FAA-CT-8080-7C
Addendum C–April 2014

COMPUTER TESTING SUPPLEMENT FOR AIRLINE TRANSPORT PILOT AND AIRCRAFT DISPATCHER

Addendum C
April 2014

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U.S. Department of Transportation
Federal Aviation Administration

Acknowledgments

The graphics for Figures 389 through 416 were used by permission from Cessna Aircraft Company.

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Airspeed Limitations

Airspeed limitations and their operational significance are shown in Airspeed Limitations chart.

	SPEED	KCAS	KIAS	REMARKS
V_{MO}	Maximum Operating Speed	175	175	Do not exceed this speed in any operation.
V_A	Maneuvering Speed: 8750 Pounds 7500 Pounds 6250 Pounds 5000 Pounds	 148 137 125 112	 148 137 125 112	Do not make full or abrupt control movements above this speed.
V_{FE}	Maximum Flap Extended Speed: UP - 10° Flaps 10° - 20° Flaps 20° - FULL	 175 150 125	 175 150 125	Do not exceed these speeds with the given flap settings.
	Maximum Open Window Speed	175	175	Do not exceed this speed with window open.

Figure 389

STALL SPEEDS

CONDITIONS:
8750 Pounds
POWER Lever **IDLE**
FUEL CONDITION Lever **HIGH IDLE**

MOST REARWARD CENTER OF GRAVITY

Flap Setting	Angle of Bank							
	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	63	78	68	84	75	93	89	110
10°	58	69	62	74	69	82	82	98
20°	53	63	57	68	63	75	75	89
FULL	48	60	52	64	57	71	68	85

MOST FORWARD CENTER OF GRAVITY

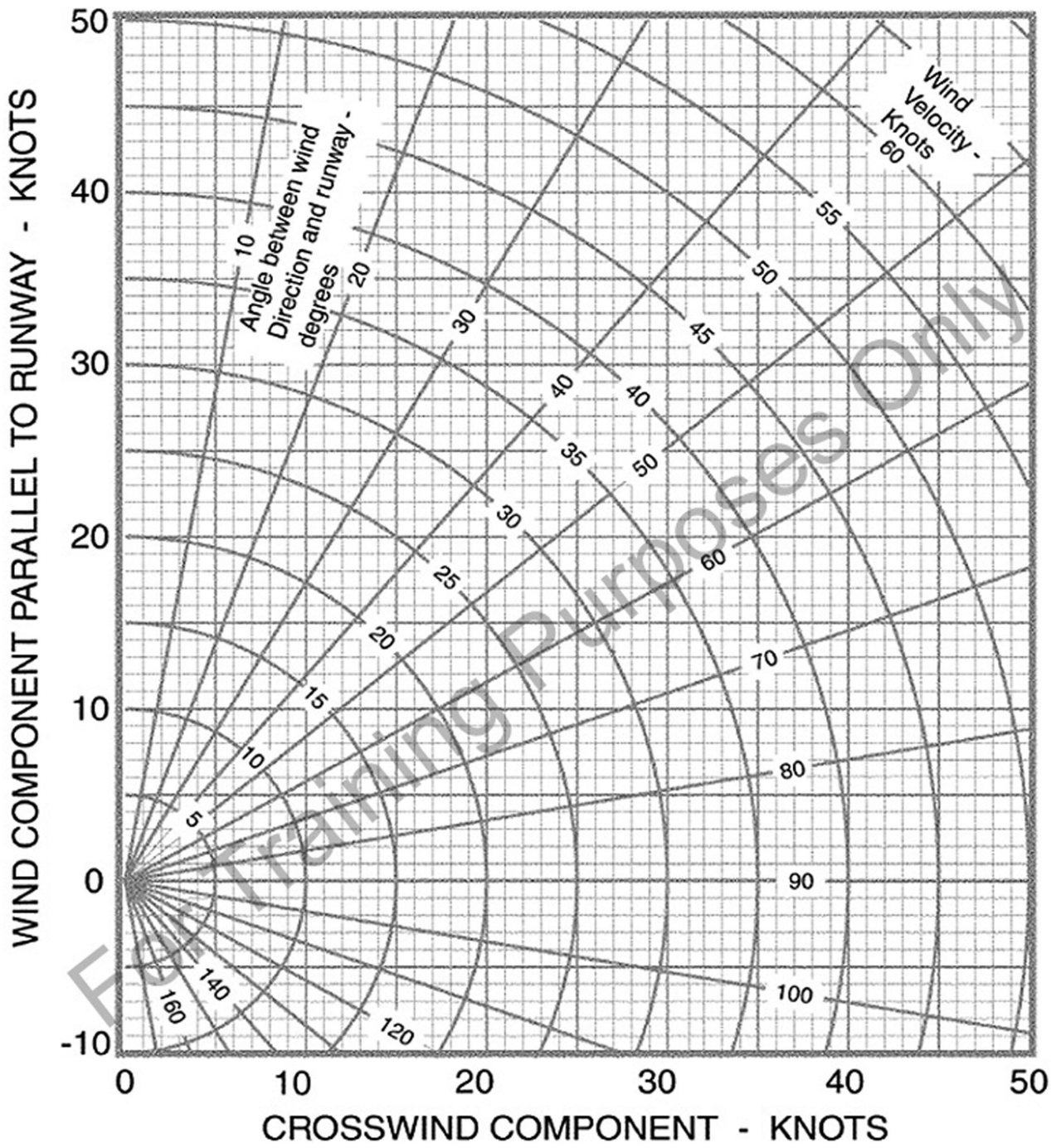
Flap Setting	Angle of Bank							
	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	63	78	68	84	75	93	89	110
10°	60	70	64	75	71	83	85	99
20°	54	64	58	69	64	76	76	91
FULL	50	61	54	66	59	73	71	86

NOTE

1. Altitude loss during a stall recovery may be as much as 300 feet from a wings-level stall, and even greater from a turning stall.
2. KIAS values are approximate.

Figure 390

WIND COMPONENTS



Note: Maximum demonstrated crosswind velocity is 20 knots (not a limitation).

