



Standard Guide for Aircraft Electrical Load and Power Source Capacity Analysis¹

This standard is issued under the fixed designation F2490; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide covers how to prepare an electrical load analysis (ELA) to meet Federal Aviation Administration (FAA) requirements.

1.2 The values given in SI units are to be regarded as the standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *FAA Aeronautics and Space Airworthiness Standards:*²

14 CFR 23.1309 Normal, Utility, Acrobatic, and Commuter Category Airplanes—Equipment, Systems, and Installations

14 CFR 23.1351 Normal, Utility, Acrobatic, and Commuter Category Airplanes—General

14 CFR 23.1353 Normal, Utility, Acrobatic, and Commuter Category Airplanes—Storage Battery Design and Installation

14 CFR 23.1419 Normal, Utility, Acrobatic, and Commuter Category Airplanes—Ice Protection

14 CFR 23.1529 Normal, Utility, Acrobatic, and Commuter Category Airplanes—Instructions for Continued Airworthiness

14 CFR 91 General Operating and Flight Rules

14 CFR 135.163 Operating Requirements: Commuter and On Demand Operations and Rules Governing Persons on Board Such Aircraft—Equipment Requirements: Aircraft Carrying Passengers under IFR

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *abnormal electrical power operation (or abnormal operation), n*—occurs when a malfunction or failure in the electric system has taken place and the protective devices of the system are operating to remove the malfunction or failure from the remainder of the system before the limits of abnormal operation are exceeded.

3.1.1.1 *Discussion*—The power source may operate in a degraded mode on a continuous basis when the power characteristics supplied to the using equipment exceed normal operation limits but remain within the limits for abnormal operation.

3.1.2 *alternate source, n*—second power source that may be used instead of the normal source, usually on failure of the normal source.

3.1.2.1 *Discussion*—The use of alternate sources creates a new load and power configuration and, therefore, a new electrical system that may require separate source capacity analysis.

3.1.3 *cruise, n*—condition during which the aircraft is in level flight.

3.1.4 *electrical source, n*—electrical equipment that produces, converts, or transforms electrical power.

3.1.5 *electrical system, n*—consists of an electrical power source, the electrical wiring interconnection system, and the electrical load(s) connected to that system.

3.1.6 *emergency electrical power operation (or emergency operation), n*—condition that occurs following a loss of all normal electrical generating power sources or another malfunction that results in operation on standby power (batteries or other emergency generating source such as an auxiliary power unit (APU) or ram air turbine (RAT)) only, or both).

3.1.7 *ground operation and loading, n*—time spent in preparing the aircraft before the aircraft engine starts.

3.1.7.1 *Discussion*—During this period, the APU, internal batteries, or an external power source supplies electrical power.

3.1.8 *landing, n*—condition starting with the operation of navigational and indication equipment specific to the landing approach and following until the completion of the rollout.

¹ This guide is under the jurisdiction of ASTM Committee F39 on Aircraft Systems and is the direct responsibility of Subcommittee F39.01 on Design, Alteration, and Certification of Electrical Systems.

Current edition approved July 1, 2013. Published September 2013. Originally approved in 2005. Last previous edition approved in 2005 as F2490 – 05^{ε1}. DOI: 10.1520/F2490-05R13.

² Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401.