Electromagnetic Pulse Protection

Introduction
European EMC Products Ltd was formed in July 1996 to supply high quality products and services to the Electromagnetic Compatibility (EMC) market. The emphasis being on EMP and RF Shielded Chambers and associated products and services such as RF Shielded Windows, Shielded Doors and Shielding Effectiveness and EMP Testing.

Quality
European EMC Products are registered to BS EN ISO 9001:2015, Certificate No. FS 38901. License scope: The design, assembly, servicing and testing of RF Shielded structures and equipment including EMI shielding and thermal management materials; Gas tight doors; and specialised mobile electromagnetic pulse protected (EMPP) containers.

The Nuclear Electromagnetic Pulse
The Nuclear Electromagnetic Pulse is a product of a nuclear explosion. The phenomena has been known since the late 1950s. The characteristics of the electromagnetic radiation resulting from the nuclear explosion depends on the altitude at which the explosion occurs. The three categories are; high altitude, air burst and surface burst NEMP. The source of electromagnetic radiation is basically the same in all cases. The high energy Gamma Radiation from the nuclear explosion collides with the air molecules in the earth’s atmosphere and dislodges electrons from these molecules which then become free to move rapidly away from their parent molecule. These free electrons are known as Compton Electrons and the movement of the charge is known as Compton Current.

However the last few years has seen the development of ‘pulse weapons’ designed to have the same affects as nuclear EMP but without the need for a nuclear bomb!

Electromagnetic Pulse Protection (EMPP)
The purpose of EMP Protection is to prevent the electromagnetic pulses from high level nuclear weapons disrupting and destroying electronic equipment.
EEP can offer the following Products & Services within the EMP Sector:

**EMPP Design**

Full EMPP design, complete with all drawings covering:
- Wall, floor and ceiling sheet layout
- Method of fixing RF sheets
- Layout showing doors and penetration panels
- Pipe penetrations for diesel, water and gases
- Ventilation grills for air conditioning
- Electrical power and telephone filters

**Modular EMP Shielded Rooms and Cabinets**

These modular shielded rooms are constructed from prefabricated, standardised panels. The panels are connected using bolts and an electrically conductive mesh gasket is fitted between each joint. The modular construction allows for almost unlimited size and configurations. The panel material is 2 mm thick galvanised steel sheet to ensure maximum shielding performance and corrosion resistance.

**EMP Performance (Standard)**

- Magnetic Field: 60 dB at 10 kHz to 80 dB at 100 kHz
- Electric Field: 80 dB from 1kHz to 1GHz
- Plane Wave: 80 dB from 1 GHz to 18 GHz

Upper and lower frequency performance can be extended if required.

EEP can offer full internal linings, lights and electrical distribution within all Shielded Rooms and Cabinets.
EMP Shielded Doors

The door is the most important part of any shielded facility therefore the design and quality of the construction is essential. EEP design a wide range of Shielded Doors to meet all performance levels and applications both internally and externally.

As most shielding projects are unique EEP can design or adapt our designs to meet your specific needs. These can include manual, electric or pneumatic latches, all types of locks, weather and NBC (nuclear, biological chemical) seals, and thermal, acoustic or blast protection.

EMP Shielded Ventilation Vents

EMPP Ventilation Vents consist of a steel honeycomb which allows air to pass through but attenuates radiated interference. They are designed for use in all high performance EMPP, EMC and TEMPEST applications.

Manufactured from steel they offer excellent shielding performance in the H field, as well as the E field and Plane wave modes.
EMP Line Protection Systems

A combination of active and passive elements that makes an EMP pulse to be diverted and attenuated.
EMP line protection system line actions.
Diversion at stage 1 by primary surge arrestor, spark gap or varistor.
Delay between first and second stage by delay choke.
Diversion at stage 2 by surge arrestor, spark gap or varistor.
Attenuation at stage 4 by a high performance EMI filter.
Diversion at stage 4 by diode or varistor.
All stages given additional protection by enclosure in a shielded box / or boxes.

EMP Testing
Shielding Effectiveness Testing of EMPP Facilities to:
Mil Std 285, IEEE 299 and Mil Std 188-125
Pulse injection testing of EMPP filters to all NATO military standards

European EMC Products Experience
Listed below is a small selection of some recent projects we have worked on:

- RAF North Luffenham UK (Communications Centre)
- RAF Uxbridge UK (Communications Centre)
- Imphal Barracks UK (Communications Centre)
- RNAD (Royal Naval Ammunition Depot) Gosport UK
- NATO facilities, Italy
- Norwegian Defence Command, 30 plus sites
- Communications Bunker, Abu Dhabi
- EMPP facility for Polish MOD
- USAF RAF, Fylingdales UK
- USN, Newquay, UK
- USAF, Doha Qatar
- United Arab Emirates, Ministry of Defence, Abu Dhabi: EMP cabinets, doors, waveguides and EMP testing
- Norwegian Ministry of Defence, various locations: EMP cabinets
- United Kingdom Ministry of Defence, various locations: RF Shielded Doors, Mobile RF shielded shelters, Maintenance and RF testing of existing EMP facilities.
- HMS Collingwood: RF Shielded Communications Room
- British Aerospace, UK: RF shield to protect against High Voltage interference.
- GEC Marconi, UK: 3 modular RF shielded rooms.
- HM Government, UK: Stainless steel ground plane for EMC testing.
- Royal Airforce of Oman, RAFO: Shielded control rooms for RAFO radar sites housing Alenia Marconi Radar
- Royal Swedish Navy, Kockums Shipyard: Stainless steel RF Vents for Visby stealth frigate programme