Figure 391

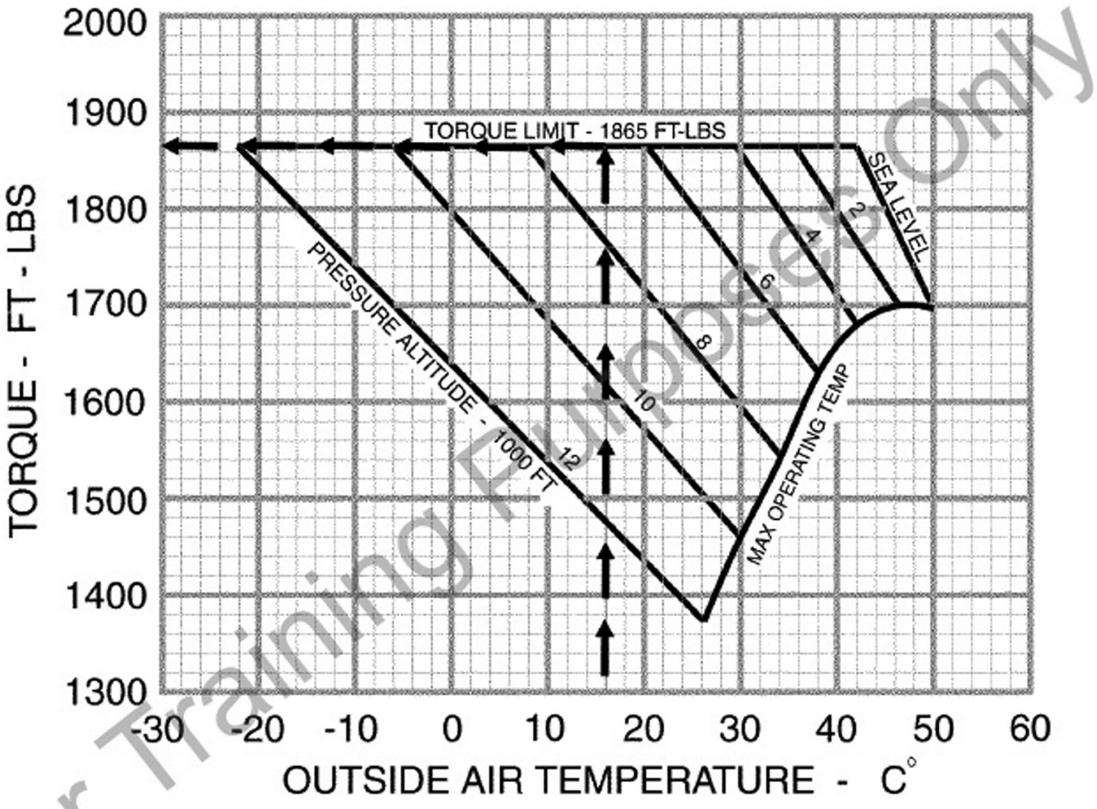
MAXIMUM ENGINE TORQUE FOR TAKEOFF

CONDITIONS:

1900 RPM

60 KIAS

INERTIAL SEPARATOR **NORMAL**



NOTE

1. Torque increases approximately 10 Ft-Lbs from 0 to 60 KIAS.
2. Torque on this chart shall be achieved without exceeding 805°C ITT or 101.6 percent N_g. When the ITT exceeds 765°C, this power setting is time limited to 5 minutes.
3. With the inertial separator in BYPASS, where altitude and temperature do not permit 1865 Ft-Lbs for takeoff, decrease torque setting by 15 Ft-Lbs.
4. With the cabin heater ON, where altitude and temperature do not permit 1865 Ft-Lbs for takeoff, decrease torque setting by 65 Ft-Lbs.

Figure 392

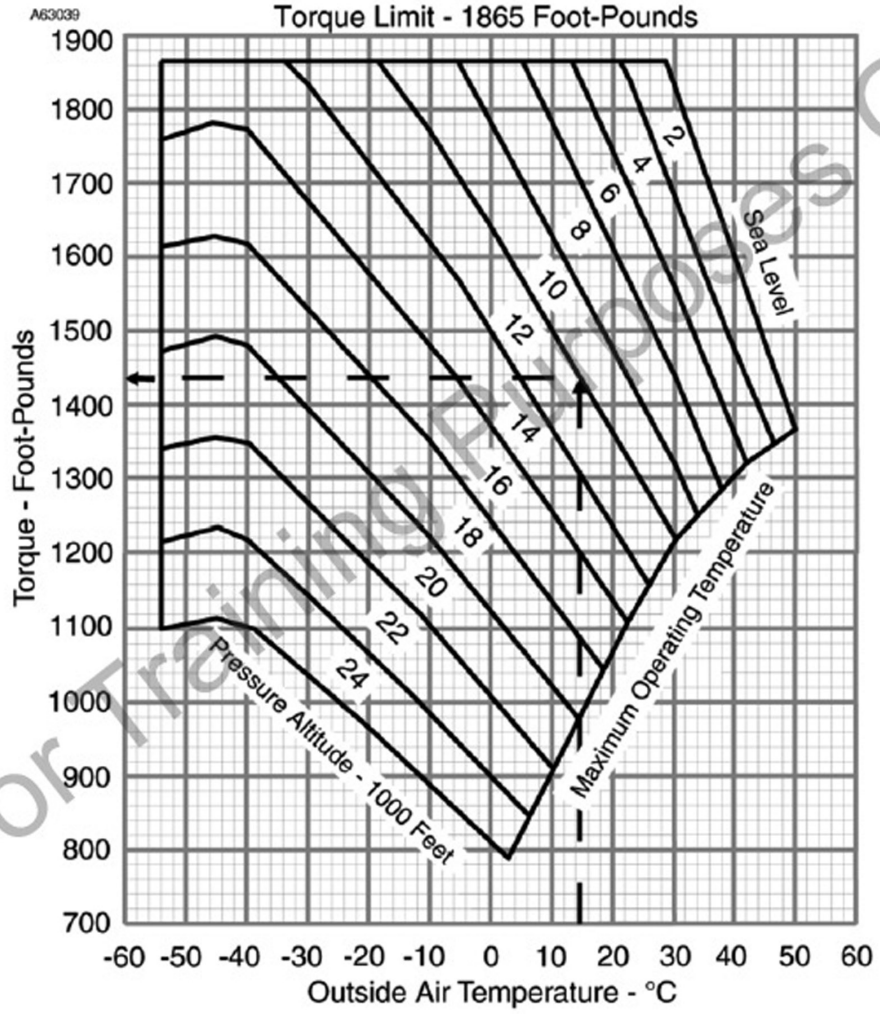
MAXIMUM ENGINE TORQUE FOR CLIMB

CONDITIONS:

1900 RPM

V_y KIAS

INERTIAL SEPARATOR **NORMAL**



NOTE

1. Torque on this chart shall be achieved without exceeding 765°C ITT or 101.6 percent N_g.
2. With the inertial separator in BYPASS, decrease torque setting by 100 Ft-Lbs.
3. With the cabin heater ON, decrease torque setting by 80 Ft-Lbs.

Figure 393

CARGO POD INSTALLED
SHORT FIELD TAKEOFF DISTANCE

NOTE

The following general information is applicable to all SHORT FIELD TAKEOFF DISTANCE Charts.

1. Use short field takeoff technique as specified in Section 4.
2. Decrease distances by 10% for each 11 knots headwind. For operation with tailwind up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distances by 15% of the "Ground Roll" figure.
4. With takeoff power set below the torque limit (1865 foot-pounds), increase distances (both ground roll and total distance) by 3% for INERTIAL SEPARATOR in BYPASS and increase ground roll by 5% and total distance by 10% for CABIN HEAT ON.
5. Where distance values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those distances which are included but the operation slightly exceeds the temperature limit are provided for interpolation purposes only.
6. For operation above 40°C and below the operating temperature limits, increase distances at 40°C by 20%.

Figure 394

CARGO POD INSTALLED
SHORT FIELD TAKEOFF DISTANCE

CONDITIONS:
Flaps **20°**
1900 RPM — Torque Set Per Figure 5-8
CABIN HEAT **OFF** — Paved, Level, Dry Runway
INERTIAL SEPARATOR **NORMAL** — Zero Wind
Refer to Sheet 1 for appropriate notes applicable to this chart.

Lift Off: 70 KIAS
8750 Pounds: Speed at 50 Feet: 83 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1205	2160	1280	2295	1365	2430
2000	1360	2430	1455	2580	1545	2740
4000	1550	2745	1655	2920	1760	3105
6000	1765	3115	1890	3325	2015	3540
8000	2025	3560	2165	3805	2345	4125
10,000	2335	4090	2585	4580	2930	5325
12,000	2875	5155	3270	6030	3745	7175

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	1445	2570	1535	2720	1625	2870
2000	1645	2905	1745	3075	1910	3400
4000	1875	3295	1995	3510	2290	4135
6000	2145	3765	2435	4370	2805	5195
8000	2670	4815	3065	5715	3565	7005
10,000	3370	6350	3915	7790	---	---
12,000	4350	8865	5130	11,755	---	---

Figure 395

CARGO POD INSTALLED
FLAPS UP TAKEOFF DISTANCE

NOTE

The following general information is applicable to all FLAPS UP TAKEOFF DISTANCE Charts.

1. Use Type II, Type III, or Type IV anti-ice fluid takeoff technique as specified in Section 4.
2. Decrease distances by 10% for each 11 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distances by 15% of the "Ground Roll" figure.
4. With takeoff power set below the torque limit (1865 foot-pounds), increase distances (both ground roll and total distance) by 3% for INERTIAL SEPARATOR in BYPASS and increase ground roll by 5% and total distance by 10% for CABIN HEAT ON.

