



Transport
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Study and Reference Guide

Flight Dispatchers

Third Edition
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Canada

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<http://www.tc.gc.ca/aviation/general/flightcrew/study.htm>

GENERAL

The conditions of issue of all flight crew licenses are stated in the Canadian Aviation Regulations (CARs).

EXAMINATIONS

The examinations are as follows:

Examination	Questions	Time Limit	Pass Mark
Aviation Regulations and Air Traffic Procedures, Aeroplane Operations and General Navigation, Radio aids and Flight Planning	80	3½ hours	70%

Examination	Questions	Time Limit	Pass Mark
Meteorology	100	3½ hours	70%

Following the completion of generic examinations candidates must complete air operator specific training as approved by Transport Canada.

KNOWLEDGE REQUIREMENTS

Generic training consists of the common body of knowledge required by all flight dispatchers. In order for a flight dispatcher candidate to commence on-the-job training at the air operator of employment, he or she must have passed both Transport Canada's generic examinations, one of which will test the meteorology-related subjects and the other the remaining subjects in this publication.

The proficiency levels used in this document are defined as follows:

1) Denotes a basic knowledge of the subject:

- The learner will be involved in learning facts. Verbs such as list, recall, name etc. will be used to describe the student's performance.
Example: list the conditions for the withdrawal of an Air Operator's Certification.

2) Denotes an understanding of the principle:

- The learner will be required to remember and explain principles.
- Verbs such as explain, define, write etc. will be used to describe the students performance.
Example: explain how a dispatcher uses the Air Almanac on the job.

3) Denotes knowledge of the subject and the ability to apply it practically:

- The learner will show an understanding of the principle by explaining the procedure used to apply it. Words such as list the steps, put in order, flow chart, will be used to describe the student's performance.
- Example: explain the dispatcher procedures for handling an aircraft experiencing icing.

3) Denotes a thorough knowledge of the subject and the ability to apply it with speed and accuracy:

- The student will be able to apply procedures to a problem efficiently and accurately.
- Verbs such as select, distinguish, demonstrate, will be used to describe the student's performance.
- Example: Given a variety of conditions select an appropriate route of flight for a defined aircraft.

5) Denotes extensive knowledge of the subject and the ability to apply procedures derived from it with judgment in light of the circumstances.

- Given a problem with a variety of different solutions the learner will select and apply the most efficient procedures to handle the problem.
- Verbs such as analyze, demonstrate, manipulate, assemble will be used to describe the student's performance.
- Example: Given an observed weather condition on an aircraft's performance the student will quickly and accurately amend the take off data for the aircraft.

Sections with sidebars indicate new topic areas.

NOTE: Times stated (time 8 – 10 hrs.) is a suggested minimum to maximum required for study and is for general guidance only

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- .1 Propeller Thrust and Torque
- .2 Geometric and Effective Pitch
- .3 Slipstream, Gyroscopic Effect and Asymmetric Thrust
- .4 Controls
- .5 Ground and Flight Range
- .6 Constant Speed
- .7 Feathering
- .8 Reversing

2.4 AIRCRAFT SYSTEMS

(proficiency level 4)

- .1 Fuel
- .2 Oil
- .3 Electrical
- .4 Hydraulic
- .5 Pneumatic
- .6 Warning (e.g. Ice, Fire, GPWS and Altitude Alert)
- .7 Fire Protection
- .8 Heating
- .9 De-icing and Anti-icing
- .10 Oxygen
- .11 Air Conditioning
- .12 Pressurization
- .13 Landing Gear and Brakes
- .14 Autopilot
- .15 Avionics
- .16 Flight Controls
- .17 Fuel Systems

SECTION 3: METEOROLOGY

(proficiency level 5 for all items in section 3)

3.1 THE EARTH'S ATMOSPHERE

- .1 Properties
- .2 Vertical Structure
- .3 ICAO Standard Atmosphere

3.2 ATMOSPHERIC PRESSURE

- .1 Pressure Measurements
- .2 Station Pressure
- .3 Mean Sea Level Pressure
- .4 Pressure Systems and Their Variations
- .5 Effects of Temperature
- .6 Horizontal Pressure Differences

3.3 METEOROLOGICAL ASPECTS OF ALTIMETRY

- .1 Pressure Altitude
- .2 Density Altitude
- .3 True Altitude
- .4 Altimeter Setting
- .5 Effects of both Pressure and Temperature

3.4 TEMPERATURE

- .1 Heating and Cooling of the Atmosphere - Convection/Advection/Radiation
- .2 Horizontal Differences
- .3 Temperature Variations with Altitude
- .4 Inversions
- .5 Isothermal Layers

3.5 MOISTURE

- .1 Relative Humidity/Dewpoint
- .2 Sublimation/Condensation
- .3 Cloud Formation
- .4 Precipitation
- .5 Saturated/Dry Adiabatic Lapse Rates

3.6 STABILITY AND INSTABILITY

- .1 Lapse Rate and Stability
- .2 Modification of Stability
- .3 Characteristics of Stable/Unstable Air
- .4 Surface Heating and Cooling
- .5 Lifting Process
- .6 Subsidence/Convergence

3.7 CLOUDS

- .1 Classification
- .2 Formation
- .3 Types and Recognition
- .4 Associated Precipitation and Turbulence

3.8 TURBULENCE

- .1 Convection
- .2 Mechanical
- .3 Orographic
- .4 Clear Air Turbulence
- .5 VIRGA - Evaporation Cooling
- .6 Reporting Criteria
- .7 Mountain Waves

3.9 WIND

- .1 Pressure Gradient
- .2 Deflection Caused by the Earth's Rotation
- .3 Low Level Winds - Variation in Surface Wind
- .4 Friction
- .5 Centrifugal Force
- .6 Veer and Back
- .7 Squalls and Gusts
- .8 Diurnal Effects
- .9 Land and Sea Breezes
- .10 Katabatic/Anabatic Effects
- .11 Topographical Effects
- .12 Wind Shear, Types and Causes

3.10 JET STREAMS

- .1 Frontal Jet Streams
- .2 Wind Distribution/Location
- .3 Temperature Distribution
- .4 Seasonal Variations in Latitude and Speed
- .5 Arctic Stratospheric Jets
- .6 Subtropical Jet Streams
- .7 Turbulence

3.11 AIR MASSES

- .1 Definition and Characteristics
- .2 Formation
- .3 Classification
- .4 Modification
- .5 Factors that Determine Weather
- .6 Seasonal and Geographic Effects
- .7 Air Masses Affecting North America

3.12 FRONTS

- .1 Structure
- .2 Types
- .3 Formation
- .4 Cross-sections
- .5 Discontinuities Across Fronts
- .6 Frontal Waves and Occlusions
- .7 Frontogenesis and Frontolysis

3.13 FRONTAL WEATHER

- .1 Warm Front
- .2 Cold Front
- .3 Stationary Front
- .4 TROWAL and Upper Fronts

3.14 AIRCRAFT ICING

- .1 Formation
- .2 Type of Ice
- .3 Reporting Criteria
- .4 Cloud Types and Icing
- .5 Freezing Rain and Drizzle
- .6 Icing in Clear Air (Hoar Frost)
- .7 Collection Efficiency
- .8 Aerodynamic Heating

3.15 THUNDERSTORMS

- .1 Requirements for Development
- .2 Life Cycle
- .3 Classification - Air Mass, Frontal, Squall Line, Convective, Orographic and Nocturnal
- .4 Tornadoes and Hurricanes
- .5 Hazards - Turbulence, Hail, Rain, Icing, Altimetry, Lightning, Gust Fronts, Downbursts and Microbursts

3.16 SURFACE BASED LAYERS

- .1 Fog Formation
- .2 Fog Types
- .3 Haze and Smoke
- .4 Blowing Obstructions to Vision

3.17 METEOROLOGICAL SERVICES AVAILABLE TO Dispatchers

- .1 Aviation Weather Briefing Service (AWBS)
- .2 Aviation Weather Information Service (AWIS)
- .3 Flight Service Stations (FSS)
- .4 Weather Broadcasts by Flight Service Stations
- .5 Atmospheric Environment Service Weather Briefing
- .6 Transcribed Weather Broadcasts (TWB)
- .7 DUATS - Commercial Weather Service
- .8 Automatic Terminal Information Service (ATS)
- .9 VOLMET (HF) Broadcast
- .10 Pilots Automatic Telephone Reporting Criteria, Cloud Types and Icing Weather Answering Service (PATWAS)

