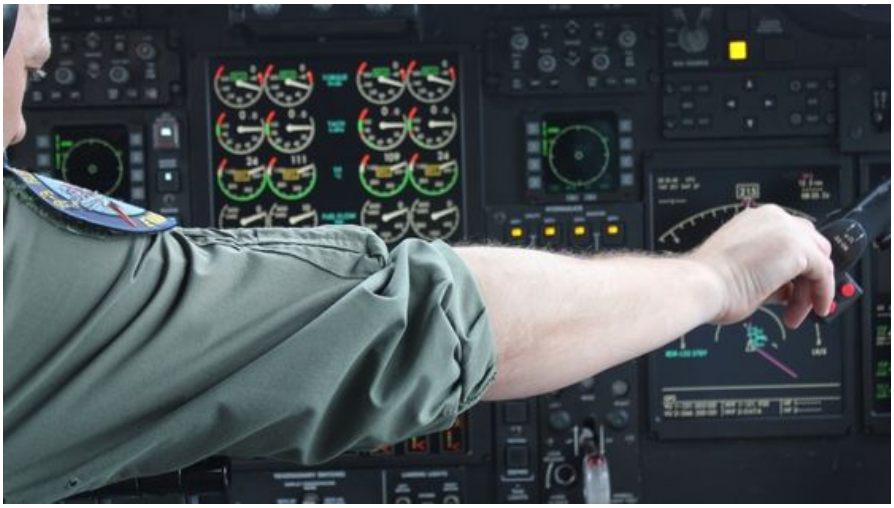

Overview of MIL-STD-704 Requirements for Power Supply

Civilian and military aircraft require reliable, high-performance power supplies to ensure safe operation in a variety of environmental conditions.

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What is MIL-STD-704?

MIL-STD-704 is a military specification that defines and outlines the requirements for compatibility between the airborne utilization equipment (power supplies) and the aircraft power system (including the external sources for the power system).

It also establishes the characteristics that the power system needs to provide at the utilization equipment power terminals. The standard covers multiple areas for AC and DC systems including:

- Power factor
- Voltage
- Phase unbalance
- Frequency
- Maximum current
- Ripple
- Abnormal conditions (e.g. over or undervoltage)
- Electrical noise

requirements.

Aircraft Electric Power System Requirements

An aircraft electric power system consists of a main power source, emergency power source, power conversion equipment, control and protection devices and an interconnection network (wires, cables, connectors, etc.). The main power is derived from aircraft generators driven by the aircraft propulsion engines. Emergency power is derived from batteries, engine bleed air, independent auxiliary power units or ram air, or hydraulically driven generators.

The airframe modifier or manufacturer must provide the protection network and distribution to utilization equipment terminals while maintaining the power characteristics specified in the standard.

computer processors, etc.

Aircraft Utilization Equipment Requirements

MIL-STD-704 also covers the requirements for aircraft utilization equipment. Below you'll find an overview of all these requirements.

Power Compatibility

with the requirements of the applicable aircraft specifications for the control of electromagnetic interference and voltage spikes caused by power switching, lightning, and electromagnetic pulses. MIL-STD-704 does not cover voltage spikes and electromagnetic interference.

Operation

Besides power compatibility, another crucial requirement of aircraft utilization equipment is that it shall not cause the power characteristics at its input terminals to exceed the limits specified in the standard, as well as providing the level of performance required by its detailed specification for each operating condition.

Regardless of the operating conditions of the electrical system, the utilization equipment should not negatively affect the electrical system or cause it to malfunction.

The operation modes addressed in MIL-STD-704 are:

MIL-STD-704 also provides more specifications for utilization equipment using AC power as per below:

- For equipment requiring more than 0.5 kVA of 400 Hz AC power, the configuration shall be designed to utilize three-phase steady-state balanced power.
- Utilization equipment whose total load is greater than 30 kVA should have a load unbalance no greater than 3.33% of its total three-phase load.
- Single-phase AC power should be used only on a line-to-neutral basis.
- AC power should not be half-wave rectified.

External Power Source Requirement

When aircraft are not airborne, external sources are used to supply the power system. These sources shall supply power to the external power receptacles. To allow for steady state voltage drops

ruggedized power supplies within the aircraft can continue operation when the aircraft is on the ground.

Test Requirements

Both the aircraft power system and the utilization equipment shall be tested to ensure compliance with the standard. Military aircraft are tested to demonstrate that the electric system power characteristics are within the limits of the standard throughout all operating conditions. The aircraft test requirements are typically defined in the aircraft detail specification.

Utilization equipment shall be tested to demonstrate compatibility and compliance with the electric system power characteristics. The applicable test methods to be used are defined in MIL-HDBK-704-1 thru 8, depending on the type of

Power Supplies and **DC-DC Power Supplies** to meet the requirements of the latest, or any of the previous revisions of MIL-STD-704. If you are looking for a rugged **MIL-STD-704 compliant aerospace power supply**, Viable Power's team of experts can assist you. Request a proposal or contact us for more information on our custom power supply design services for the military aerospace sector.

Similar and Further Readings

- **7 Military Standards for Ruggedized Power Supplies**
- **What is MIL-STD-810?**
- **MIL-STD-1275 Power Supply: What You Should Know**

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