Figure 396

CARGO POD INSTALLED
RATE OF CLIMB - TAKEOFF FLAP SETTING
FLAPS 20°

CONDITIONS:
Takeoff Power
1900 RPM

INERTIAL SEPARATOR **NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Rate of Climb - Feet Per Minute (FPM)				
			-40°C	-20°C	0°C	20°C	40°C
8750	Sea Level	92	875	855	835	815	795
	2000	90	860	835	815	795	730
	4000	89	835	815	790	765	645
	6000	88	815	790	765	740	555
	8000	87	785	760	735	620	435
	10,000	85	760	730	665	500	---
	12,000	84	725	680	540	380	---
8300	Sea Level	91	955	940	920	900	880
	2000	89	940	920	895	875	810
	4000	88	915	895	870	850	725
	6000	86	895	870	845	820	630
	8000	85	865	840	815	700	505
	10,000	84	835	810	745	575	---
	12,000	82	805	760	615	450	---
7800	Sea Level	89	1055	1035	1020	1000	980
	2000	87	1035	1015	995	975	910
	4000	86	1015	995	970	950	820
	6000	85	990	965	945	920	720
	8000	83	965	940	915	795	595
	10,000	82	935	905	840	665	---
	12,000	80	905	855	710	540	---
7300	Sea Level	88	1160	1145	1130	1110	1090
	2000	86	1145	1125	1105	1085	1020
	4000	85	1125	1105	1080	1060	925
	6000	84	1100	1075	1055	1030	825
	8000	82	1075	1050	1025	900	690
	10,000	81	1045	1015	950	765	---
	12,000	79	1015	965	810	635	---

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NOTE

1. **Do not exceed torque limit for takeoff per MAXIMUM ENGINE TORQUE FOR TAKEOFF chart. When ITT exceeds 765°C, this power setting is time limited to 5 minutes.**
2. With climb power set below the torque limit, decrese rate of climb by 20 FPM for INERTIAL SEPARATOR set in BYPASS and 45 FPM for CABIN HEAT ON.
3. Where rate of climb values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those rates of climb which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 397

CARGO POD INSTALLED
CLIMB GRADIENT - TAKEOFF
FLAPS UP

CONDITIONS:
Takeoff Power — Zero Wind
1900 RPM — INERTIAL SEPARATOR **NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Climb Gradient - Feet/Nautical Mile (FT/NM)				
			-40°C	-20°C	0°C	20°C	40°C
8750	Sea Level	68	735	695	655	620	475
	2000	69	695	655	615	580	390
	4000	69	660	615	580	500	305
	6000	70	620	580	545	410	230
	8000	70	580	540	475	330	165
	10,000	71	545	505	390	250	---
	12,000	72	505	420	305	180	---
8300	Sea Level	66	810	770	725	690	535
	2000	66	770	730	685	650	445
	4000	67	730	690	650	565	360
	6000	68	690	645	610	470	280
	8000	68	650	605	540	380	210
	10,000	69	610	570	445	300	---
	12,000	69	570	475	355	225	---
7800	Sea Level	61	910	860	815	775	615
	2000	62	865	820	775	735	515
	4000	62	820	775	730	640	425
	6000	62	780	730	690	540	340
	8000	63	735	690	615	445	265
	10,000	63	690	645	515	360	---
	12,000	63	645	550	420	280	---
7300	Sea Level	59	1020	970	920	875	700
	2000	59	975	920	875	830	595
	4000	59	925	875	830	730	500
	6000	59	880	830	780	620	405
	8000	59	830	780	700	520	330
	10,000	59	785	735	595	430	---
	12,000	59	735	630	490	340	---

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NOTE

1. **Do not exceed torque limit for takeoff per MAXIMUM ENGINE TORQUE FOR TAKEOFF chart. When ITT exceeds 765°C, this power setting is time limited to 5 minutes.**
2. With climb power set below the torque limit, decrease climb gradient by 10 FT/NM for INERTIAL SEPARATOR set in BYPASS and 40 FT/NM for CABIN HEAT ON.
3. Where climb gradient values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those climb gradients which are included, but the operation slightly exceeds the temperature limit, are provided for interpolation purposes only.

Figure 398

CARGO POD INSTALLED
TIME, FUEL, AND DISTANCE TO CLIMB
MAXIMUM RATE OF CLIMB

CONDITIONS:

Flaps **UP** — Zero Wind

1900 RPM — INERTIAL SEPARATOR **NORMAL**

Weight Pounds	Pressure Altitude Feet	Climb Speed KIAS	Climb From Sea Level								
			20°C Below Standard			Standard Temperature			20°C Above Standard		
			Time min	Fuel Lbs	Dist NM	Time min	Fuel Lbs	Dist NM	Time min	Fuel Lbs	Dist NM
8750	Sea Level	104	0	0	0	0	0	0	0	0	0
	4000	104	4	32	8	5	33	8	6	38	10
	8000	104	9	64	16	9	66	17	12	80	24
	12,000	102	14	98	25	15	105	29	22	132	43
	16,000	96	20	136	37	23	152	45	35	202	71
	20,000	88	28	186	54	36	219	72	69	349	142
	24,000	79	49	278	93	75	388	152	---	---	---
8300	Sea Level	103	0	0	0	0	0	0	0	0	0
	4000	103	4	29	7	4	30	7	5	34	9
	8000	103	8	58	14	8	60	15	11	72	21
	12,000	101	13	89	23	14	95	26	19	116	37
	16,000	95	18	123	33	21	135	40	30	172	60
	20,000	87	25	165	47	31	189	61	51	265	104
	24,000	77	40	233	76	54	287	106	---	---	---
7800	Sea Level	101	0	0	0	0	0	0	0	0	0
	4000	101	4	26	6	4	27	6	4	30	8
	8000	101	7	52	13	8	54	14	10	63	18
	12,000	99	11	80	20	12	84	22	16	100	31
	16,000	92	16	110	29	18	119	34	25	145	49
	20,000	84	22	146	41	27	163	51	40	210	79
	24,000	74	33	198	62	42	229	81	88	395	178
7300	Sea Level	99	0	0	0	0	0	0	0	0	0
	4000	99	3	24	5	3	24	6	4	27	7
	8000	99	7	47	11	7	49	12	9	55	16
	12,000	97	10	72	18	11	75	20	14	87	27
	16,000	89	14	99	25	16	105	30	21	124	41
	20,000	80	20	129	35	23	141	43	32	173	63
	24,000	70	29	171	52	34	191	65	55	260	108

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NOTE

1. **Torque set at 1865 foot-pounds or lesser value must not exceed maximum climb ITT of 765°C or Ng of 101.6%.**
2. Add 35 pounds of fuel for engine start, taxi, and takeoff allowances.
3. With INERTIAL SEPARATOR set in BYPASS, increase time, fuel, and distance numbers by 1% for each 2000 feet of climb and for CABIN HEAT ON, increase time, fuel, and distance numbers by 1% for each 1000 feet of climb.
4. Where time, fuel, and distance values have been replaced by dashes, an appreciable rate of climb for the weight shown cannot be expected.

