



MPE
Quality, Reliability, Performance

Company Bulletin

for EMC, EMP & TEMPEST Protection

Issue 10



RAF Fylingdales

MPE helps protect against ballistic missiles & military satellites

RAF Fylingdales, located at Snod Hill, near Pickering on the North Yorkshire Moors, is an integral part of the Ballistic Missile Early Warning System (BMEWS) for UK and US defence, with a secondary duty of detecting, reporting and tracking satellite activity, given that many currently in orbit are of a military nature and able to gather intelligence using diverse covert techniques.

All radar equipment on the site is US designed and manufactured and was originally installed by Raytheon. Fully operational from September 1963, Fylingdales has witnessed substantial and ongoing upgrade work over the years, and nowadays its significance to the international community has never been greater, as technology is ever increasing the strike range of ICBMs. In fact RAF Fylingdales provides a vitally important capability by fulfilling its mission to provide continuous ballistic missile early warning and space surveillance services to the UK and US Governments.

Accordingly, MPE has had an ongoing relationship with RAF Fylingdales dating back over 25 years, having designed and supplied EMP protection filters for its solid-state radar array system originally back in the late 1980s and then throughout the intervening years. More recently Fylingdales made the decision to upgrade its facility to meet the present, internationally applied, US Standard Mil-Std-188-125, including upgrades to the previously installed EMP filters.

In 2013, following a competitive tendering process, MPE was awarded the contract to supply a complete suite of HEMP powerline, control line and telephone line filters. This suite of filters included a number of MPE's unique, high-current HEMP filters up to 800A. MPE was awarded the contract based on a number of important criteria, including technical, mechanical and experiential.

MPE HEMP powerline filters consist of a single circuit with no current-sharing elements, thus avoiding the problems inherent in high-current filters which are based on the paralleling of multiple lower current filters. The paralleling of filters may lead to significant overheating and possible failure in the lowest-resistance filter, unless it has an appreciable safety margin in terms of temperature rise. If a parallel element fails, then the increased load placed on the remaining interconnected filters can potentially cause a cascade failure of the entire HEMP protection system. With MPE's single-circuit design there is no danger of that happening.



Original MPE filters in situ prior to removal



Installation via rope access



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Filters may be difficult to access

Another important factor was MPE's ability to design and supply custom filters mechanically identical to the filters being replaced, simplifying the installation work and reducing installation time and cost. The filters were installed by MPE's project partner – the US Department of Defense (DoD) contractor Jaxon Engineering & Maintenance of Colorado Springs (www.jaxon-em.com) – in the early part of 2014, were fully commissioned and signed over later the same year following complete site acceptance tests, and have now been in service for over two years.

Of particular interest was the opportunity to test the MPE EMP filters replaced following 25 years of active service. The original EMP powerline filters were designed and manufactured by MPE in 1990-1991 and tested to an earlier NATO EMP specification. They had been in continuous service ever since.

42 original MPE powerline filters were removed from the site to undergo a full inspection and testing process to check for any degradation or deterioration in performance. In detail the filters comprised 10A three-phase; 15A single-phase; 30A single-phase and three-phase; 60A single-phase and three-phase; and finally 100A three-phase.

Upon testing all were found to be operating completely within their original manufacturing parameters, with no degradation in capacitor performance.

Such long life reduces costly plant maintenance and system downtime. The costs of filter replacement are often substantial – in terms of dismantling much of the equipment system to retrieve faulty filters from relatively inaccessible locations. That procedure may put a critical defence facility at risk for a period, with unknown consequences.

Hence such “fit-and-forget” MPE products can show a clean bill of health that reassures contractors, installers and defence customers old and new.

Looking to the future, MPE continues to work closely with RAF Fylingdales, designing and supplying its high-current HEMP filters and providing expert advice on site where necessary.

www.mpe.co.uk/downloads/hemp-filter-datasheets