFI suppression requirements of DEF STAN 59-411 Land Class A.**

Click for more details

## Keeping it cool with MPE HEMP filters

**Following a very rigorous and extensive design proving exercise, MPE was awarded the contract to supply a quantity of its unique 1200A HEMP filters for installation on a critical defence application in Virginia, USA. The contract award was made via MPE's distributor in the USA, Technical Sales Solutions (TSS). Whilst HEMP protection in accordance with MIL-STD-188-125 was a prerequisite, site specifics and issues previously encountered within the application meant that equipment performance under operational load and at operational temperature was of equal importance. Of particular concern were heat rise and heat dissipation.**

Click for more details

# FAST FACTS ON MPE LTD

- MPE has traded since 1925 and employs over 50 people.
- MPE has designed, manufactured and shipped in excess of 8,000,000 high-performance EMC, EMP and TEMPEST filters and feedthrough capacitors in the last 30 years.
- Many products have been in service for more than 20 years with undiminished performance.
- MPE has a portfolio of over 20,000 custom product designs to meet all possible requirements.
- The MPE factory at Knowsley, Liverpool, is certified to the quality standard ISO 9001:2015, and its products meet all applicable defence standards.


**For comprehensive information about MPE's products and services, contact the Sales and Marketing Department, MPE Ltd, Hammond Road, Knowsley Industrial Park, Liverpool, L33 7UL, U.K.**
**Tel +44 (0)151 632 9100.**
**Email sales@mpe.co.uk. Website www.mpe.co.uk**
**If you have a friend or colleague who you think might find the MPE Company Bulletin informative, then why not forward it to them?**

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Dylan Cassidy receives the North-West Training Council's "First Year Electrical Apprentice" award from the Rt Hon George Howarth, MP for the Knowsley constituency, on his official visit to MPE in August

The North-West Training Council headquarters in Bootle, Merseyside

## Apprenticeship first for MPE

As reported in Issue 12 of the MPE Company Bulletin, in a first for MPE, during 2016 MPE took on two Production Apprentices, Dylan Cassidy and Ben Meadley. These three-year apprenticeships have been undertaken in conjunction with Knowsley Council and the North-West Training Council.

Now Dylan has been honoured with the North-West Training Council's prestigious "First Year Electrical Apprentice" award. This was presented to him by the Rt Hon George Howarth, MP for Knowsley, during an official visit to MPE on August 11th.

Dylan Cassidy and Ben Meadley joined MPE in August 2016 and have successfully completed the first year of their apprenticeships.

From the areas around Knowsley, Dylan and Ben have been introduced to a wide range of Production tasks over their first year, whilst fulfilling academic studies one day a week at the North-West Training Council headquarters in Bootle, Merseyside. Academic modules completed have included Health and Safety; Basic Workshop Practice; Basic Electrical Circuit Testing; and Basic Fault-Finding. At MPE their Production assignments have incorporated product assembly; product finishing; resin fill; and capacitor clearance.

Dylan and Ben will now move on to their second year of study toward their NVQ / BTEC Level 3 Extended Diploma in Electrical and Electronic Engineering.

During this second year, academic modules will embrace further Health and Safety; Communication for Engineering Technicians; Electrical and Electronic and Mechanical Principles; Engineering Drawing; Engineering Materials; Mathematics for Engineering Technicians; and Electronic Measurement and Testing. At MPE, both will continue to increase their knowledge and experience in the areas of Production to which they have been introduced during the first year of their apprenticeship.

Accordingly, with Dylan and Ben both progressing well and contributing to MPE's efforts, MPE has taken on three further Production Apprentices in September 2017. Again, these apprenticeships are being run in conjunction with the North-West Training Council. Looking ahead, MPE plans to continue and expand its apprentice scheme in the coming year.

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John Lindsay

## Spotlight on John Lindsay

As one of MPE's Design Engineers, John Lindsay is responsible for the design and development of new and existing products at MPE. As part of the design process, he conducts component evaluations, builds and tests prototype circuits and develops and keeps up-to-date datasheets, bills-of-materials, test plans and specifications.