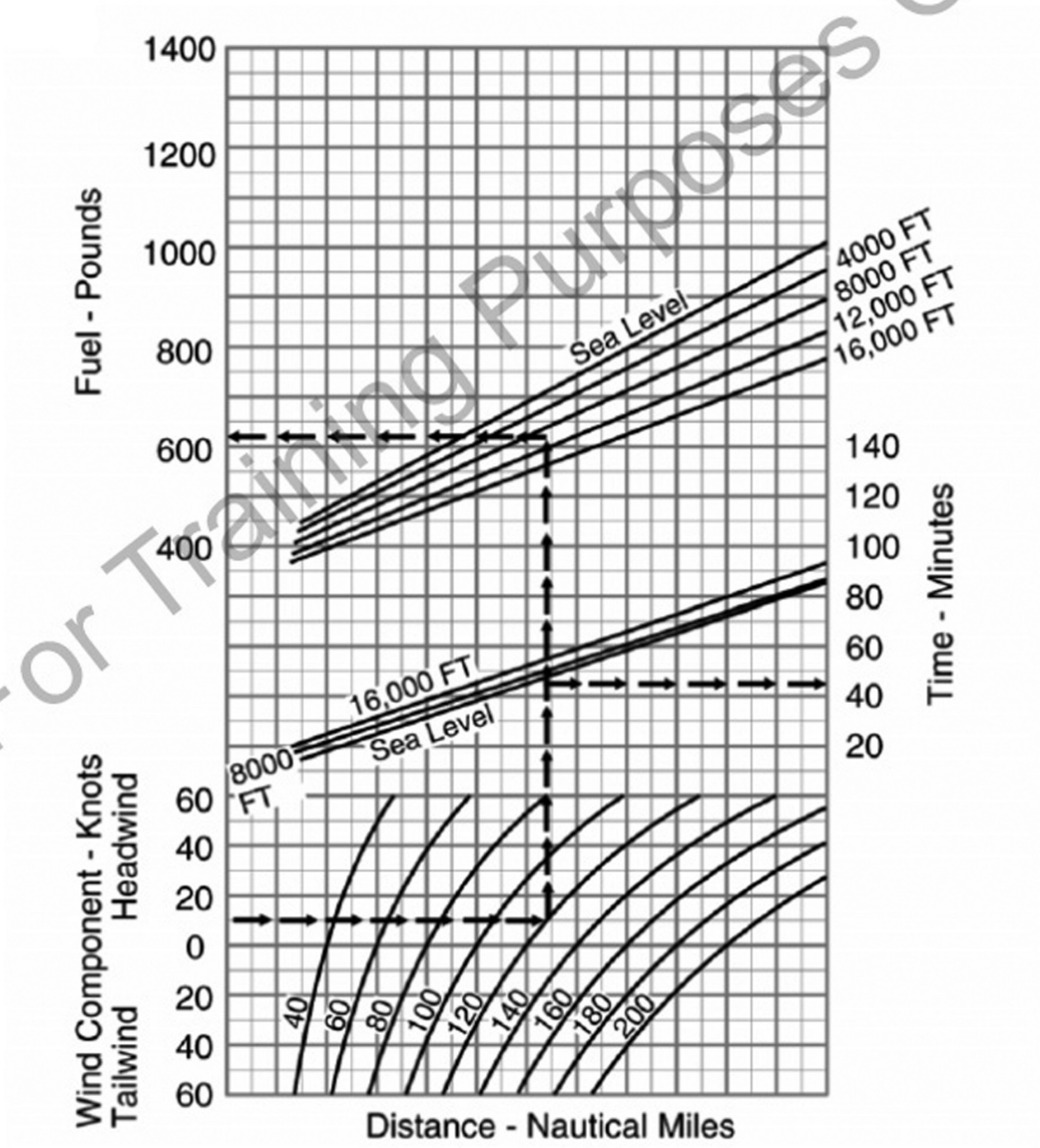
Figure 399

CARGO POD INSTALLED
FUEL AND TIME REQUIRED

MAXIMUM CRUISE POWER (40-200 Nautical Miles)

CONDITIONS:

8750 Pounds	Standard Temperature
1900 RPM	INERTIAL SEPARATOR **NORMAL**



NOTE

1. Fuel required includes the fuel used for engine start, taxi, takeoff, maximum climb from sea level, descent to sea level and 45 minutes reserve. Time required includes the time during a maximum climb and descent.
2. With INERTIAL SEPARATOR in BYPAS, increase time by 4% and fuel by 2% or CABIN HEAT ON, increase time by 3% and fuel by 2%.

Figure 400

CARGO POD INSTALLED
SHORT FIELD LANDING DISTANCE

NOTE

The following general information is applicable to all SHORT FIELD LANDING DISTANCE Charts.

1. Use short field landing technique as specified in Section 4.
2. Decrease distances by 10% for each 11 knots headwind. For operation with tailwind up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distances by 40% of the "Ground Roll" figure.
4. If a landing with flaps UP is necessary, increase the approach speed by 15 KIAS and allow for 40% longer distances.
5. Use of maximum reverse thrust after touchdown reduces ground roll distance by approximately 10%.
6. Where distance values have been replaced by dashes, operating temperature limits of the airplane would be greatly exceeded. Those distances which are included but the operation slightly exceeds the temperature limit are provided for interpolation purposes only.

Figure 401

CARGO POD INSTALLED
SHORT FIELD LANDING DISTANCE

CONDITIONS:

Flaps **FULL**
Zero Wind
Maximum Braking
PROP RPM Lever **MAX**
Paved, Level, Dry Runway

POWER Lever **IDLE** after clearing obstacles. **BETA** range (lever against spring) after touchdown.

Refer to Sheet 1 for appropriate notes applicable to this chart.

8500 Pounds: Speed at 50 Feet: 78 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	835	1625	865	1670	900	1715
2000	900	1715	935	1765	965	1815
4000	965	1815	1005	1865	1040	1920
6000	1040	1920	1080	1975	1120	2030
8000	1125	2035	1165	2095	1210	2155
10,000	1215	2160	1260	2220	1305	2285
12,000	1310	2295	1360	2360	1410	2430

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	930	1765	965	1810	995	1855
2000	1000	1860	1035	1910	1070	1960
4000	1075	1970	1115	2020	1150	2070
6000	1160	2085	1200	2140	1240	2195
8000	1250	2210	1295	2270	1340	2330
10,000	1350	2345	1400	2410	---	---
12,000	1460	2495	1510	2560	---	---

