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AEROSPACE RECOMMENDED PRACTICE

ARP 717

400-CYCLE GENERATOR CHARACTERISTICS FOR CIVIL AIRCRAFT
GROUND SUPPORT APPLICATIONS

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Revised

1. SCOPE - This SAE Recommended Practice for defining the terms and tabulating the limits of characteristics for generators supplying 400-cycle power to civil aircraft is intended to assist the airlines in standardizing on specifications for various sizes and configurations of equipment. The basic tolerance found to be acceptable in the civil aircraft industry are presented. Individual limits which are necessary to meet specific conditions must be stipulated by the user based on the location and use of the generator.
2. GLOSSARY OF TERMS - This glossary of terms is included as a part of this Recommended Practice, for information only, and is not to be considered a part of the recommended limits:

Type of Mounting is the means of mounting the generator with its prime mover and controls.

Prime Mover is the source of power for driving the generator.

Generator Speed is the nominal speed at which the generator operates to produce 400 cycles.

Altitude is the maximum height in feet above sea level at which the generator must operate and maintain characteristics within recommended limits.

Ambient Temperature is the temperature range in degrees Fahrenheit in which the generator must operate and maintain characteristics within recommended limits.

Temperature Rise is the rise in degrees Centigrade above ambient for components of the 400 cycle generator.

Dielectric Tests are the high voltages impressed between a component and the frame of the generator. This test is used to check insulation characteristics.

Generator Rating is the full load value expressed in KVA at .8 power factor.

Overload Rating is the normal overload value expressed in KW at .8 power factor for a specified time.

Maximum Overload is the maximum load expressed in KW at .8 power factor that the generator must produce for a specified time.

Three/Unit Short Circuit Current provides that the generator under short circuit conditions must provide at least three times rated current. This feature will trip any overcurrent devices in the aircraft so that a fault may be isolated.

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2. GLOSSARY OF TERMS (continued)

Nominal Voltage Rating is the root-mean-square line-to-neutral and line-to-line voltage at which the generator is rated. The generator is normally set such that output voltage is maintained at this value.

Regulated Voltage Range is the range in adjustment of the line-to-line voltage as controlled by the regulator rheostat.

Type of Regulator refers to the system for controlling the output voltage of the generator.

Regulator Sensing is the means by which the voltage is sensed and fed to the voltage regulator.

Highest Phase Voltage Limiting is a means of limiting the highest phase voltage of the generator during any unbalanced load condition.

Line Drop Compensation is a system of increasing the generator voltage in proportion to the current and power factor in the output cable such that the voltage is held constant at the aircraft receptacle.

Remote Sensing is a means of providing constant voltage at the aircraft receptacle by sensing the voltage at the receptacle with three separate leads in the output cable.

Voltage Regulation is the band that the output voltage stays within except during transients.

Voltage Regulation Steady-State is the band that the output voltage stays within with a fixed load.

Voltage Transients are the maximum momentary deviation of the output voltage from the voltage regulation band.

Voltage Transient Recovery is the time required for the output voltage to recover to and remain within the prescribed limits after full-load application or removal.

Voltage Modulation is the cyclic variation about an average of the a-c peak voltage during any steady-state load. The modulation envelope is formed by a continuous curve connecting each sine wave peak to the successive sine wave peak. Voltage modulation is calculated by taking maximum voltage minus minimum voltage times 100 and then dividing this value by maximum voltage plus minimum voltage.

Frequency Characteristic of Voltage Modulation are the component frequencies which make up the modulation envelope wave form.

2. GLOSSARY OF TERMS (continued)

Phase Voltage Balance with Balanced Load is the maximum deviation of any of the three phase voltages from the average of the three phase voltages with a balanced three phase load. The percent unbalance is calculated by taking maximum deviation of any one line-to-neutral voltage from the average of the three phase voltages times 100 divided by the average of the three phase voltages.

Phase Voltage Displacement with Balanced Load is the maximum deviation in degrees from 120 degrees between phases of the generator voltages during balanced load conditions.

Phase Voltage Balance with Unbalanced Load is the maximum deviation of any of the three phase voltages from the average of the three phase voltages with a prescribed unbalanced load. Per cent unbalance is calculated in the same method as under balanced load conditions.

Phase Voltage Displacement with Unbalanced Load is the maximum deviation in degrees from 120 degrees between phases of the generator voltages during a prescribed unbalanced load.

Individual Harmonic is the RMS value of any individual harmonic voltage when measured with a harmonic analyzer. This value is expressed as a percentage of the fundamental.

Total Harmonic Content is the total RMS voltage remaining when the fundamental component is removed. This value is determined by calculating the square root of the sum of the squares of the individual harmonics and expressing this value as a percentage of the fundamental.

Crest Factor is the ratio of the peak voltage to the RMS voltage. This ratio with a true sine wave is 1.414.

Frequency Regulation is the band that the output frequency stays within except during transients.

Frequency Regulation Steady-State is the band that the output frequency stays within during any fixed load.

Frequency Transients are the maximum instantaneous deviation of the output frequency from the frequency regulation band.

Frequency Transient Recovery is the time required for the output frequency to recover to and remain within the prescribed limits after full load application or removal.

Frequency Modulation is the cyclic variation of instantaneous frequency about a mean frequency during any steady-state load. Frequency modulation in percent is calculated by taking maximum frequency minus minimum frequency times 100 and then dividing this value by maximum frequency plus minimum frequency.

Frequency Modulation Rate is the rate of change of frequency due to frequency modulation when plotted against time.