3.18 AVIATION WEATHER REPORTS

- .1 Aviation Routine Weather Report (METAR)
- .2 SPECI
- .3 Decoding
- .4 AWOS
- .5 Pilot Reports (PIREP/AIREP)

3.19 AVIATION FORECASTS

- .1 Times Issued/Validity Periods
- .2 Decoding
- .3 Graphical Area Forecasts (GFA)/AIRMET
- .4 Terminal Area Forecasts (TAF)
- .5 Upper Level Winds and Temperature Forecasts (FD)
- .6 Significant In-flight Weather Warning Message (SIGMET)

3.20 WEATHER MAPS AND PROGNOSTIC CHARTS

- .1 Times Issued/Validity Periods
- .2 Symbols/Decoding
- .3 Surface Weather Map
- .4 Prognostic Surface Chart
- .5 Upper Level Charts - ANAL (850mb, 700mb, 500mb & 250mb)
- .6 Upper Level Charts - PROG (FL240, FL340, FL450)
- .7 Significant Weather Prognostic Chart FL100-250 (700-400mb) & FL250-600 (400-100mb)

SECTION 4: INSTRUMENTS

4.1 FLIGHT INSTRUMENTS - PRINCIPLES AND OPERATIONAL USE

(proficiency level 3)

- .1 Pitot Static System
- .2 Airspeed Indicator
- .3 Machmeter
- .4 Altimeter and Encoding
Altimeter
- .5 Radio/Radar Altimeter
- .6 Outside Air Temperature
- .7 Turn-and-bank Indicator/Turn
Co-ordinator
- .8 Vertical Speed Indicator (VSI)
- .9 Heading Indicator
- .10 Attitude Indicator (AI)
- .11 Flight Director
- .12 Radio Magnetic Indicator (RMI)
- .13 Horizontal Situation Indicator
(HSI)
- .14 Angle of Attack Indicator

4.2 FLIGHT MANAGEMENT INSTRUMENTS

(proficiency level 3)

- .1 Flight Management System
(FMS)
- .2 Electronic Flight Instrument
System (EFIS)

4.3 ENGINE INSTRUMENTS - PRINCIPLES AND USE

(proficiency level 3)

- .1 Tachometer
- .2 Manifold Pressure
- .3 Oil Pressure
- .4 Oil Temperature
- .5 Exhaust Gas Temperature
- .6 Cylinder Head Temperature
- .7 Carburetor Air Temperature
- .8 Intake Air Temperature
- .9 Fuel Pressure
- .10 Fuel Flow
- .11 Torquemeter
- .12 Engine Pressure Ratio (EPR)
- .13 Turbine Temperature (ITT/TIT)

4.4 AIRCRAFT COMPASS SYSTEMS

(proficiency level 2)

- .1 Construction
- .2 Use
- .3 Limitations and Faults
- .4 Gyromagnetic Remote
Indicating Compass

SECTION 5: NAVIGATION - GENERAL

5.1 NAVIGATION TERMS

(proficiency level 4)

- .1 Air Position
- .2 Great Circle
- .3 Rhumb Line
- .4 Greenwich Hour Angle

5.2 MAPS AND CHARTS

(proficiency level 5)

- .1 Lambert Conformal
- .2 Transverse Mercator
- .3 Enroute Low and High Altitude Charts

5.3 TIME AND LONGITUDE

(proficiency level 5)

- .1 Time Zones and Relation to Longitude

5.4 FLIGHT PLANNING CALCULATIONS AND FORMS

(proficiency level 5)

- .1 Heading and True Airspeed
- .2 Wind and Windspeed
- .3 IAS-CAS-EAS-TAS
- .4 Track and Groundspeed
- .5 Mach
- .6 Time
- .7 Weight and Balance
- .8 Flight Planned Fuel Requirements
- .9 Fuel Load/Zero Fuel Weight
- .10 Pay Load/Weight Shift
- .11 Critical Point (CP)
- .12 Equal Time Point (ETP)
- .13 Flight Plans
- .14 Flight Itinerary
- .15 ICAO Flight Plan
- .16 ETOPS

5.5 COMPUTERIZED FLIGHT PLANS

(proficiency level 5)

- .1 Decode
- .2 Analysis and Interpolation

5.6 EN ROUTE NAVIGATION

(proficiency level 5)

- .1 Use of Aeronautical Charts
- .2 Calculation of Heading and Groundspeed
- .3 Use of Radio Aids to Determine Position and Transferring Position Lines
- .4 Gyro Steering Techniques in Areas of Compass Unreliability
- .5 Maintaining Flight Log (Air Position)
- .6 Determination of Wind Velocity

**SECTION 6: RADIO COMMUNICATIONS AND AIDS TO NAVIGATION -
BASIC PRINCIPLES AND USE**

6.1 RADIO

(proficiency level 3)

- .1 Elementary Theory
- .2 Wave Length and Frequency
- .3 Frequency Bands Used in Communication and Navigation
- .4 Characteristics of Low, High and Very High Frequency Radio Waves
- .5 Ground Waves and Sky Waves
- .6 Skip Distance
- .7 Reflection and Refraction
- .8 Night Effect

6.2 AIRCRAFT RADIO TRANSCEIVERS

(proficiency level 4)

- .1 VHF
- .2 HF
- .3 DATALINK

6.3 SELECTIVE CALL SYSTEM (SELCAL)

(proficiency level 4)

- .1 VHF
- .2 HF

6.4 EMERGENCY LOCATOR TRANSMITTER (ELT)

(proficiency level 2)

- .1 Requirements
- .2 Testing
- .3 Flight Planning
- .4 Accidental Transmission
- .5 Pilot Response to Signals
- .6 Downed Aircraft Procedures

6.5 RADAR

(proficiency level 3)

- .1 Elementary Theory
- .2 Primary Returns

.3 Secondary Returns

.4 Weather Radar

6.6 NAVIGATION SYSTEMS

(proficiency level 3)

- .1 Automatic Direction Finder (ADF)
- .2 VHF Omnidirectional Range (VOR)
- .3 Distance Measuring Equipment (DME)
- .4 Co-located VOR and TACAN (VORTAC)
- .5 Long Range Area Navigation (LORAN C)
- .6 Global Navigation Satellite System (GNSS - GPS)
- .7 Very High Frequency Direction Finding (VHF - DF)
- .8 Area Navigation System (RNAV)
- .9 Inertial Navigation System (INS)

6.7 APPROACH AIDS

(proficiency level 4)

- .1 Instrument Landing System (ILS)
- .2 Global Navigation Satellite System (GNSS - GPS)
- .3 Surveillance Radar (ASR & AASR)
- .4 Precision Approach Radar (PAR)
- .5 Secondary Surveillance Radar (SSR)
- .6 VASIS/PAPI

6.8 TRANSPONDERS

(proficiency level 4)

6.9 ACAS/TCAS

SECTION 7: FLIGHT OPERATIONS

7.1 ATMOSPHERIC EFFECTS IN FLIGHT

(proficiency level 5)

- .1 ICAO Standard Atmosphere
- .2 Temperature and Pressure/Air Density
- .3 Humidity/Rain
- .4 Cold Temperature Corrections

7.2 PERFORMANCE

(proficiency level 5)

- .1 Indicated and True Stalling Speeds
- .2 Slow Speed Flight Characteristics
 - Turbo-prop
 - Turbo-jet
- 3. High Speed Flight Characteristic
 - Turbo-prop
 - Turbo-jet
- 4. Relationship of Speed to Angle of Attack
- .5 Cruising for Range/Endurance
- .6 Flight Performance "V" Speeds - Definition and Use
- .7 Weight and Balance - Load Adjustment
- .8 Effect of Changes in Weight and Load Distribution
- .9 Hydroplaning
- .10 Wind Shear - Effects and Avoidance
- .11 Landing Techniques
- .12 Selection of Alternates

7.3 CHARTS AND GRAPHS

(proficiency level 5)

- .1 Weight and Balance
- .2 Take-off
- .3 Climb
- .4 Cruise
- .5 Buffet Boundary
- .6 Descent
- .7 Landing

