TEMPEST SHIELDING
European EMC Products Limited

EUROPEAN EMC PRODUCTS LIMITED was formed in July 1996 to supply high quality products and services to the EMC (Electromagnetic Compatibility) market. The emphasis being on EMP and RF shielded chambers and associated products and services such as RF shielded windows, doors and shielding effectiveness and EMP testing.

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.
What Services Do We Offer?

• Full Design, Consultancy and Advice Service Regarding Tempest, RF & EMP Protection.

• The Supply of Specialist Shielding Components.

• Full Installation, or Supervised Installation Service, of Shielded Enclosures.

• Testing of Shielding Installations.
What is Tempest Shielding?

AES-256 keys sniffed in seconds using €200 of kit a few inches away
Van Eck phreaking getting surprisingly cheap
By Iain Thomson in San Francisco 23 Jun 2017 at 22:58

- NATO SDIP-27 Level A (formerly AMSG 720B) and USA NSTISSAM Level I.
- "Compromising Emanations Laboratory Test Standard"
- This is the strictest standard for devices that will be operated in NATO Zone 0 environments, where it is assumed that an attacker has almost immediate access (e.g. neighbouring room 1 metre distance).

Side-channel attacks that monitor a computer's electromagnetic output to snaffle passwords are nothing new. They usually require direct access to the target system and a lot of expensive machinery – but no longer.

TEMPEST Shielding creates an area that is protected from the emissions of electromagnetic signals; one in which communications – data or voice - can remain secure. This primarily consists of creating an electromagnetic clean zone in the form of a Faraday Cage.

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The Phases of Building a Modular Tempest Facility:

**Phase 1:** Defining Your Requirements

**Phase 2:** Designing The MODULAR TEMPEST FACILITY

**Phase 3:** Manufacturing

**Phase 4:** Installing The Modular Tempest Facility

**Phase 5:** Testing The Modular Tempest Shield
Defining Your Requirements...

What are your critical facilities or buildings?

Who and what must you protect?

What must survive to allow you to carry on?
Designing the Tempest Protected Facility

EEP will assess and survey the host facilities fabric and services in advance of the Design process.
EEP can supply full detailed design capability from survey, concept design to manufacturing drawings.
Major Components of a Tempest Protected Shielded Room

- Modular Shield
- Doors
- Waveguides for Ventilation
- Tempest Filters
- Fibre Optic Pipe Penetrations
- Other Pipe Penetrations
- Earthing
Designing The Tempest Protected Shield

The Tempest Shield is typically a galvanised modular system using preformed 2mm panels bolted together with RF gasket and M8 bolts.

Rooms can be adjoined to further rooms. Sluice door systems for continuous protection and allowances can be made for existing structural beams or structures.

Floating floors, ceilings and wall linings can also form part of the design.
Tempest Shielded Doors

- Doors can facilitate pedestrian and large equipment access.
- Pairs of doors (sluice doors) add unbroken protection.
Tempest Shielded Doors

Full 3D Computer Aided Design capability

Fire test on inward and outward opening RF doors - Doors passed a 2 hour fire rating.
Waveguides for Ventilation

- Frequency Range: Performance 100 dB up to 10 GHz.
- EEP manufactured matrix steel vents 10 mm x 50mm matrix.
- Bolted onto the shield using RF TCS (Tin coated steel) gasket.
- External waveguides would also be painted for greater corrosion protection.
EMP Filters

All electrical PoE (Points of Entry) **MUST** be fitted with EMP Filters **AND** EMP Surge Suppression.
Tempest Filters

All EMP Power Filters can be fitted with MOV (Metal Oxide Varistor) Monitoring (MMOV).

This allows constant monitoring of the life left in the MOV. Indication can be from a simple light signal to remote electronic sensing.
Fibre Optic Penetrations

Fibre Optic Data lines can safely pass through our waveguide tubes.
Other Penetrations

Coolant Water, Compressed Air and other Ventilation Systems require Wavetubes to stop RF from entering the Facility.
Our Manufacturing Capabilities

EEP can manufacture all elements:
EEP site installers will work alongside the client throughout the installation of the EMP Shield.
Installation Sequence of a Modular Tempest Shielded Room

Phase 1: Damp-proof membrane on floor and floor panels laid down.

Phase 2: Wall panels installed.
Phase 3: Ceiling panels installed.

Phase 4: Decorative wall lining panels installed.
Phase 5: Power Filters installed onto the shielded rooms walls.

Phase 6: Fibre Optic Cable Penetrations installed onto the shielded rooms walls.
Phase 7: Low level ventilation vents installed in the wall panels.

Phase 8: RF gasket prepared on the ventilation vents.
Testing The Tempest Shield
Shielding Effectiveness (SE)
Shielded Containers
Shielded Cabinets

- EEP can supply any size and configuration of Shielded Cabinet that is required.
- All design requirements such as shock mounts or wheels can be accommodated.
- All cabinets can contain a 19 in rack for mounting of internal equipment.
Case Study of Tempest Protection for a Modular Shielded Data Centre

Client: European Data Centre for a client in the financial industry.

Requirement: To offer EMP protected space to a variety of companies.

Solution: EEP supplied a modular EMP shielded room, 25 mL x 10mW x 4 mH, with internal fire resisting linings, air conditioning and electrical supplies.
Case Study of EMP & Tempest Protection for a Welded Steel, Shielded, Communications Facility

Client: NATO

Requirement: To offer EMP and Tempest protected buildings for a satellite communications facility.

Solution: EEP supplied a steel shielded room including generator back up. Total 5000 m2.
Case Study of Tempest Protection for Shielded Cabinets within a Data Centre

Client: Global Internet Service supplier
Requirement: To offer specific Tempest protection to racks within their datacentre.
Solution: EEP supplied steel shielded cabinets within existing data centre facility
European EMC Products Ltd References

Norwegian Ministry of Defence, various locations: EMP Cabinets.
United Kingdom Ministry of Defence, various locations: RF Shielded Doors and Mobile RF Shielded Shelters.
HMS Collingwood: RF Shielded Communications Room.
RAFO Radar sites, various locations: Shielded Control Rooms for RAFO Radar Sites Housing Alenia Marconi Radar.
Kockums Shipyard for Royal Swedish Navy: Stainless Steel RF Vents for Visby Stealth Frigate Programme.
Turkish Embassy, UK: 2 Modular Tempest Shielded Rooms for Communications.
UK Government, Belgium: Modular Shielded Room for UK EU Mission.
MOD, United Arab Emirates: EMP Shielding to new Communications Centre, Abu Dhabi.
MOD, United Kingdom: 2 no. RF Shielded Test Facilities for Typhoon Repair and Maintenance.
Carillion Alawi, Oman: Radio Frequency Shielding to new Airport, Muscat, Oman.
GPZ, Bahrain: Gas Tight and Blast Doors for Government Facility.
USN, Newquay, UK: EMP Shielding.
USAF, Fylingdales UK: EMP Shielding.