John uses PSpice modelling in the initial filter design stage to determine the component values needed to attain the performance stipulated by the customer or to comply with a technical requirement. Then various other tools such as AutoCAD are utilised to ensure that the often demanding size and weight constraints are fully met. Furthermore, since MPE manufactures its own feedthrough capacitors, John is called upon to simulate the wound dimensions of capacitors using custom software, in order to compute the outer dimension of the finished capacitor.

Following graduation from the University of Liverpool with a Master of Physics (MPhys) with Honours in 2009, John started working at MPE in 2011 as a Junior Design Engineer. He divided the majority of his time between new component testing and updating existing documentation. In particular he worked on new modular designs for 800A and 1200A HEMP and IEMI powerline filters.

After promotion to Design Engineer, John concentrated on designing variants of existing products for custom applications. He also spent time within Production writing standard operating procedures and assembly instructions, to ensure that the high quality and consistency of MPE filters are maintained at all times.

As regards vocational qualifications at MPE, with many of the company's designs being custom, raising challenges in Production, John led a six-man team, the second group from MPE to achieve their NVQ Level 2 in Business Improvement Techniques. This involved completing projects employing techniques such as Root Cause Analysis, Just-in-Time and 5S to improve quality and reduce waste.

John has been a member of the Institution of Engineering & Technology (IET) since 2013 and of the International Electrotechnical Commission (IEC) SC77C High Power Transient Phenomena subcommittee since 2016.

He lives with his partner at Crosby, Liverpool and loves to travel and try out new experiences. After graduating from University, he went backpacking around Australia, New Zealand and South-East Asia, where he tried his hand at scuba diving and bungie jumping.

John likes to watch all types of sport and, as an avid supporter of Everton FC, he is passionate about going to Goodison Park to watch his team. In his spare time he enjoys keepfit and is a keen reader of science fiction novels.

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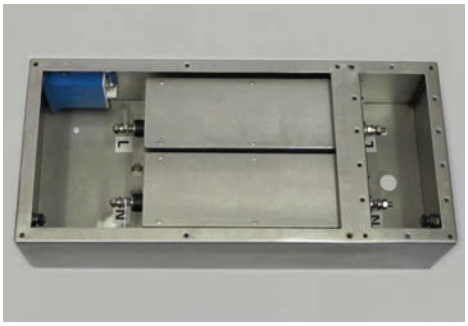

## Individual element HEMP filters

MPE's 800A and 1200A HEMP filters have always been modular, with line-replaceable individual elements, but now the company has expanded its existing, well-established HEMP range to provide 6A to 400A filters in modular as well as integrated form. This is to satisfy recent market requests, and in particular to address certain US specifications and applications.

With over 10,000 lines of MPE HEMP protection now installed and operational in numerous territories around the world, MPE's track record of high reliability is well proven in the field. This enviable track record, combined with an ultra-low failure rate in service of less than 0.1%, has never suggested that line-replaceable elements would be beneficial to users.

Therefore, previously MPE has manufactured HEMP filters up to 400A as either 2-line or 4-line integrated solutions. Meanwhile MPE's larger current 800A and 1200A HEMP filters have always been single-line because of size and weight considerations.

However, regardless of MPE's unmatched record for reliability, some defence specifications and particular applications do still call for individual element or line-replaceable filters. Therefore, to address such cases, MPE has now introduced a modular HEMP filter range for currents up to 400A.

Based soundly on the same field-proven designs and components as in MPE's integrated HEMP filter ranges, the new range provides both 2-line and 4-line variants, from 6A through to 400A. Filters are offered with both Standard and Extended (TEMPEST) insertion loss performance. This initiative by MPE allows the company to supply individual element filters from 6A right up to 1200A, with no need for any paralleling of multiple lower current filters.

Although only just introduced, MPE's new modular HEMP filters have already been exported and are duly in service at a number of defence and other critical infrastructure sites internationally.

Further information regarding the new modular range can be found on the HEMP filter product pages of the MPE website www.mpe.co.uk/category/hemp.

You are also invited to download the catalogue for MPE's complete HEMP filter range by clicking on the hyperlink here.