- .8 Crosswind
- .9 Weight, Altitude, Temperature (WAT), Takeoff/Landing Performance Charts

7.4 CRITICAL SURFACE CONTAMINATION

(proficiency level 5)

- .1 Clean Aircraft Concept - Practices and Techniques
- .2 Frozen Contaminants Including Cold-Soaking Phenomenon
- .3 De-icing and Anti-icing Fluids
- .4 De-icing and Anti-icing Procedures
- .5 Variables that Can Influence Holdover Time
- .6 Critical Surface Inspections
- .7 Pre-take-off Inspection
- .8 Health Affects
- .9 Application Guideline Tables

7.5 WAKE TURBULENCE

(proficiency level 5)

- .1 Causes and Effects
- .2 Avoidance Procedures
- .3 Separation Criteria and Waiver

7.6 FLIGHT MANUAL

(proficiency level 3)

- .1 Approved Information

7.7 VOLCANIC ASH

(proficiency level 5)

- .1 Hazards

7.8 AIRMANSHIP/RULES OF THUMB

(proficiency level 4)

- .1 General

SECTION 8: THEORY OF FLIGHT**8.1 FORCES ACTING ON AN
AEROPLANE**

(proficiency level 4)

- .1 Load Factor
- .2 Relationship of Weight and
Load Factor to Stalling
- .3 Gust Loads
- .4 Stability
- .5 Lift/Weight/Thrust/Drag

8.2 WING DESIGN

(proficiency level 3)

- .1 Wing Tip Vortices
- .2 Sweepback
- .3 Leading and Trailing Edge
Flaps
- .4 Winglets
- .5 Canards
- .6 Vortex Generators
- .7 Wing Fences
- .8 Spoilers

SECTION 9: HUMAN FACTORS

9.1 AVIATION PHYSIOLOGY (proficiency level 3)

- .1 Hypoxia/Hyperventilation
- .2 Gas Expansion Effects
- .3 Decompression (Including SCUBA Diving)
- .4 Vision/Visual Scanning Techniques
- .5 Hearing
- .6 Orientation/Disorientation (Including Visual and Vestibular Illusions)
- .7 Positive and Negative "G"
- .8 Circadian Rhythms/Jet Lag
- .9 Sleep/Fatigue

9.2 THE OPERATING ENVIRONMENT (proficiency level 1)

- .1 Personal Health Exercise/Fitness
- .2 Obesity/Diet/Nutrition
- .3 Medications (Prescribed and Over-the-counter)
- .4 Substance Abuse (Alcohol and Drugs)
- .5 Pregnancy
- .6 Heat/Cold
- .7 Noise/Vibration
- .8 Effects of Smoking
- .9 Toxic Hazards (Including Carbon Monoxide)

9.3 AVIATION PSYCHOLOGY (proficiency level 4)

- .1 The Decision-Making Process
- .2 Factors That Influence Decision-Making
- .3 Situational Awareness
- .4 Stress
- .5 Managing Risk
- .6 Attitudes
- .7 Workload (Attention and Information Processing)

9.4 PILOT - EQUIPMENT / MATERIALS RELATIONSHIP (proficiency level 5)

- .1 Controls and Displays
 - Errors in Interpretation and Control
 - Information Selection: e.g. "glass" cockpits
- .2 Alerting and Warning Systems
 - Appropriate Selection and Set Up
 - False Indications
 - Distractions and Responses
- .3 Standard Operating Procedures (SOPs)
- .4 Correct Use of Charts, Checklists and Manuals
- .5 Cockpit Visibility and Eye Reference Position/Seat Position

9.5 INTERPERSONAL RELATIONS (proficiency level 4)

- .1 Communications with Flight and Cabin Crew/Passengers/ Company Management/Flight Operations/Maintenance Personnel/Air Traffic Services
- .2 Crew Problem Solving and Decision Making
- .3 Crew Management/Small Group Dynamics
- .4 Operating Pressures Family/ Peer Group/Employer

9.6 CREW-DISPATCH RESOURCE MANAGEMENT (CRM - DRM) (proficiency level 5)

EXAMINATION RESULTS - DECODING

Candidates who write an examination will be informed of the Question topics they answered incorrectly by a series of numbers related to the sections and topics contained in this Guide. Questions relating to more than one topic are shown by a slash (/) separating the series of numbers (example 3). The method of decoding these numbers is explained by the examples below.

HOW TO DECODE

Example (1) 1.1.2.3

Section	1.	Air Law and Procedures
Sub-section	1.	CARs - PART 1 - General Provisions
Subpart	2.	Administration and Compliance
Topic	3	Record Keeping

Example (2) 3.5.1

Section	3.	Meteorology
Sub-section	5.	Moisture
Topic	1	Relative Humidity / Dewpoint

Example (3) 3.9.12 / 7.2.10

Section	3.	Meteorology
Sub-section	9.	Wind
Topic	12	Wind Shear Types and Causes
Section	7.	Flight Operations
Sub-section	2.	Performance
Topic	10	Wind Shear - Effects and Avoidance

TABLES AND CHARTS

The following section contains examples of different tables and charts, which may be used on ATPL-A examinations

WEIGHT SHIFT FORMULA

WEIGHT OF CARGO MOVED	=	DISTANCE CG MOVED
WEIGHT OF AEROPLANE		— DISTANCE BETWEEN ARM LOCATION

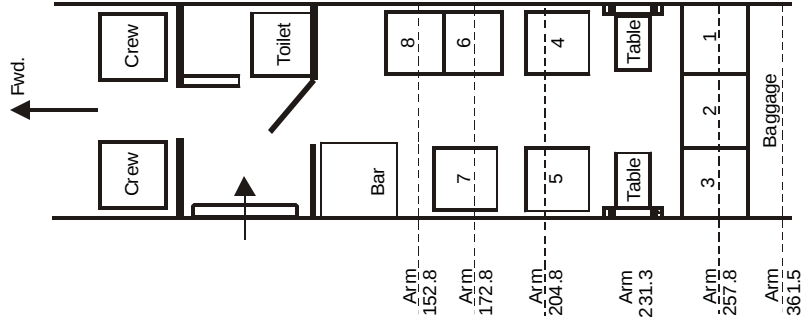
WEIGHT & BALANCE LOADING DATA (Page 1 of 2)

Fuel Loading Chart

Fuel Taken as 7,807 lb. per Imp. Gal. / Moments are in in.-lb.