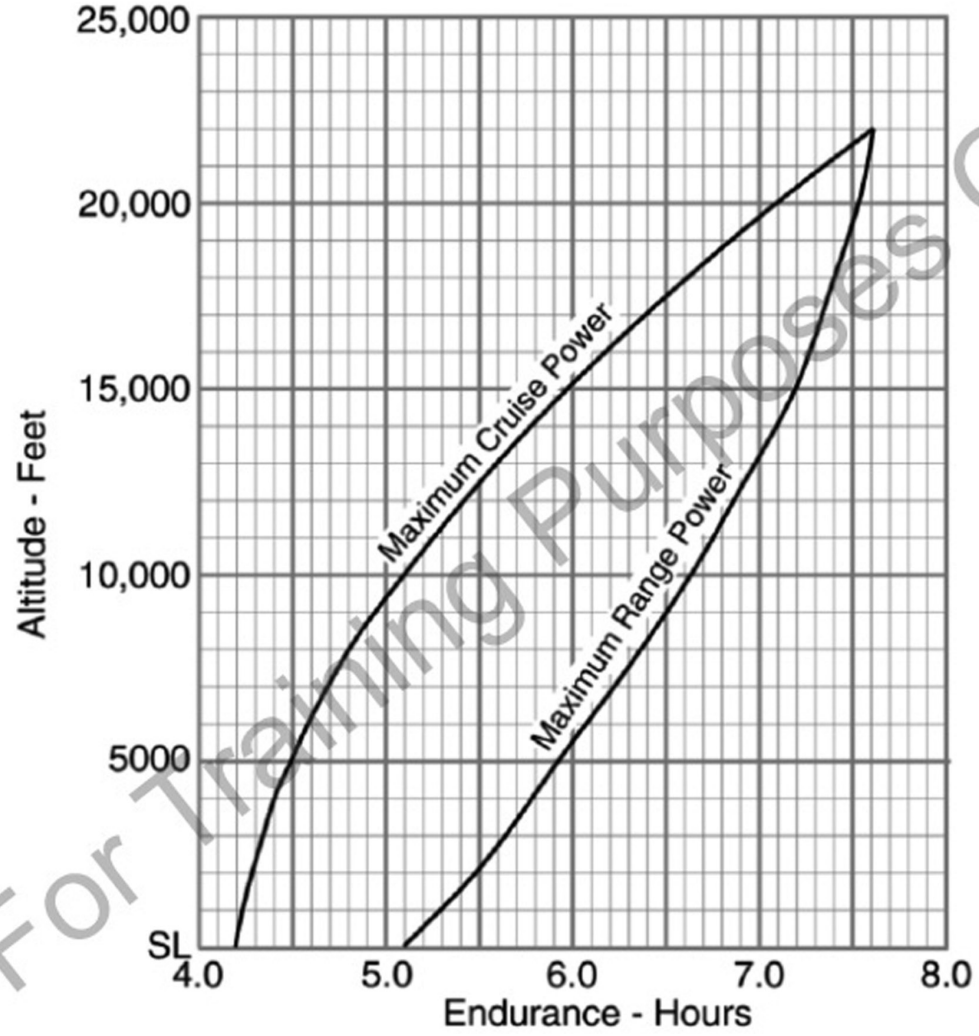
Figure 402

WITHOUT CARGO POD

ENDURANCE PROFILE
45 MINUTES RESERVE
2224 POUNDS USABLE FUEL

CONDITIONS:

8750 Pounds	Standard Temperature
1900 RPM	INERTIAL SEPARATOR **NORMAL**



NOTE

1. This chart allows for the fuel used for engine start, taxi, takeoff, climb and descent. The time during a maximum climb and the time during descent are included.
2. With INERTIAL SEPARATOR in BYPASS, decrease endurance by 2%, or CABIN HEAT ON, decrease endurance by 3%.

Figure 403

WEIGHT AND BALANCE RECORD (LOAD MANIFEST)

CESSNA 208B WEIGHT AND BALANCE RECORD

DEP. DATE 2 | ORIGIN | AIRCRAFT NO.
FLIGHT NO. | DESTINATION

ITEM			ITEM WEIGHT	ITEM INDEX	WEIGHT INDICES																										
	ZONE	MAX. LOAD			25	50	75	100	150	200	250	300	350	400	500	600	700	800	900	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3100
CABIN	1	1780			999	998	997	996	994	992	990	988	986	984	980	976	972	968	964	960	952	944	936	928							
	2	3100			1	3	4	5	8	10	13	15	18	21	26	31	36	41	48	52	62	72	83	93	103	114	124	134	144	155	160
	3	1900			4	7	11	14	22	29	38	43	51	58	72	87	101	116	130	145	174	203	232	261	290						
CARGO	4	1380			5	10	15	21	31	41	51	62	72	82	103	123	144	164	185	205	246	287									
	5	1270			6	13	19	26	38	51	64	77	89	102	128	153	179	204	230	255	305	387									
	6	320			8	15	23	30	46	61	76	91	108																		
	TOTAL	3400																													
POD	A	230			997	994	991	988	982	976	970																				
	B	310			000	999	999	998	997	996	996	994	993																		
	C	270			2	4	6	8	12	17	21	25	21																		
	D	280			5	10	14	19	29	38	48	57																			
PILOT & FLT KIT	+				997	994	992	989	983	977	972	968																			
OBSERVER	+				997	994	992	989	983	977	972	968																			
TKS FLUID	+																														
TOTAL PAYLOAD	-																														
A/C EMPTY WT.	+																														
ZERO FUEL WEIGHT	-																														
T.O. FUEL	+																														
T.O. WEIGHT	-																														
MAX ALLOWABLE T.O. WEIGHT	-																														
TAXI FUEL	-																														
RAMP WEIGHT	-																														

ENTER ONLY LAST THREE DIGITS OF THE TOTAL IN ITEM INDEX COLUMNS

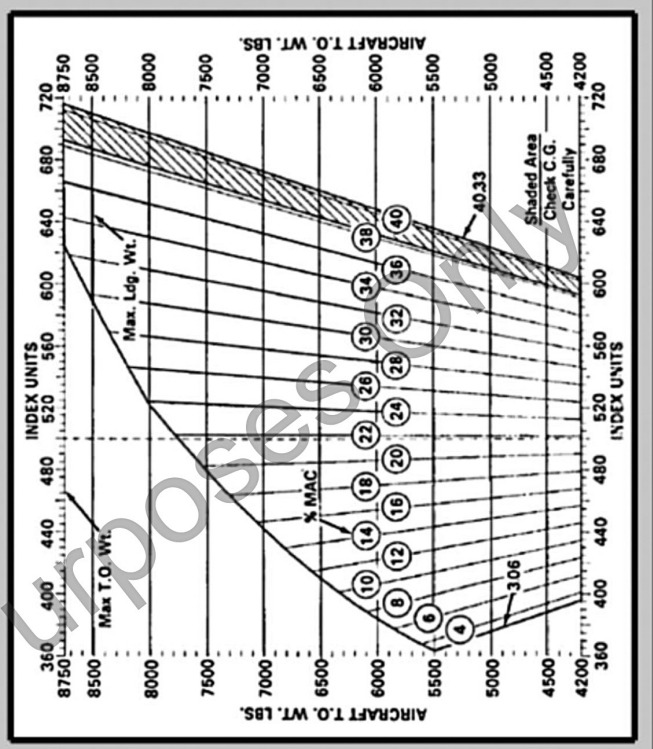
C.O.% MAC

C.O.% MAC

NOTES:

FUEL INDICES

WT.	INDEX	WT.	INDEX	WT.	INDEX	WT.	INDEX	WT.	INDEX	WT.	INDEX
50	1	500	11	950	21	1400	32	1850	42		
100	2	550	12	1000	23	1450	33	1900	43		
150	3	600	13	1050	24	1500	34	1950	44		
200	4	650	14	1100	25	1550	35	2000	45		
250	5	700	16	1150	26	1600	36	2050	46		
300	7	750	17	1200	27	1650	37	2100	47		
350	8	800	18	1250	28	1700	38	2150	48		
400	9	850	19	1300	29	1750	39	2200	49		
450	10	900	20	1350	31	1800	40	2224	49		



ALL FAA AND COMPANY LOADING LIMITATIONS AND WEIGHT AND BALANCE REQUIREMENTS SATISFIED IN ACCORDANCE WITH FAR 135.430 AND 125.299C.

FLIGHT CREWMEMBER (SIGNATURE) | EMPLOYEE NO

Figure 404

WEIGHT AND BALANCE RECORD (LOAD MANIFEST)

MAXIMUM STRUCTURAL WEIGHTS	
MAX RAMP	8785 LBS
MAX TAKEOFF	8750 LBS
MAX LANDING	8500 LBS

INDEX FORMULA

BASIC AIRPLANE INDEX = $\frac{WT\ (ARM - 192)}{500}$ + 500	
LOAD ITEM INDEX = $\frac{WT\ (ARM - 192)}{500}$	= (IF NEG. SUBTRACT FROM 1000)