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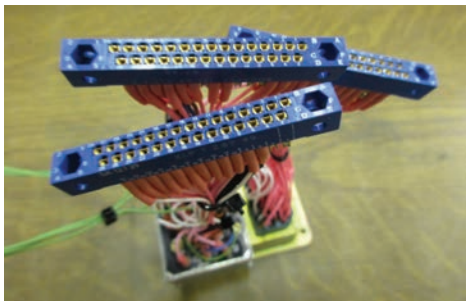
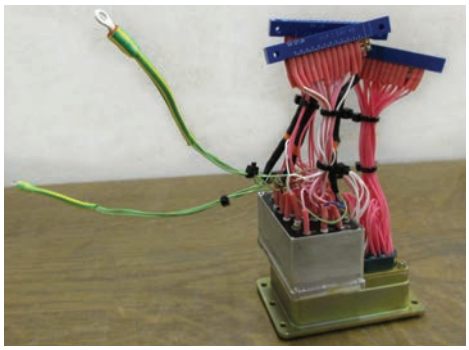
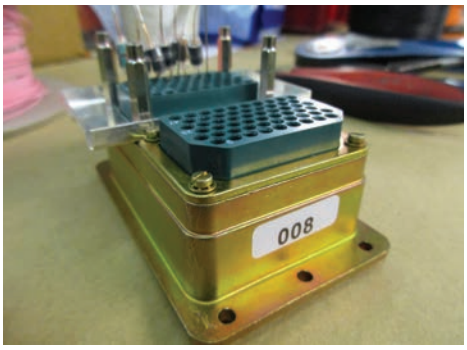




Filtered connectors for cable harness loom




Assembly of filtered cable harness loom

## Manufacture outside the box

MPE is commonly associated and respected for its traditional boxed filter and feedthrough solutions. Utilising manufacturing skillsets and techniques developed over decades, MPE manufactures in the region of 100 different designs of filter and feedthrough solutions every month, with all manufacturing and assembly processes being conducted in-house at MPE.

What is less commonly known is that MPE also regularly uses the same manufacturing skillsets and techniques to deliver solutions outside of these traditional product ranges. Whilst still providing the same high-performance EMC or EMP filtering, some solutions manufactured and delivered by MPE are dramatically different – mechanically or electrically – in their design.

One such recent example, pictured opposite, is a filtered cable harness loom, produced and delivered for the Indian Air Force (IAF). The IAF's complement of personnel and aircraft assets ranks fourth amongst the airforces of the world.

So, as part of the Indian Air Force's upgrade program for its fleet of Jaguar aircraft, MPE was contracted to manufacture a quantity of custom filtered harnesses to be retrofitted to the aircraft. The 57 wire harnesses contained four different line types within the filter and were completely bespoke in their nature.

However, because it conducts all manufacturing processes in-house, MPE is not limited to any specific product manufacture or assembly constraints. Therefore, even given this bespoke nature, the design, material procurement, production techniques and assembly skills required to manufacture the solution all fell squarely within MPE's core capability and competency.

The filtered harness loom is just a recent example of the many different custom manufacture contracts which MPE regularly completes and, with many defence platforms around the world either extending operational lifespans or retrofitting upgrades, this manufacturing requirement is only set to grow in the future.

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John Jephcott presenting at the IEEE EMC conference in Sweden

The Combitech facility in Växjö, Sweden, which hosted the event

## MPE speaks out at IEEE EMC conference

Building on its previous presentation during the EMC Europe event in Gothenburg, in April MPE again had the opportunity to present to the IEEE community, this time at the Combitech test house premises located in Växjö, Sweden. The hosts Combitech AB are an independent technical consulting company, part of the defence and security group Saab.

The conference was held by the Swedish chapter of the IEEE EMC Society, which meets two to three times per year. MPE's participation was organised by its Swedish distributor, Jolex AB of Värmdö (www.jolex.se).

Recent IEEE seminars have concentrated on topics such as EMC within high-current facilities; EMC issues in naval applications; and emerging EMC threats. April's conference focussed on the topic of recognising and dealing with the TEMPEST threat in Sweden, and other presenters alongside MPE included the likes of Combitech, Eldon and the Swedish Defence Materiel Administration (Försvarets Materielverk or FMV).