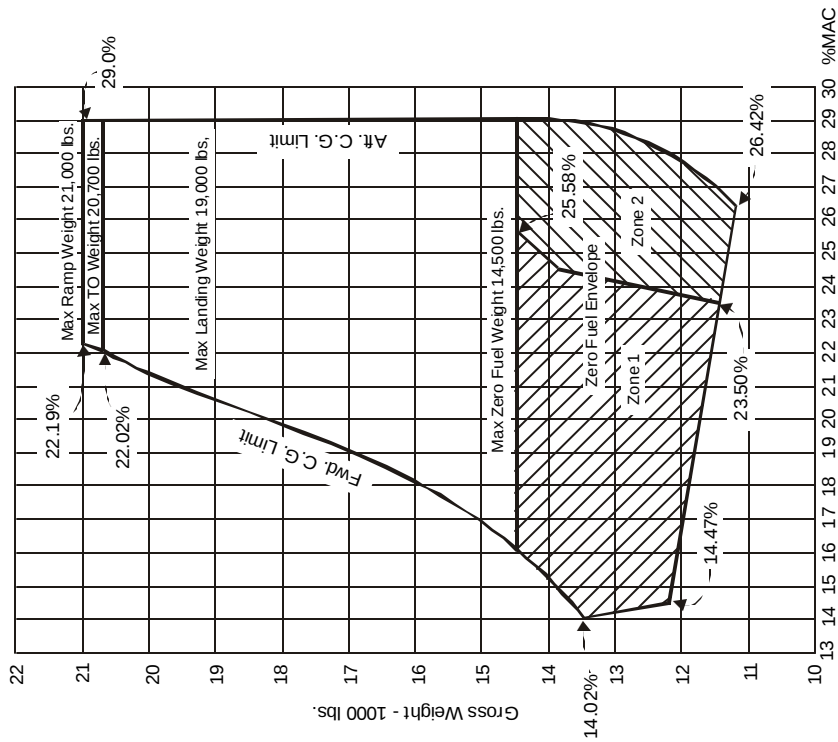
Fuselage and Wng Tanks			Fuselage and Wing Tanks (Cont.)			Fuselage and Wing Tanks (Cont.)			Fuselage and Wing Tanks (Cont.)		
Imp. Gallons	Wt. (lb.)	Mom./1000	Imp. Gallons	Wt. (lb.)	Mom./1000	Imp. Gallons	Wt. (lb.)	Mom./1000	Imp. Gallons	Wt. (lb.)	Mom./1000
10	78	23	300	2,342	682	590	4,606	1,326	880	6,870	1,971
20	156	46	310	2,420	704	600	4,684	1,349	891	6,956	2,000
30	234	68	320	2,498	727	610	4,762	1,370			
40	312	91	330	2,576	748	620	4,840	1,393			
50	390	115	340	2,654	771	630	4,918	1,415			
60	468	137	350	2,732	793	640	4,996	1,438			
70	546	160	360	2,810	815	650	5,075	1,459			
80	625	183	370	2,889	837	660	5,153	1,482			
90	703	205	380	2,967	860	670	5,231	1,504			
100	781	229	390	3,045	882	680	5,309	1,526			
110	859	252	400	3,123	904	690	5,387	1,548			
120	937	275	410	3,201	926	700	5,465	1,571			
130	1,015	298	420	3,279	949	710	5,543	1,593			
140	1,093	321	430	3,357	970	720	5,621	1,615			
150	1,171	343	440	3,435	993	730	5,699	1,637			
160	1,249	366	450	3,513	1,015	740	5,777	1,660			
170	1,327	389	460	3,591	1,038	750	5,855	1,681			
180	1,405	412	470	3,669	1,059	760	5,933	1,704			
190	1,483	435	480	3,747	1,082	770	6,011	1,726			
200	1,561	458	490	3,825	1,104	780	6,089	1,749			
210	1,639	480	500	3,904	1,125	790	6,168	1,770			
220	1,718	503	510	3,982	1,148	800	6,246	1,793			
230	1,796	525	520	4,060	1,171	810	6,324	1,815			
240	1,874	548	530	4,138	1,193	820	6,402	1,838			
250	1,952	570	540	4,216	1,215	830	6,480	1,859			
260	2,030	593	550	4,294	1,237	840	6,558	1,882			
270	2,108	615	560	4,372	1,260	850	6,636	1,904			
280	2,186	638	570	4,450	1,281	860	6,714	1,926			
290	2,264	659	580	4,528	1,304	870	6,792	1,948			

Aircraft Seating Diagram



WEIGHT & BALANCE LOADING DATA (Page 2 of 2)

Centre Of Gravity Envelope



Zone 1 If the Zero Fuel Weight falls within this zone - fuel can be loaded up to Max Ramp Wt. without exceeding C.G. Limits.

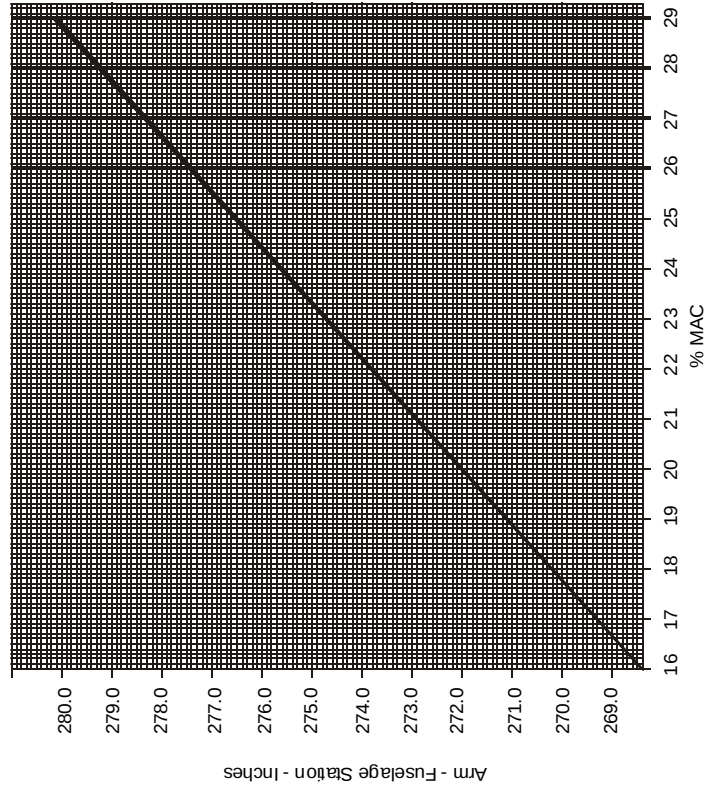
Zone 2 If the Zero Fuel Weight falls within this zone - the fuel quantity that may be added must be restricted such that at take-off the aft C.G. Limit is not exceeded.

MAC is 90.197 inches

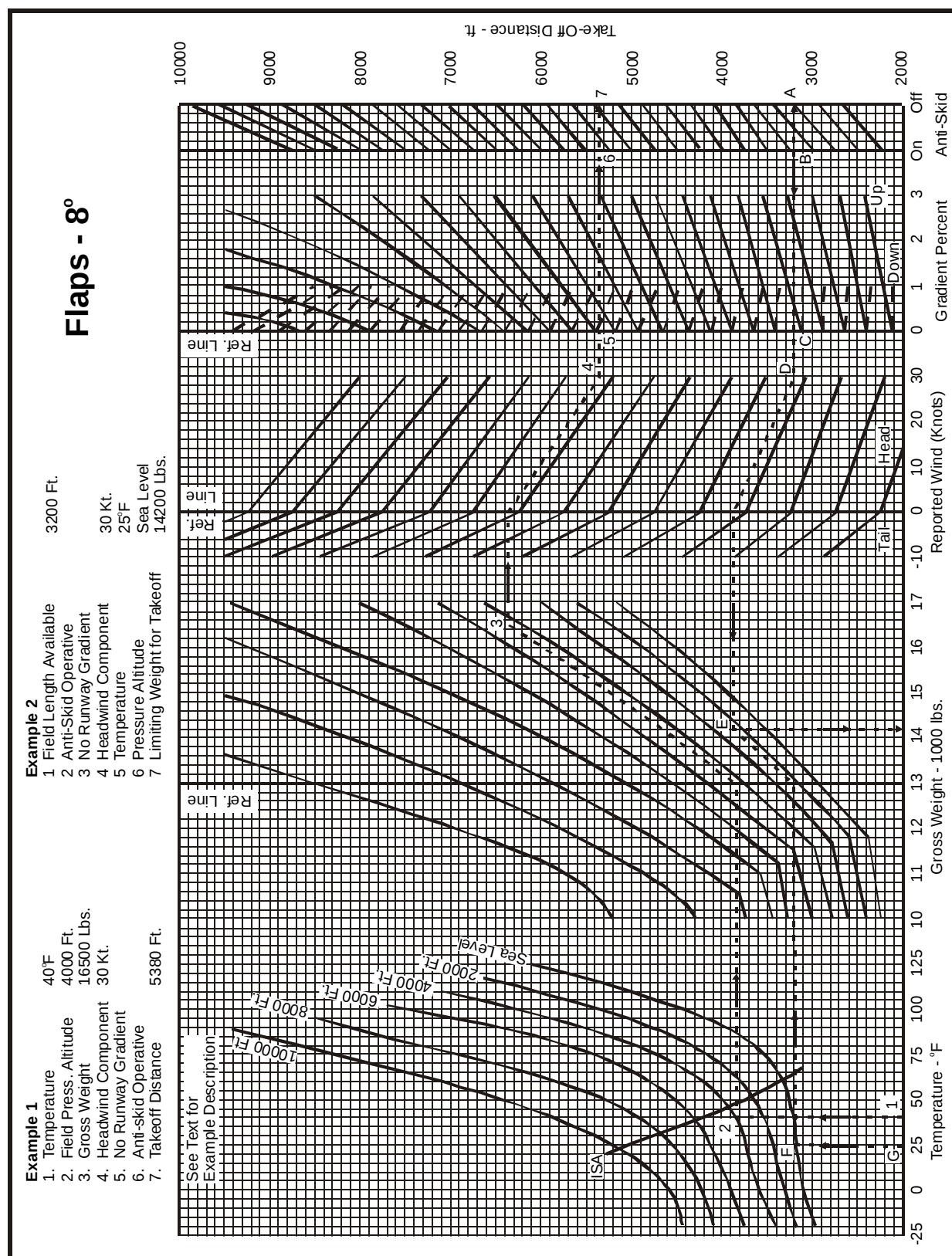
L.E. of MAC is 253.964 in. aft of reference datum.