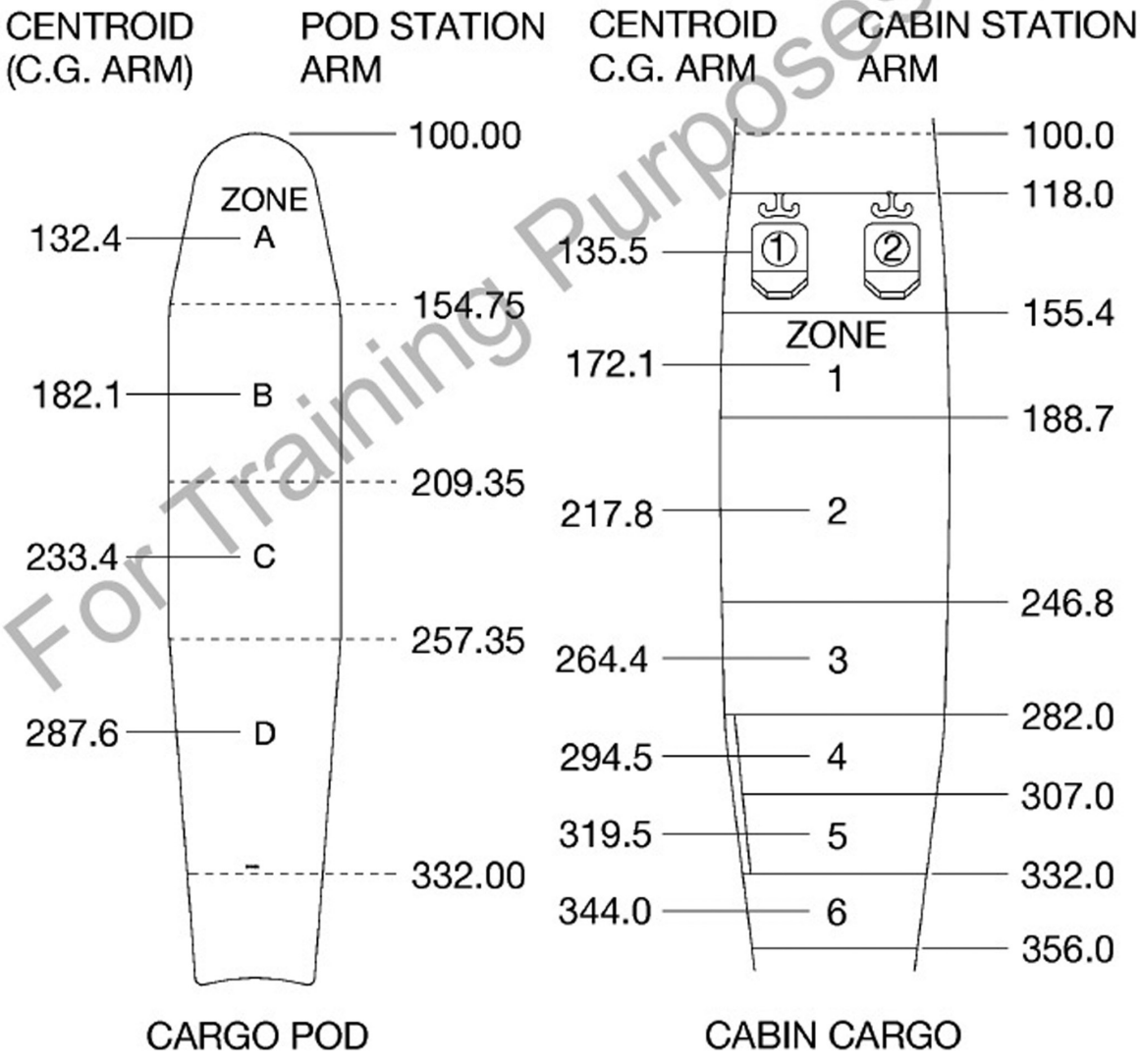


Figure 405

CARGO POD

The airplane may be equipped with a 111.5 cubic foot capacity cargo pod attached to the bottom of the fuselage. The pod is divided into four compartments (identified as Zones A, B, C, and D) by bulkheads and has a maximum floor loading of 30 pounds per square foot and maximum load weight limit of 1090 pounds. Each compartment has a loading door located on the left side of the pod. The doors are hinged at the bottom, and each has two latches. When the latch handles are rotated to the horizontal position with the doors closed, the doors are secured. Refer to the Pod Internal Dimension and Load Markings and Cargo Pod Loading Arrangements figures for additional details.

MAXIMUM ZONE/COMPARTMENT LOADINGS

Maximum zone loadings are as follows:

			WEIGHT LIMITS (Pounds)		
	ZONE/ COMPART-MENT	VOLUME (CUBIC FEET)	*SECURED BY TIE-DOWNS	**UNSECURED USING PARTITIONS OR IN CARGO POD	C.G. (STATION LOCATION)
FUSELAGE	1	52.9	1780	415	172.1
	2	109.0	3100	860	217.8
	3	63.0	1900	495	264.4
	4	43.5	1380	340	294.5
	5	40.1	1270	315	319.5
	6	31.5	320	245	344.0
CARGO POD	A	23.4	- - -	230	132.4
	B	31.5	- - -	310	182.1
	C	27.8	- - -	270	233.4
	D	28.8	- - -	280	287.6

* THIS IS THE MAXIMUM CARGO ALLOWED IN THE BAY INDICATED.

**DENSITY MUST BE 7.9 LBS/FT^3 OR LESS AND BAY 75% OR MORE FULL.

Figure 406

CABIN INTERNAL LOAD MARKINGS (CARGO VERSION)