John Jephcott of MPE delivered a presentation lasting just over an hour entitled "Integrated Protection of C4I Equipment and Facilities" to an engrossed audience of some 50 people.

Covering data, power and telephone filters, John's talk enunciated the differences between EMC, EMP, HEMP and TEMPEST filters and then progressed to explain the different design approaches adopted by MPE in delivering filters to meet the stringent requirements of TEMPEST applications.

Using specific application examples and recent case studies, the presentation concluded with a section on the correct selection of TEMPEST filters and best practice for filter installation and testing.

The technically orientated audience covered a wide spectrum from companies and organisations such as BAE Systems Hägglunds AB, Combitech, the Swedish Defence Materiel Administration, Kockums, Saab and Volvo, and questions were plentiful, following John's address which was extremely well received.

Further information on MPE's ranges of TEMPEST filters can be found on the TEMPEST product pages of the MPE website or by clicking on this hyperlink:

www.mpe.co.uk/category/tempest

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Electrade's staff and suppliers celebrate the company's 25th anniversary at the Linderhof Palace, in south-western Bavaria near Ettal Abbey

Dieter Mühlberger, Managing Director of Electrade GmbH, describes the local history and architecture to his guests

## Celebrating Electrade's silver anniversary

July 1st 2017 saw MPE's distributor in Germany, Electrade GmbH, reach the 25th anniversary of its incorporation, a significant milestone in any company's history.

Established in 1992, Electrade – based at Gräfelfing, 1km west of Munich, and with offices in Frankfurt-am-Main and Hannover – handles sales of high-technology products such as electronics materials, connectors, sensors, transducers and instrumentation from leading manufacturers that neatly complement MPE's solutions in many areas.

Appointed by MPE as its distributor for Germany in June 2013 for both standard and customised products, Electrade has a broad customer base encompassing areas such as aerospace, defence, process control, transport, test and measurement, EMC and shielding, information and communications technology (ICT) and medical equipment.

So, to mark this silver anniversary, on 28th July Electrade celebrated with its staff and key supply partners. David Seabury and John Jephcott from MPE attended and, along with approximately 40 other guests, were treated to a day of activities in and around the Garmisch-Partenkirchen region.

Firstly visiting the historic Ettal Abbey brewery, where Benedictine monks have been brewing beers for over 400 years, guests were treated to a guided tour by the head brewer. Following a lunch taken at the Ludwig der Bayer restaurant in Ettal, the afternoon was then spent touring the opulent Linderhof Palace, built in 1886 and originally a residence of King Ludwig II during the 19th century. The evening saw the celebrations continue at the Goldene Gans restaurant in Pasing.

MPE presented Electrade with an anniversary gift comprising a bottle of fine wine and a newspaper dating from the day of Electrade's incorporation.

John Jephcott of MPE commented: "It was an excellent day of cultural activities, but what was most pleasurable was to witness the warmth and friendship between Electrade and suppliers, some of whom have been partners for almost all of Electrade's 25-year history."

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The Ocelot LPPV in service in Afghanistan

The PSV wiper system for the Ocelot – with integral EMC suppression provided by MPE's custom filter

## EMC suppression for wiper solutions

From its headquarters at Navigation Road, Diglis, Worcester-based PSV Wipers Ltd (PSV) has been supplying high-quality windscreen wiper systems for specialist vehicle manufacturers since 1980 (www.psvwipers.com). Following previous company structures and ownerships, PSV was acquired by current Managing Director Paul Curry from the ESG Group in July 2015.

PSV designs and manufactures complete wiper systems, including wiper arms, wiper blades, wiper motors, drive systems and linkage parts. Working closely with vehicle OEMs, PSV offers both bespoke original equipment and aftermarket technical solutions for a range of applications such as military, civil engineering and construction, and agricultural vehicles as well as regular automotive applications.

One such application is the British "Ocelot" light protected patrol vehicle (LPPV), where PSV worked closely with MPE in the design and implementation of a wiper solution with integral EMC suppression.