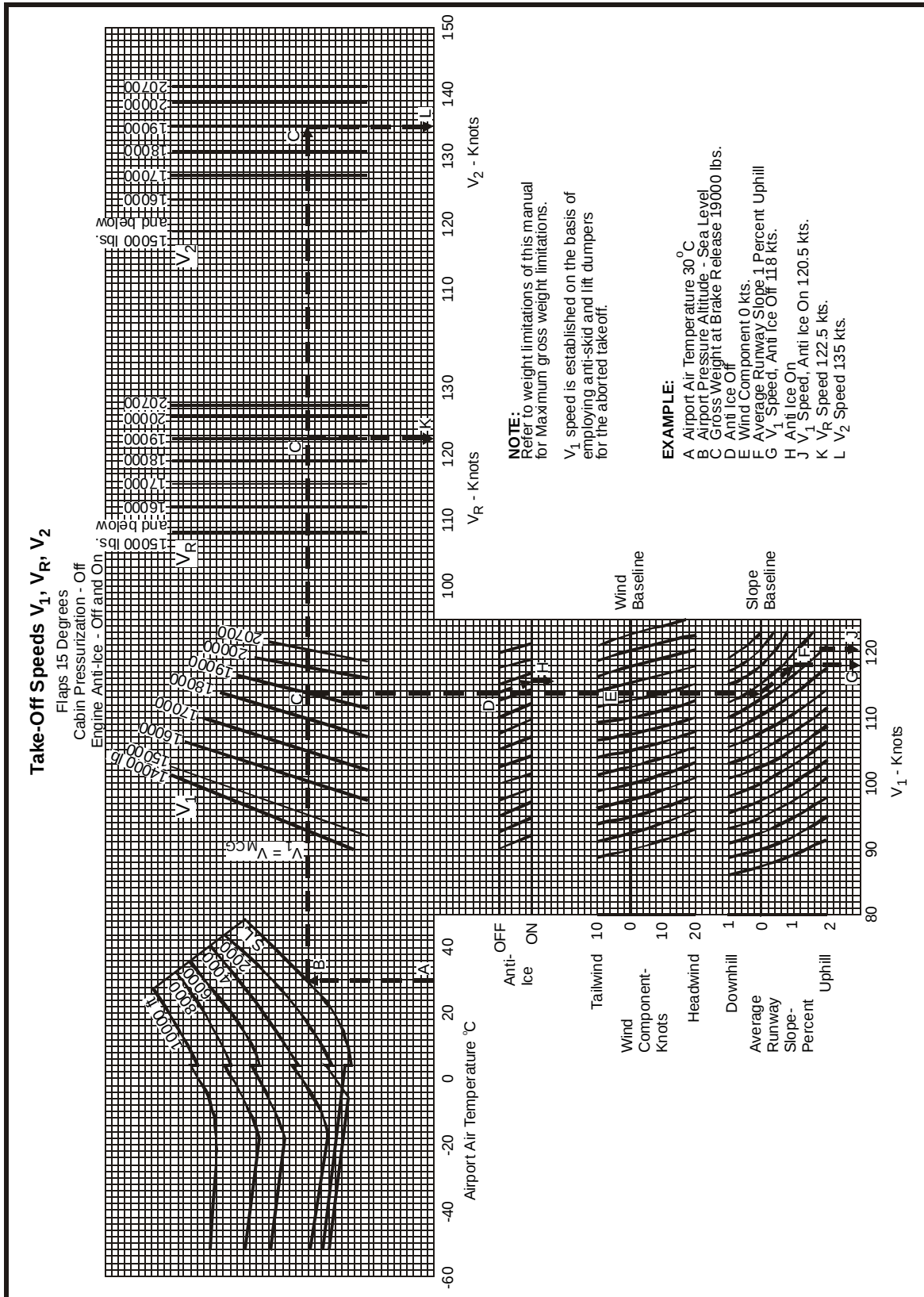
Conversion Formula - Arm to %MAC:

$$\%MAC = \frac{ARM(in.) - 253.964}{90.197} \times 100$$



Conversion Chart - Arm to %MAC



TAKE-OFF SPEEDS V_1 , V_R , V_2 

TAKE-OFF PERFORMANCE

Accelerate-Go - Flaps 0%

Associated Conditions:

Power Take-Off power set before brake release.

Flaps 0%

Auto-Feather Armed

Landing Gear Retract after lift-off
Runway Paved, level, dry surface

Note: 1. Air distance is 50% of take-off field length.

2. V_1 (engine failure speed) equals V_R (rotation speed).

3. Usable clearway cannot exceed 25% of the runway length.

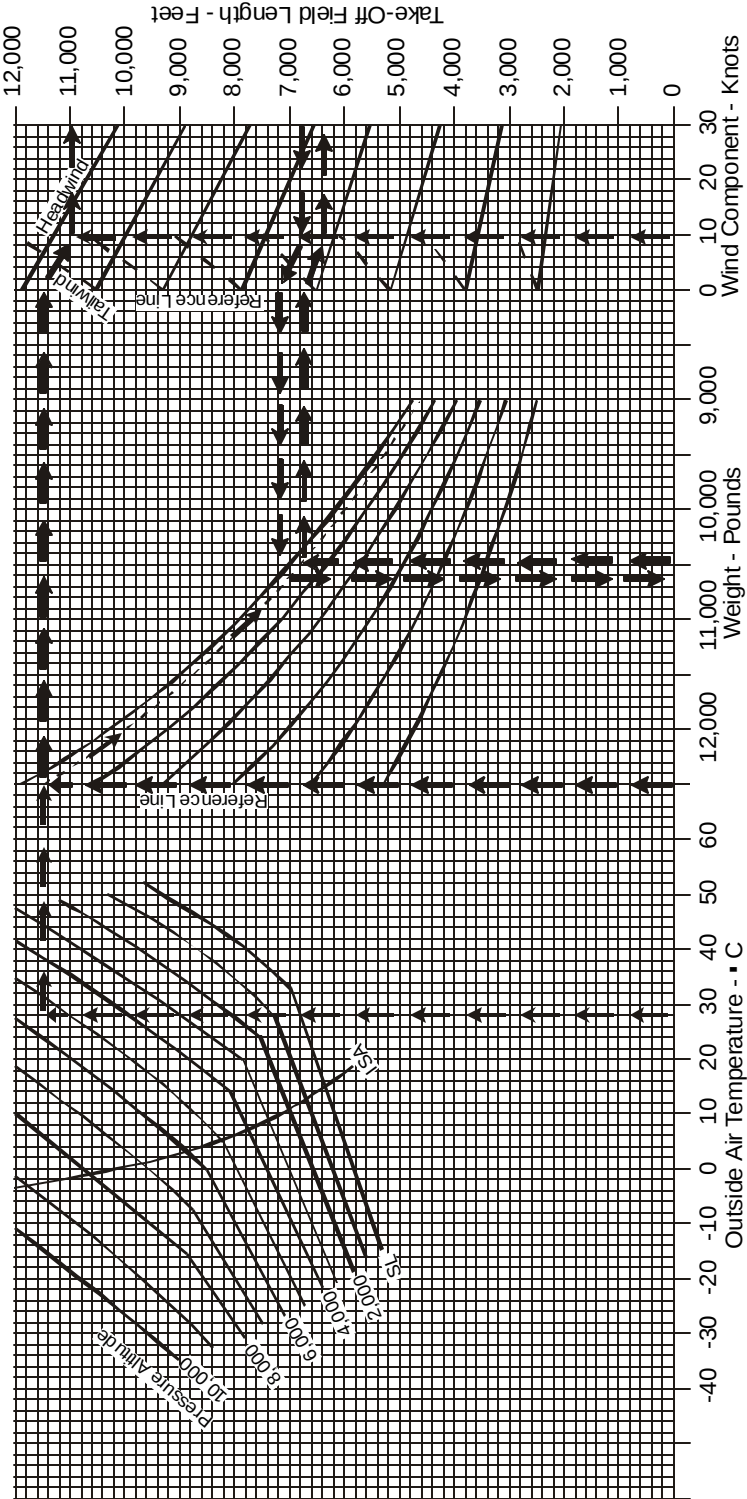
Example:

OAT 28° C
Pressure Altitude 5430 Feet
Headwind Component 9.5 Knots

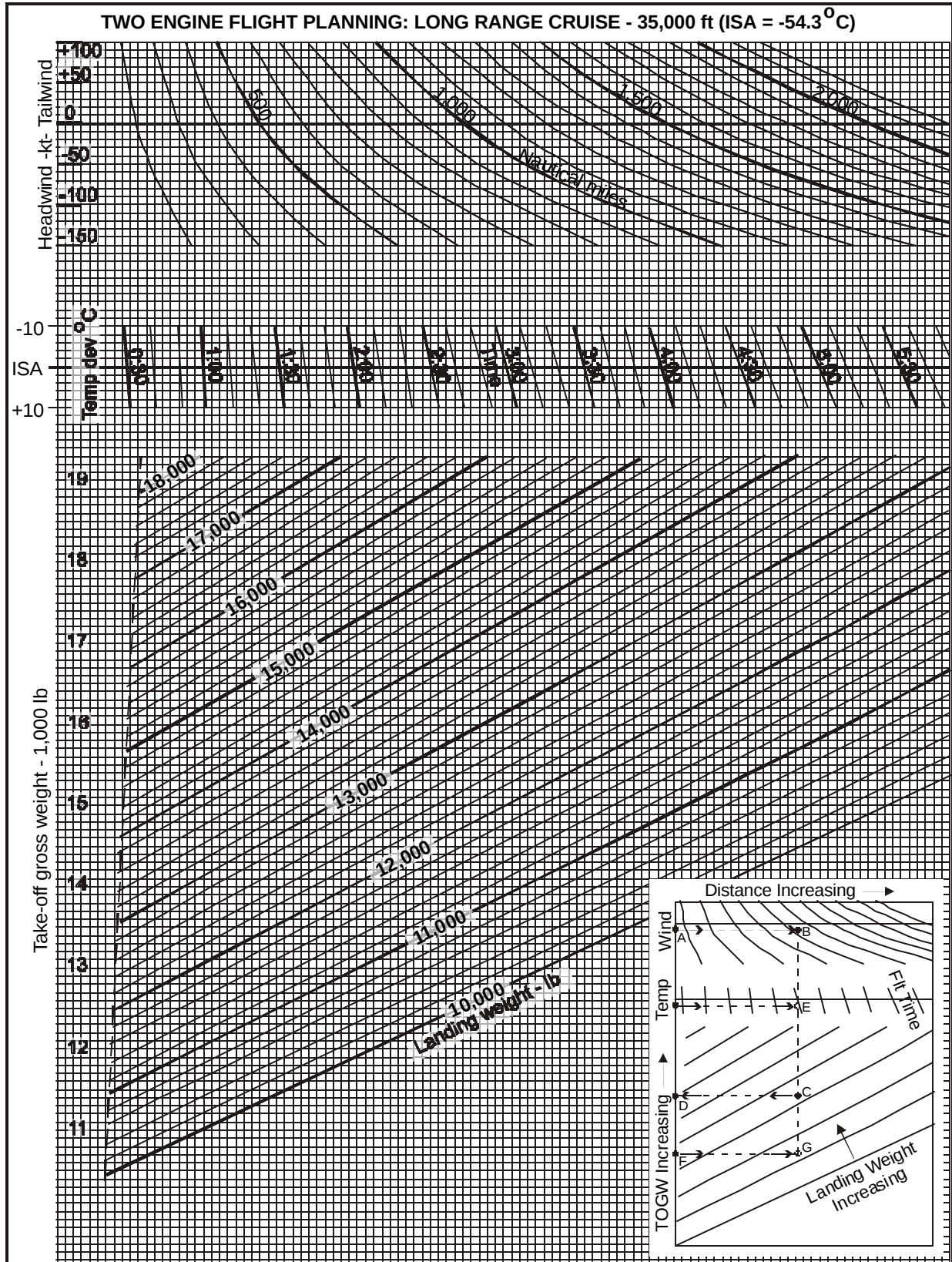
Take-Off Weight - Pounds	Take-Off Field Length - Feet
12,500	10,950
10,650	6,786
10,470	6,370

Speeds (10,470 Pounds) V_R 95 Kt.
 V_{LOF} 101 Kt.
 V_2 113 Kt.

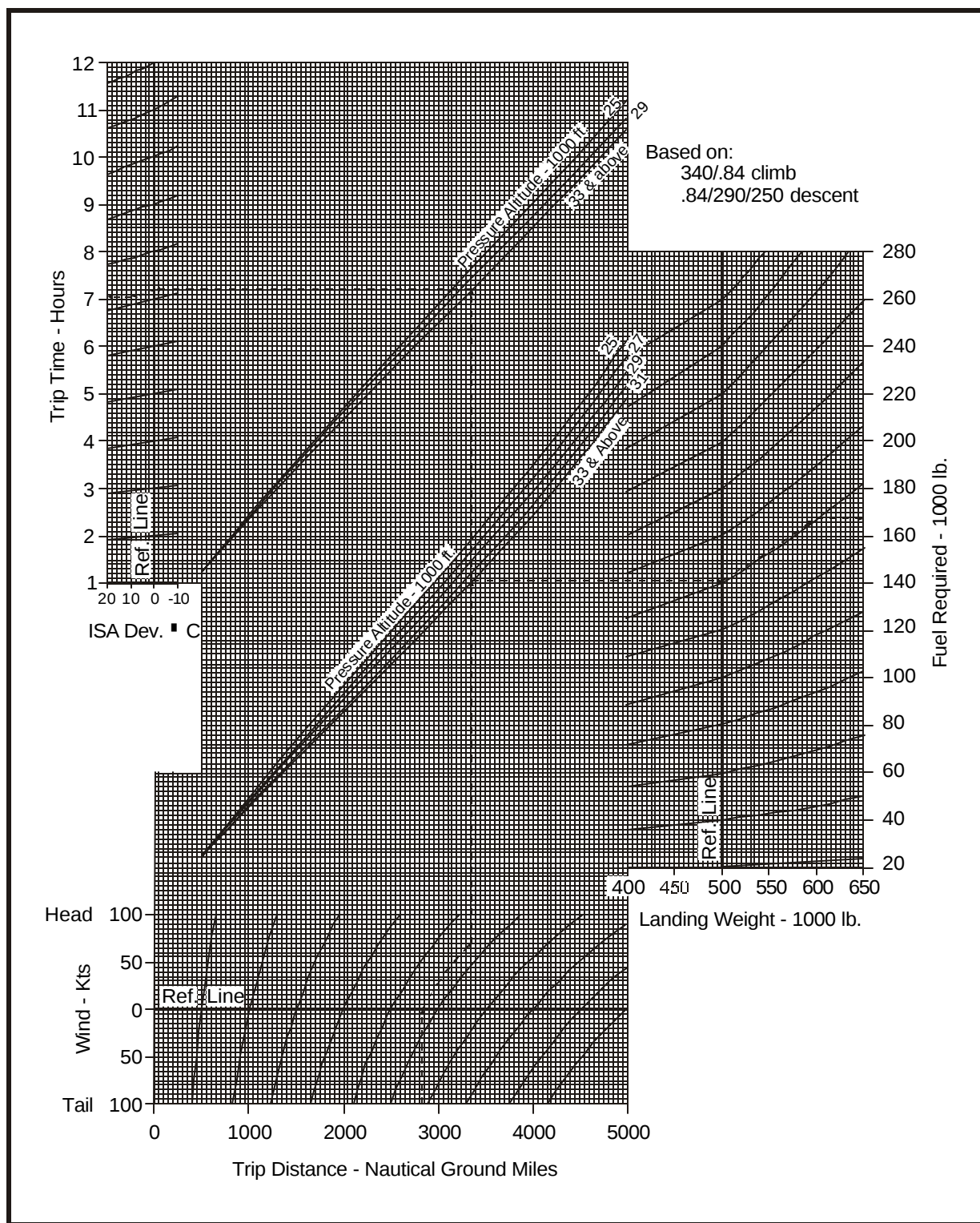
Weight - Pounds	Speed - Knots	
	V_R	V_2
12,500	95	101
12,000	95	101
11,000	95	101
10,000	95	101
9,000	95	101



