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The process of electromagnetic shielding involves encasing electronics and cables with conductive or magnetic materials to safeguard against incoming or outgoing electromagnetic frequencies (EMF). This is crucial for preventing electromagnetic interference (EMI) or radio frequency interference (RFI), which can disrupt operations, corrupt data, or even damage equipment. EMI and RFI are often used interchangeably, but they refer to subsets of the larger EM spectrum. Incoming or outgoing EMF can pose a risk, as can human-generated EMF, which may impact living organisms. Various materials and techniques are employed for EM shielding, including metals like copper, aluminum, steel, or nickel. Shields may also utilize alloys, polymers with metallic elements, or network cable options such as shielded twisted pair or coaxial cable. The type and thickness of material used depend on the situation, including incoming or outgoing EMF, component protection, and EM energy type. Common techniques for EM shielding include metallic foil or braids, metallic mesh, metallic sheets, metallic casing, conductive paint, and conductive foam. Electromagnetic interference is a significant concern in various fields. Conductive materials are molded into specific shapes to seal openings and connections against EM radiation. To reduce EMI, electronic components can be filtered using capacitors or ferrules, or by twisting wires with grounds. An electromagnetic shield doesn't need to fully enclose a component as long as its openings are smaller than the blocked EM waves. For magnetic fields under 100 kHz, shields must use magnetic materials that redirect field lines rather than block them. This technology is employed in consumer electronics, spacecraft, and medical equipment like pacemakers and patient monitoring systems. It's also found in PCBs, hard disk drives, data center cabinets, digital devices to protect against unauthorized access, and air-gapped systems to prevent EM energy leakage. Shielding can be used to enclose high-current areas near occupied spaces or even painted onto walls for added protection. Its applications extend to automobiles, satellites, airplanes, ships, laboratories, and homes or offices where individuals may employ shielding techniques to safeguard sensitive information.

How does magnetic shielding work. Magnetic shielding explanation. What is commonly used to provide magnetic shielding for transformers. Where can magnetic shielding be used. Magnetic shielding materials. What is magnetic shielding. What material is used for magnetic shielding. What type of material is used for shielding against magnetic interference.