Following a detailed design process, MPE provided a custom 7A, 28V DC, four-line filter to PSV, ensuring that the wiper motors were compliant with the stringent EMI/RFI suppression requirements of DEF STAN 59-411 Land Class A and also met the extreme conditions that the vehicle would face in theatres of operation.

Ocelot was given the name Foxhound in service and, with this custom DC filter having been supplied by MPE in production volumes since 2011, there are over 1,000 units currently in service on the Foxhound vehicle.

Alongside this custom DC filter, working closely with the vehicle designers Ricardo and Force Protection Europe, MPE also designed and supplied a custom 52A, three-line filter to ensure the same stringent EMI/RFI compliance for the compressor pump motor.

Paul Curry, PSV's Managing Director, commented: "It is really important for us to develop a close working relationship with our customers including OEMs, so that we can fully understand the technical challenges and develop the appropriate solutions. Close cooperation with MPE on the Ocelot project was critical, and MPE's agile response ensured a smooth design process and a timely and effective transition into production volumes."

You can download your personal copy of MPE's general datasheet on custom EMI and EMP filters from here.

PSV Wipers Limited

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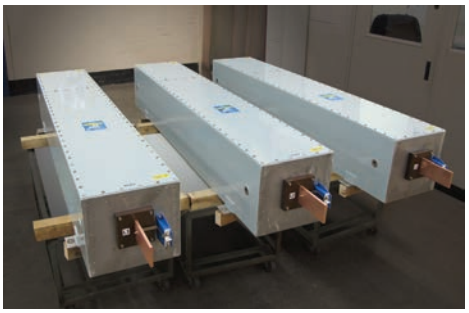
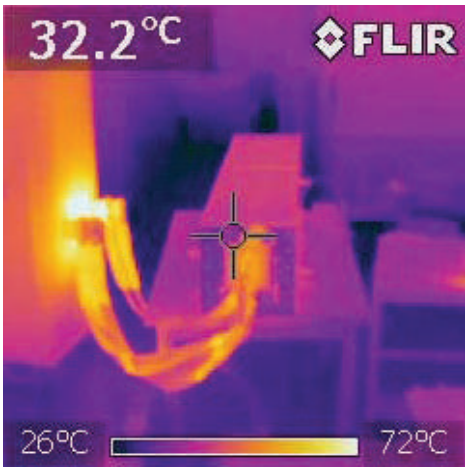


A consignment of MPE's 1200A filters prior to shipment




MPE conducted intensive 24-hour temperature rise tests

## Keeping it cool with MPE HEMP filters

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Whilst HEMP protection in accordance with MIL-STD-188-125 was a prerequisite, site specifics and issues previously encountered within the application meant that equipment performance under operational load and at operational temperature was of equal importance. Of particular concern were the heat rise and heat dissipation performance of any HEMP filters to be installed.

Following numerous visits to site by MPE and TSS, MPE was asked to provide both documented laboratory and site test analysis for a number of key parameters including the harmonic and temperature performance of its 1200A HEMP filters. MPE therefore conducted an extensive period of testing in order to provide all the information requested.

Specifically, MPE conducted a 24-hour temperature rise test, including current overload tests in accordance with UL1283 and the Army Corp of Engineers specification. Since MPE's 1200A HEMP filters have been installed at operational sites for many years, in addition to this laboratory testing MPE was also able to provide a wealth of data on the same filters in current service.

MPE supplied the entire order for its 1200A filters, along with several smaller current filters, to the Department of Defense facility in Virginia within 12 weeks of receiving the contract award. Following supply, installation was carried out during 2016 by Directed Energy Technologies (DeTech) based at Sumerduck, Virginia.

The methodical and extensive design proving activity, coupled with MPE's well-established 1200A HEMP filter design, ensured a seamless and swift installation process, with all filters now having been in operation in this critical application for some time. Subsequently MPE has also supplied its 1200A HEMP filters for other Department of Defense applications in the USA.

You can download from here your personal copy of MPE's 1200A HEMP filter catalogue.

tss
Technical Sales Solutions