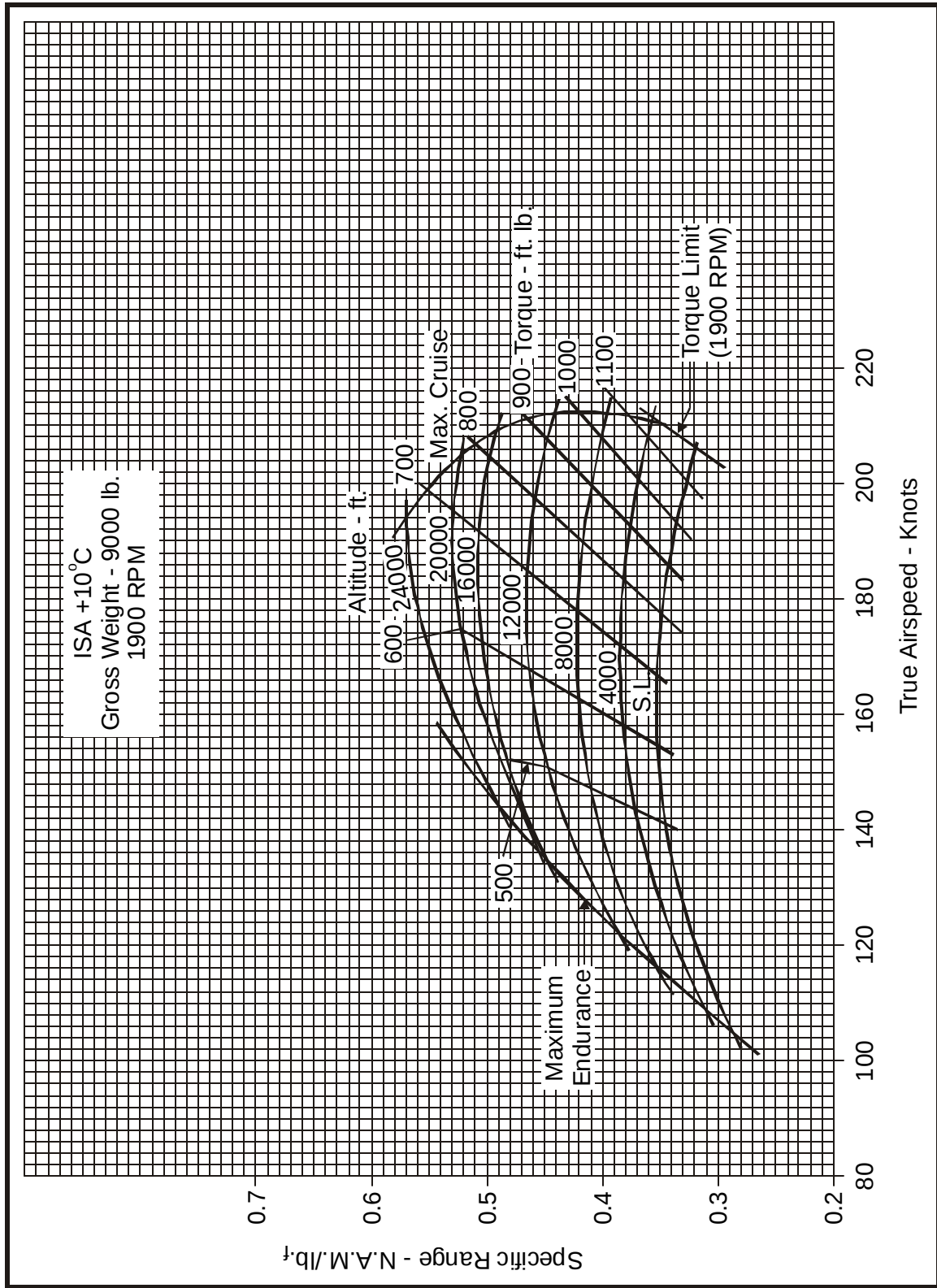
CRUISE PERFORMANCE



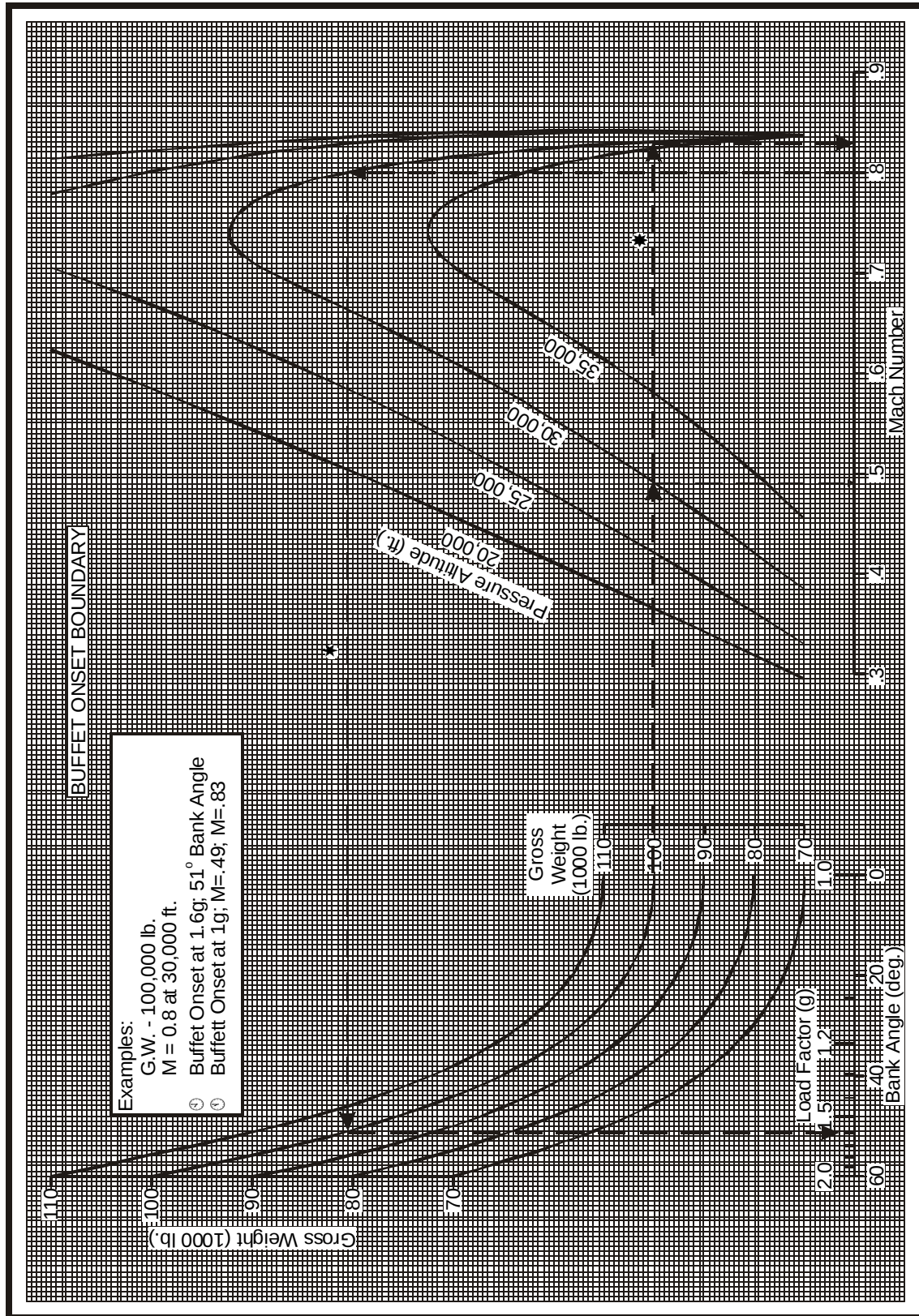
LONG RANGE CRUISE



SPECIFIC RANGE



BUFFET ONSET BOUNDARY



Sample Computer Flight Plan

Plan 1510	CYAM TO CYOW	CES2	HSC/F	IFR				
	TIME	DIST	ARRIVE	TAKEO	LAND	AV PLN	OPNLWT	
				FF				
POA	01/09	0386	1809Z	013703	012228	00457	008446	
CYOW								
ALT CYND	00036	00/13	0013	1822Z				
	9							
HLD	00000	00/00						
	0							
RES	00295	03/16						
	6							
TOT	00480	04/38						
	0							

