

Submitted for recognition as an American National Standard

Helicopter FUEL Economy Evaluation

FOREWORD

Changes in this reaffirm are format/editorial only.

1. SCOPE:

1.1 Purpose:

The purpose of this standard is to provide a method of evaluating helicopter fuel economy which accounts for the significant technical variables in helicopter and powerplant design.

1.2 Helicopter Operational Modes:

This method evaluates helicopter fuel economy for two modes of operation: best range and maximum endurance. The best range mode is important for patrol, inspection, search or cargo delivery missions. The maximum endurance mode is important for traffic control, antisubmarine warfare or other loiter-type missions.

1.3 Data:

The helicopter Pilot's Handbook is the only data source required. The Best Range Chart, Maximum Endurance Chart and the specified helicopter weight empty are used.

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2. FUEL ECONOMY EVALUATION:

2.1 Best Range Evaluation:

To evaluate Best Range Fuel Economy (BRFE), find the maximum gross weight (GW) at sea level standard day on the Best Range Chart. Calculate useful load by subtracting helicopter weight empty (EW). Multiply the useful load by the maximum range air speed (VBR) as given in the Best Range Chart for the maximum gross weight, sea level standard day. Divide by the fuel flow (FFBR) given for that airspeed. In equation form:

$BRFE = (GW - EW)VBR/FFBR$, useful pound miles per pound of fuel (useful newton meters per kilogram of fuel)

2.2 Maximum Endurance Evaluation:

To evaluate Maximum Endurance Fuel Economy (MEFE), find the maximum gross weight (GW) at sea level standard day on the Maximum Endurance Chart. Calculate the useful load by subtracting helicopter weight empty (EW). Divide by the fuel flow (FFME) given on the Maximum Endurance Chart for the maximum gross weight, sea level standard day, at the velocity for maximum endurance. In equation form:

$MEFE = (GW - EW)/FFME$, useful pound hours per pound of fuel (useful newton hours per kilogram of fuel)

3. METHOD OBJECTIVES:

3.1 Availability of Data:

All required data are given in every helicopter Pilot's Handbook. No mission assumption is required.

3.2 Quality Assessment:

The quality of structural design is accounted for in the useful load term. Engine quality appears in the fuel flow term. Aerodynamic quality controls speed for maximum range and power for maximum endurance. Helicopter size is eliminated as a variable by using the ratio of useful load to fuel flow. The use of two operational modes recognizes two general areas of potential helicopter use.

NOTE: In evaluating a helicopter for a given application, use the operational gross weight, altitude and temperature of the specific mission for which the helicopter is being evaluated.

PREPARED BY SAE COMMITTEE S-12, HELICOPTER POWERPLANT