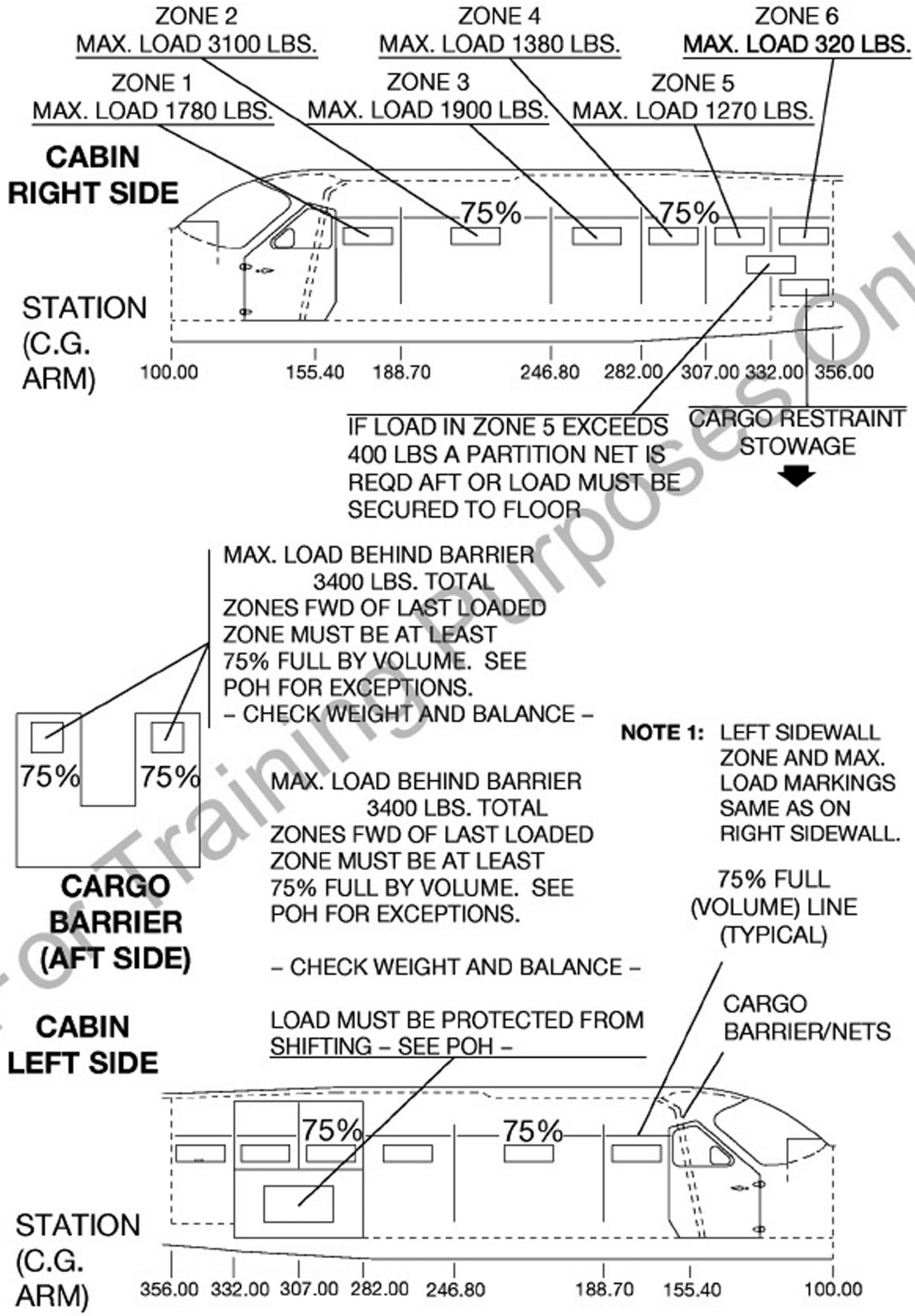
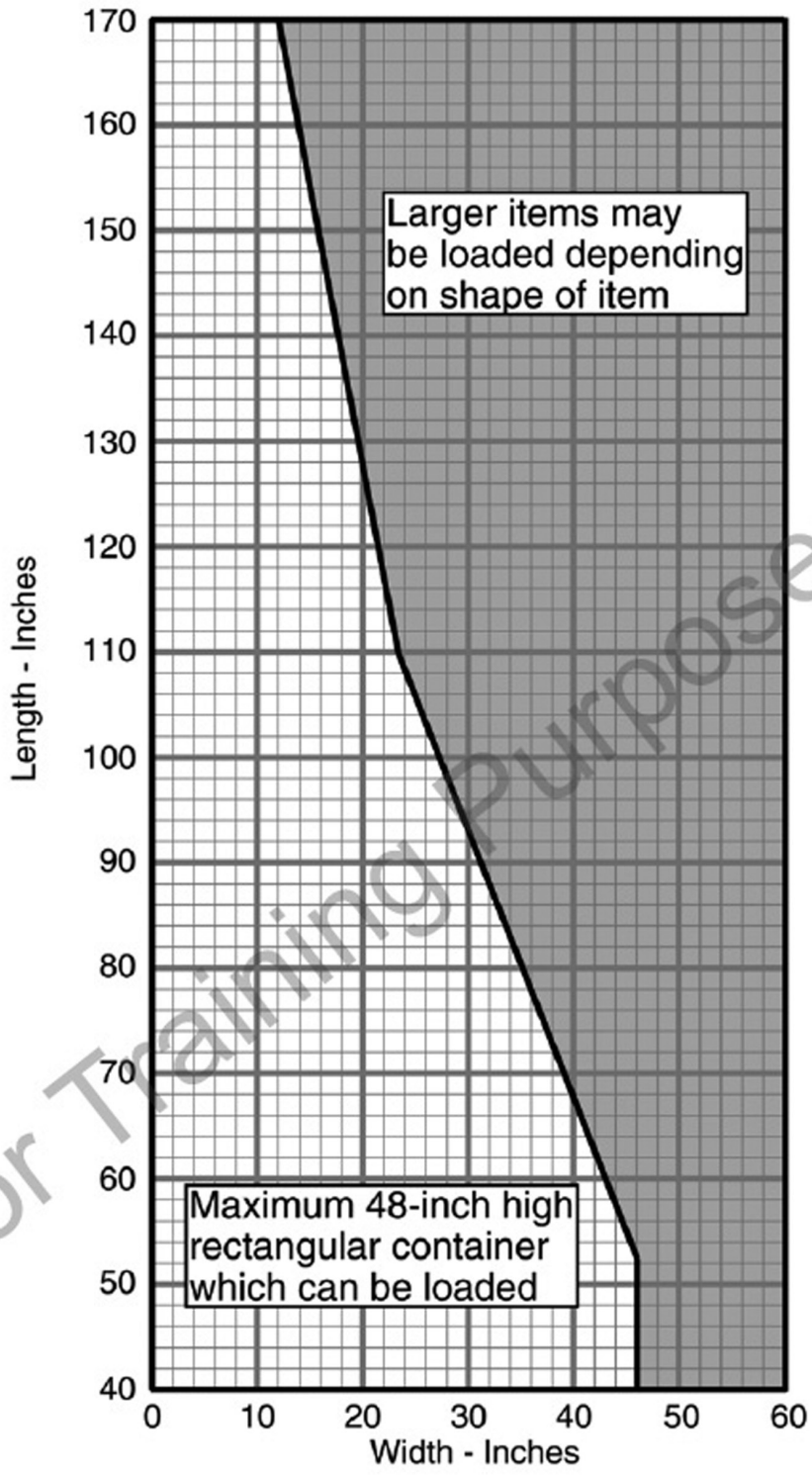


Figure 407

MAXIMUM CARGO SIZES



NOTE

1. Approximately one inch clearance allowed from sidewall and ceiling.
2. Subtract roller height and pallet thickness, if applicable.

Figure 408

CARGO POD INSTALLED
SHORT FIELD LANDING DISTANCE

CONDITIONS:
Flaps **FULL**
Zero Wind
Maximum Braking
PROP RPM Lever **MAX**
Paved, Level, Dry Runway

POWER Lever **IDLE** after clearing obstacles. **BETA** range (lever against spring) after touchdown.

Refer to Sheet 1 for appropriate notes applicable to this chart.

8500 Pounds: Speed at 50 Feet: 78 KIAS

Pressure Altitude Feet	-10°C		0°C		10°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	835	1625	865	1670	900	1715
2000	900	1715	935	1765	965	1815
4000	965	1815	1005	1865	1040	1920
6000	1040	1920	1080	1975	1120	2030
8000	1125	2035	1165	2095	1210	2155
10,000	1215	2160	1260	2220	1305	2285
12,000	1310	2295	1360	2360	1410	2430

Pressure Altitude Feet	20°C		30°C		40°C	
	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst	Grnd Roll Feet	Total Dist To Clear 50 Foot Obst
Sea Level	930	1765	965	1810	995	1855
2000	1000	1860	1035	1910	1070	1960
4000	1075	1970	1115	2020	1150	2070
6000	1160	2085	1200	2140	1240	2195
8000	1250	2210	1295	2270	1340	2330
10,000	1350	2345	1400	2410	---	---
12,000	1460	2495	1510	2560	---	---

Figure 409

WEIGHT AND MOMENT TABLES
10 PLACE COMMUTER
Crew and Passengers
(Single Commuter Seating)

Weight Pounds	Pilot/ Front Passenger Seats 1 and 2 (Arm = 135.5 Inch)	Aft Passengers Seats			
		3 and 4 (Arm = 173.9 Inch)	5 and 6 (Arm = 209.9 Inch)	7 and 8 (Arm = 245.9 Inch)	9 and 10 (Arm = 281.9 Inch)
	Moment (Inch-Pound/1000)				
1	0.1	0.2	0.2	0.2	0.3
2	0.3	0.3	0.4	0.5	0.6
3	0.4	0.5	0.6	0.7	0.8
4	0.5	0.7	0.8	1.0	1.1
5	0.7	0.9	1.0	1.2	1.4
6	0.8	1.0	1.3	1.5	1.7
7	0.9	1.2	1.5	1.7	2.0
8	1.1	1.4	1.7	2.0	2.3
9	1.2	1.6	1.9	2.2	2.5
10	1.4	1.7	2.1	2.5	2.8
20	2.7	3.5	4.2	4.9	5.6
30	4.1	5.2	6.3	7.4	8.5
40	5.4	7.0	8.4	9.8	11.3
50	6.8	8.7	10.5	12.3	14.1
60	8.1	10.4	12.6	14.8	16.9
70	9.5	12.2	14.7	17.2	19.7
80	10.8	13.9	16.8	19.7	22.6
90	12.2	15.7	18.9	22.1	25.4
100	13.6	17.4	21.0	24.6	28.2
200	27.1	34.8	42.0	49.2	56.4
300	40.7	52.2	63.0	73.8	84.6

EXAMPLE:

To obtain moments for a 185 pounds paasenger in seat 5, add moments shown for 100 pounds (21.0), 80 pounds (16.8), and 5 pounds (1.0) for a total moment of 38.8 inch-pound/1000.