WPT	MTR	TTR	T	TAS	G/S	DR	ZD	DREM	ZT	CRT	ZF	FREM	AFF
SSM	125.5	118	..	..	..	..	009	0377	./.	./.	./.	..	..
TOC	093.1	089	..	..	..	..	069	0308	0/20	0/49	004	0043	
YYB	093.1	089	-48	372	403	R05	134	0174	0/20	0/29	004	0039	
SMARE	102.9	092	-48	373	410	R05	053	0121	0/07	0/22	001	0038	
TOD	131.3	118	-48	374	423	R01	035	0086	0/05	0/17	001	0037	
YOW	131.3	118	..	..	..	..	074	0012	./.	./.	..	..	
CYOW	140.5	126	..	..	..	..	012	0000	0/17	0/00	000	0033	

CYAM	N46291W084306	SSM	N46247W084189	YYB	N4621
SMARE	N46196W078098	YOW	N45265W075538	CYOW	N4519

FIRS	KZMP/0000	CZYZ/0004	CZUL/0103
------	-----------	-----------	-----------

(FPL-I
 -C550/L
 -CYAM1700
 -N0372F330 DCT SSM DCT YYB J513 SMARE YOW314 YOW DCT
 -CYOW0109 CYND
 -EET/KZMP0000 CZYZ0004 CZUL0103
 SEL/
 -E/0438 P/ R/ S/ J/ D/
 A/)

IN	DOWN	ZFW	DOWN
OUT	UP	R/FUEL	DOWN
FLT	AIR	T/OWT	DOWN

POA	-	Point of Arrival
ALT	-	Alternate
HLD	-	Holding
RES	-	Reserve
TOT	-	Total
AV PLD	-	Average Payload
OPNLWT	-	Operational Weight

NOTE: Weight and balance calculation computed separately take precedence over these weight calculations.

CYAM . . . SSM	-	CYAM Direct to SSM
YOW 314 YOW	-	314° Radial to YOW
WIND P035	-	Wind Push of 35 kts
FL330	-	Flight Level 330
WPT	-	Waypoint
MTR	-	Magnetic Track
T	-	Temperature
TAS	-	True Airspeed
G/S	-	Ground Speed
DR	-	Drift
ZD	-	Zone (leg) Distance
DREM	-	Distance Remaining
ZT	-	Zone (leg) Time
CTR	-	Time Remaining
ZF	-	Zone (leg) Fuel
FREM	-	Fuel Remaining
AFR	-	Actual Fuel Remaining
ETA	-	Estimated Time of Arrival
CYAM	-	CYAM Latitude and longitude
FIRS	-	FIR Boundary Times
FPL-I	-	Instrument Flight Plan
TOC	-	Top of Climb
TOD	-	Top of Descent

GOVERNMENT OF CANADA PUBLICATIONS

Transport Canada – AARA

Place de Ville, Tower C, Ottawa, Ontario, Canada , K1A 0N8

Telephone (613) 993-7284 1-800-305-2059

Facsimile (613) 957-4208 – ATTN: AARA

Internet Address: http://www.tc.gc.ca/aviation/pubs/index_e.htm

The following publications can be purchased from the above address. The fee is cost plus handling, and applicable mailing charges.

1. Air Command Weather Manual (TP 9352E).
2. Air Command Weather Manual (Supplement) (TP 9353E).
3. Human Factors for Aviation – Basic Handbook (TP 12863E), and Advanced Handbook (TP 12864E).
4. When in Doubt ... Aircraft Critical Surface Contamination Training Videos.

Note: The three videos; Ground Crew, Small Aircraft, and Large Aircraft may be purchased individually or all three combined into a single video.

The accompanying booklets; When in Doubt ... Small and Large Aircraft (TP 10643E), When in Doubt ... Ground Crew (TP 10647), and Aircraft Critical Surface Contamination Examination Questions (TP 10615E) are available from the General Aviation web site:
<http://www.tc.gc.ca/CivilAviation/General/Exams/Guides.htm>.

If you do not have access to the web, the booklets can be ordered from the above address for a nominal charge.

The publications listed below may be purchased from:

Canadian Government Publishing

Ottawa, Ontario, Canada, K1A 0S9

General Inquiries: (819) 956-4800 or 1-800-635-7943

Facsimile: (819) 994-1498 or 1-800-565-7757

Internet Address: <http://publications.pwgsc.gc.ca/publishing/pubindex-e.html>

1. Aeronautical Information Publication (A.I.P. Canada) (TP 2300E)
2. Canadian Aviation Regulations (CARs)

To find the nearest distributor of the publications listed below, contact:

Canada Map Office, Geomatics Canada

615 Booth Street

Ottawa, Ontario, Canada, K1A 0E9

Telephone (613) 952-7000 or 1-800-465-6277

Facsimile (613) 957-8861 or 1-800-661-6277

Internet Address: <http://www.geocan.nrcan.gc.ca/ps/indexe.html>

1. VFR Navigation Charts (VNC)/VFR Terminal Area Charts (VTA)/World Aeronautical Charts (WAC)
2. Canada Flight Supplement
3. Enroute Low Altitude Charts

The Study Guide for the Radiotelephone Operator's Restricted Certificate (Aeronautical) is available free of charge from district offices of Industry Canada - Examinations and Radio Licensing.

Information on the Transportation of Dangerous Goods is available from Transport Canada, Safety & Security, Civil Aviation Directorate or Transport Dangerous Goods Directorate (internet address: <http://www.tc.gc.ca/en/modes.htm>).

Information on Customs Requirements is available from the Canada Customs and Revenue Agency (internet address: <http://www.ccr-aadrc.gc.ca/>).

Information on the Canada Labour Code is available from Human Resources Development Canada (internet address: <http://www.hrdc-drhc.gc.ca/common.work.shtml>).

ADDITIONAL REFERENCE MATERIAL

Information on text books and other publications produced by commercial publishers can be obtained through local flying training organizations, bookstores and similar sources.

A variety of publications used in pilot training in the United States are available through the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. (internet address: <http://www.access.gpo.gov/index.html>).

ENQUIRIES

Information as to the location of pilot training organizations and matters pertaining to flight crew licensing can be obtained by writing the appropriate Regional licensing personnel using the information given in the following list.

Pacific Region

Regional Manager General Aviation
Transport Canada
Suite 620
800 Burrard Street
Vancouver, British Columbia
V6Z 2J8

Telephone: (604) 666-5571
Facsimile: (604) 666-4839

Prairie and Northern Region

General Aviation
Transport Canada
Canada Place, 11th Floor
1100-9700 Jasper Avenue
Edmonton, Alberta
T5J 4E6

Telephone: (780) 495-3869
Facsimile: (780) 495-7449

Regional Manager General Aviation
Transport Canada
344 Edmonton Street
2nd Floor
Winnipeg, Manitoba
R3C 0P6

Telephone: (204) 983-4341
Facsimile: (204) 984-2069

Ontario Region

Regional Manager General Aviation
Transport Canada
4900 Yonge Street
Suite 300
Willowdale, Ontario
M2N 6A5

Telephone: (416) 952-0215
Facsimile: (416) 952-0196

Quebec

Regional Manager General Aviation
Transport Canada
700 Leigh Capreol
Suite 2001
Dorval, Quebec
H4Y 1G7

Telephone: (514) 633-3863
Facsimile: (514) 633-3585

Atlantic Region

Regional Manager General Aviation
Transport Canada
P.O. Box 42
95 Foundry Street
Moncton, New Brunswick
E1C 8K6

Telephone: (506) 851-7131
Facsimile: (506) 851-2563

These locations, and others offer flight crew examination service. A complete listing can be found on the internet site <http://www.tc.gc.ca/aviation/general/FLTCREW/TCC.htm> .