SIGNAL SEAL™

Reference AC Power Interface — Engineering Comparison (6 ft)

Executive Intent

Signal Seal™ is engineered as a **final-stage power interface** for professional audio systems.

Its purpose is to reduce **RF interaction, common-mode noise coupling, and interface instability** in the final connection between already-regulated / balanced power systems and critical audio equipment.

This document presents a **physics-based comparison** against a standard 16-gauge pro-audio AC cord, focusing on measurable and defensible engineering outcomes.

Comparison Baseline

- **Signal Seal™:** Final-stage, RF-managed, mechanically stabilized power interface
- **Standard Pro-Audio AC Cord:** 16 AWG copper, unshielded, molded IEC connectors
- **Reference Length:** 6 ft

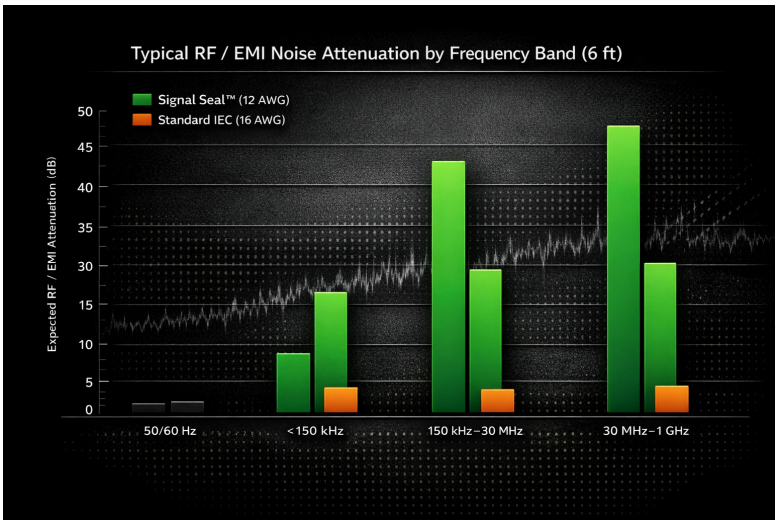
Key Engineering Advantages (Summary)

Area	Signal Seal™	Standard 16 AWG IEC
RF / EMI interaction	Substantially reduced	Minimal control
High-frequency noise coupling	Lowered	Higher
Voltage drop under load	Lower	Higher
Contact resistance stability	Higher	Variable
Micro-arcing risk	Reduced	Higher
Mechanical retention	High	Moderate

RF / EMI Noise Interaction — Frequency Domain

Values shown represent typical attenuation ranges achievable by this class of construction when properly terminated. Results are installation- and impedance-dependent.

Frequency Band	Dominant Noise Sources	Signal Seal™ (Expected)	Standard IEC	Engineering Context
50 / 60 Hz	Mains fundamental	~0 dB	~0 dB	Low-frequency magnetic fields are addressed upstream via isolation and regulation.
<150 kHz	Harmonics, dimmer hash	~6–10 dB (situational)	~0–1 dB	Geometry and bonding reduce re-radiation; primary suppression occurs upstream.
150 kHz–30 MHz	SMPS switching noise (common-mode dominant)	~35–40 dB typical	~0–3 dB	Increased HF impedance and controlled reference reduce coupling in the final lead.
30 MHz–1 GHz	Radiated RF (Wi-Fi, cellular, broadcast)	~42–50 dB class	~0–5 dB	RF containment prevents the cable from acting as an antenna.

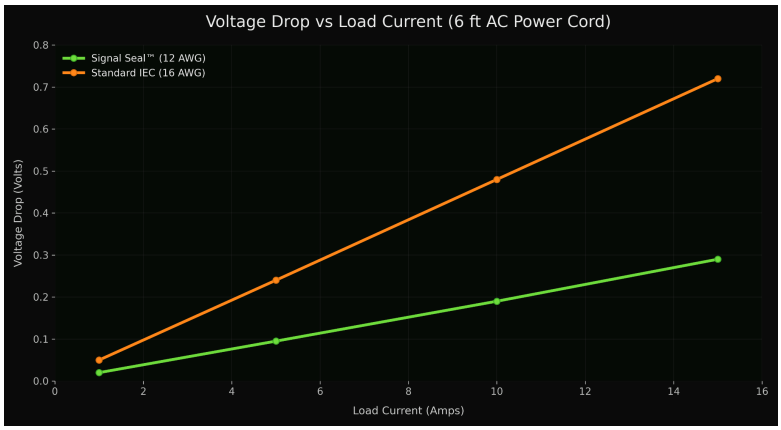


Attenuation values reflect coupling reduction and containment effects, not absolute source suppression.

Electrical Integrity — Voltage Drop vs Load (6 ft)

Metric	Signal Seal™	Standard IEC (16 AWG)
Round-trip resistance	~0.019 Ω	~0.048 Ω
Voltage drop @ 5 A	~0.095 V	~0.24 V
Voltage drop @ 10 A	~0.19 V	~0.48 V
Voltage drop @ 15 A	~0.29 V	~0.72 V
Power loss @ 10 A	~1.9 W	~4.8 W

Values calculated using standard AWG resistance data for comparative reference.



Connector Interface — Scientific Comparison

Most standard pro-audio IEC connectors use **brass contacts with nickel plating**. These materials are chosen primarily for durability and cost efficiency, not electrical performance.

Signal Seal™ employs a connector system optimized for **electrical conductivity, contact stability, and RF behavior** at the interface.

Interface Property	Signal Seal™	Standard IEC	Engineering Impact
Contact resistivity	Lower	Higher	Lower resistive loss and heat generation
Oxide behavior	Conductive	Resistive	Greater long-term stability
Contact pressure	High / controlled	Moderate	Reduced intermittent contact
RF surface impedance	Lower	Higher	Reduced RF reflection and injection
Retention force	High	Moderate	Less vibration-induced variability

---

Operational Reliability Under Dynamic Load

Micro-Arcing & Reliability

Micro-arcing occurs at interfaces with marginal pressure, oxidation buildup, or mechanical movement—especially during current transients and inrush events.

Factor	Signal Seal™	Standard IEC
Micro-arcing probability	Reduced	Higher
Load-change stability	High	Variable
Long-term consistency	High	Degrades with wear

Engineering Interpretation

Signal Seal™ is not a power conditioner, regulator, or isolation device. Instead, it addresses a known vulnerability: the **final connection**, where RF ingress, interface instability, and mechanical variability can re-introduce noise into otherwise well-managed power systems.

By improving RF containment, reducing high-frequency coupling, stabilizing electrical contacts, and lowering resistive losses under load, Signal Seal™ preserves the performance of upstream power infrastructure at the point where it matters most.