

AIEE
No. 805
Jan. 1960

Proposed
Test Procedure for
ALTERNATING-CURRENT
400-CYCLE-PER-SECOND
AIRCRAFT INDUCTION MOTORS
(Published for trial use)



AIEE No. 805

Published by
AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
33 West Thirty-ninth Street, New York 18, N. Y.

ACKNOWLEDGEMENT

The Institute wishes to acknowledge its indebtedness to those who have so freely given of their time and knowledge and conducted experimental work on which many of its publications are based.

This Test Procedure was prepared by the Aircraft Rotating Machinery Subcommittee of the AIEE Air Transportation Committee. The members were:

Present Committee:

A. J. Wesolowski, *Chairman*
R. R. Miille, *Secretary*
J. W. Allen
R. M. Brown
S. S. Burns
J. M. Hibbard
V. C. Holloway
R. P. Judkins

T. J. Martin
R. O. McCants
A. F. Pelster
Joseph Salay
R. R. Smith
H. T. Stowitts, Jr.
D. S. Toffolo
H. R. Tragesser

Former Members:

*R. D. Jones
W. R. Kruesi
L. R. Larson
M. H. Lowe

F. M. Potter
L. A. Zahorsky
W. K. Stubbs
F. C. Yaegerhofer

*Special Credit.

CONTENTS

1.1 General	7
1.1.1 to 1.1.3 Purpose	7
1.2 to 1.2.1 Scope	7
2.0 Test Facilities and Conditions	7
2.1 Characteristic of Electric Power Supply for Testing	7
2.1.1 Type	7
2.1.2 Voltage	7
2.1.3 Balance	7
2.1.4 Phase Angle	7
2.1.5 Frequency	7
2.1.6 Amplitude Modulation	7
2.1.7 Harmonic Content	8
2.1.8 Amplitude Factor	8
2.2 Standard Test Conditions	8
2.2.1 General	8
2.2.2 Temperature	8
2.2.3 Altitude	8
2.2.4 Humidity	8
2.2.5 Mounting	8
2.2.6 Position	8
2.2.7 Machine Temperature	8
2.2.8 Voltage	8
2.2.9 Frequency	8
2.3 Metering Circuits	8
2.3.1 Single-Phase Machines	8
2.3.2 Three-Phase Machines	9
2.4 Instrumentation	9
2.4.1 General	9
2.4.2 Ammeters	9
2.4.3 Voltmeters	9
2.4.4 Wattmeters	10
2.4.5 Speed Measurement	10
2.4.6 Loading Devices	10
2.4.6.1 General	10

CONTENTS (Cont'd)

2.4.6.2 Cord and Pulley Dynamometer	10
2.4.6.3 Prony Brake	11
2.4.6.4 Cradle Dynamometer	11
2.4.6.5 Calculations	11
2.4.7 Temperature Measurements	12
2.4.8 Oscillograph	12
2.4.9 Vibrometer	12
3.0 Tests	12
3.1 Insulation Resistance	12
3.1.1 Purpose	12
3.1.2 Test Equipment	12
3.1.3 Test Procedure	13
3.1.4 Caution	13
3.2 Dielectric Testing	13
3.2.1 Purpose	13
3.2.2 Test Equipment	13
3.2.3 Test Procedure	13
3.2.4 Retest of Machines	13
3.3 Winding Resistance Measurements	13
3.3.1 Purpose	13
3.3.2 Test Equipment	14
3.3.3 Test Procedure	14
3.3.4 Temperature Correction	14
3.4 Stator Polarity Test	14
3.4.1 Purpose	14
3.4.2 Test Equipment	14
3.4.3 Test Procedure	14
3.5 Efficiency and Speed Test	14
3.5.1 Purpose	14
3.5.2 Test Equipment	14
3.5.3 Test Procedure	14
3.5.4 Calculations	15
3.5.5 Characteristic Curve	15
3.6 Temperature Rise	15

CONTENTS (Cont'd)

3.6.1 Purpose	15
3.6.2 Test Equipment	15
3.6.3 Test Procedure	15
3.6.4 Calculations	16
3.6.5 Caution	16
3.7 Voltage and Frequency Variation	16
3.7.1 Purpose	16
3.7.2 Test Equipment	16
3.7.3 Test Procedure	16
3.7.4 Caution	16
3.8 Overspeed Test	16
3.8.1 Purpose	16
3.8.2 Test Equipment	17
3.8.3 Test Procedure	17
3.9 Magnetic Saturation Tests	17
3.9.1 Purpose	17
3.9.2 Test Equipment	17
3.9.3 Saturation Curve	17
3.9.4 Calculations	17
3.10 Waveform Distortion	17
3.10.1 Purpose	17
3.10.2 Test Equipment	17
3.10.3 Test Procedure	17
3.10.4 Caution	17
3.10.5 Calculations	18
3.11 Electrical Balance	18
3.11.1 Purpose	18
3.11.2 Test Equipment	18
3.11.3 Test Procedure	18
3.11.4 Calculations	18
3.11.5 Comments	18
3.12 Starting Current	18
3.12.1 Purpose	18
3.12.2 Test Equipment	18

CONTENTS (Cont'd)

3.12.3 Test Procedure	18
3.12.4 Caution	18
3.12.5 Discussion	18
3.13 Self-Induced Vibration	19
3.13.1 Purpose	19
3.13.2 Test Equipment	19
3.13.3 Test Procedure	19
3.13.4 Caution	19
3.14 Life	19
3.14.1 Purpose	19
3.14.2 Test Equipment	19
3.14.3 Test Procedure	19
3.14.4 Comment	19
3.15 Altitude	20
3.15.1 Purpose	20
3.15.2 Test Equipment	20
3.15.3 Test Procedure	20
3.15.4 Comment	20