NOTE

The airplane may be configured with left single commuter seats installed on the right side, and right single commuter seats installed on the left side. Actual seat location should be noted when computing airplane weight and balance.

Figure 410

WEIGHT AND MOMENT TABLES

FUEL (JET FUEL WITH DENSITY OF 6.7 POUNDS/GALLON AT 60°F)

Gallons	Weight Pounds	Moment Inch-Pound/1000 (Arm Varies)	Gallons	Weight Pounds	Moment Inch-Pound/1000 (Arm Varies)
5	34	6.8	175	1173	238.4
10	67	13.6	180	1206	245.2
15	101	20.4	185	1240	252.0
20	134	27.2	190	1273	258.8
25	168	34.0	195	1307	265.7
30	201	40.8	200	1340	272.5
35	235	47.6	205	1374	279.3
40	268	54.4	210	1407	286.1
45	302	61.2	215	1441	292.9
50	335	68.0	220	1474	299.7
55	369	74.8	225	1508	306.5
60	402	81.6	230	1541	313.3
65	436	88.4	235	1575	320.1
70	469	95.2	240	1608	326.9
75	503	102.0	245	1642	333.7
80	536	108.8	250	1675	340.5
85	570	115.7	255	1709	347.3
90	603	122.5	260	1742	354.1
95	637	129.3	265	1776	360.9
100	670	136.1	270	1809	367.7
105	704	142.9	275	1843	374.5
110	737	149.7	280	1876	381.2
115	771	156.6	285	1910	388.0
120	804	163.4	290	1943	394.8
125	838	170.2	295	1977	401.6
130	871	177.0	300	2010	408.4
135	905	183.8	305	2044	415.2
140	938	190.6	310	2077	422.0
145	972	197.5	315	2111	428.8
150	1005	204.3	320	2144	435.6
155	1039	211.1	325	2178	442.4
160	1072	217.9	327	2189	444.7
165	1106	224.7	330	2211	449.1
170	1139	231.5	332	2224	451.7

Figure 411

WEIGHT AND MOMENT TABLES

CARGO (CABIN LOCATIONS)

Weight Pounds	Zone 1 (Arm = 172.1 Inch)	Zone 2 (Arm = 217.8 Inch)	Zone 3 (Arm = 264.4 Inch)	Zone 4 (Arm = 294.5 Inch)	Zone 5 (Arm = 319.5 Inch)	Zone 6 (Arm = 344.0 Inch)
	Moment (Inch-Pound/1000)					
1	0.2	0.2	0.3	0.3	0.3	0.3
2	0.3	0.4	0.5	0.6	0.6	0.7
3	0.5	0.7	0.8	0.9	1.0	1.0
4	0.7	0.9	1.1	1.2	1.3	1.4
5	0.9	1.1	1.3	1.5	1.6	1.7
6	1.0	1.3	1.6	1.8	1.9	2.1
7	1.2	1.5	1.9	2.1	2.2	2.4
8	1.4	1.7	2.1	2.4	2.6	2.8
9	1.5	2.0	2.4	2.7	2.9	3.1
10	1.7	2.2	2.6	2.9	3.2	3.4
20	3.4	4.4	5.3	5.9	6.4	6.9
30	5.2	6.5	7.9	8.8	9.6	10.3
40	6.9	8.7	10.6	11.8	12.8	13.8
50	8.6	10.9	13.2	14.7	16.0	17.2
60	10.3	13.1	15.9	17.7	19.2	20.6
70	12.0	15.2	18.5	20.6	22.4	24.1
80	13.8	17.4	21.2	23.6	25.6	27.5
90	15.5	19.6	23.8	26.5	28.8	31.0
100	17.2	21.8	26.4	29.5	32.0	34.4
200	34.4	43.6	52.9	58.9	63.9	68.8
300	51.6	65.3	79.3	88.4	95.9	103.2
400	68.8	87.1	105.8	117.8	127.8	
500	86.1	108.9	132.2	147.3	159.8	
600	103.3	130.7	158.6	176.7	191.7	
700	120.5	152.5	185.1	206.2	223.7	
800	137.7	174.2	211.5	235.6	255.6	
900	154.9	196.0	238.0	265.1	287.6	
1000	172.1	217.8	264.4	294.5	319.5	
2000		435.6				
3000		653.4				

EXAMPLE:

To obtain moments for 350 pounds of cargo in Zone 1, add moments shown in Zone 1 for 300 pounds (51.6) and 50 pounds (8.6) for a total moment of 60.2 inch-pound/1000.

Figure 412

WEIGHT AND MOMENT TABLES

CARGO (CARGO POD LOCATIONS)

Weight Pounds	Zone A (Arm = 132.4 Inch)	Zone B (Arm = 182.1 Inch)	Zone C (Arm = 233.4 Inch)	Zone D (Arm = 287.6 Inch)
	Moment (Inch-Pound/1000)			
1	0.1	0.2	0.2	0.3
2	0.3	0.4	0.5	0.6
3	0.4	0.5	0.7	0.9
4	0.5	0.7	0.9	1.2
5	0.7	0.9	1.2	1.4
6	0.8	1.1	1.4	1.7
7	0.9	1.3	1.6	2.0
8	1.1	1.5	1.9	2.3
9	1.2	1.6	2.1	2.6
10	1.3	1.8	2.3	2.9
20	2.6	3.6	4.7	5.8
30	4.0	5.5	7.0	8.6
40	5.3	7.3	9.3	11.5
50	6.6	9.1	11.7	14.4
60	7.9	10.9	14.0	17.3
70	9.3	12.7	16.3	20.1
80	10.6	14.6	18.7	23.0
90	11.9	16.4	21.0	25.9
100	13.2	18.2	23.3	28.8
200	26.5	36.4	46.7	57.5
300		54.6		

EXAMPLE:

To obtain moments for 48 pounds of cargo in Zone A, add moments shown in Zone A for 40 pounds (5.3) and 8 pounds (1.1) for a total moment of 6.4 inch-pound/1000.

Figure 413

SAMPLE LOADING PROBLEM

(CARGO LOADING SHOWN)	SAMPLE AIRPLANE		YOUR AIRPLANE	
	Weight Pounds	Moment Inch-Pound/1000	Weight Pounds	Moment Inch-Pound/1000
1. Basic Empty Weight (Use the data pertaining to your airplane as it is presently equipped (includes unusable fuel and full oil).	5005	929.4	5005	929.4
2. Usable Fuel (332 Gallons Max)	2224	451.7		
3. Pilot (Seat 1) (STA. 133.5 to 146.5)	170	23.1	200	
4. Front Passenger (Seat 2) (STA. 133.5 to 146.5)				
5. Aft Passengers (Commuter Seating):				
STA. 173.9				
STA. 209.9				
STA. 245.9				
STA. 281.9				
6. Baggage/Cargo (Cabin Locations):				
Zone 1 (STA. 155.40 to 188.70)	120	20.6		
Zone 2 (STA. 188.70 to 246.80)	416	90.6		
Zone 3 (STA. 246.80 to 282.00)	200	52.9		
Zone 4 (STA. 282.00 to 307.00)	200	58.9		
Zone 5 (STA. 307.00 to 332.00)	200	63.9		
Zone 6 (STA. 332.00 to 356.00)	50	17.2		
7. Baggage/Cargo (Cargo Pod Locations):				
Zone A (STA. 100.00 to 154.75)	50	6.6		
Zone B (STA. 154.75 to 209.35)	50	9.1		
Zone C (STA. 209.35 to 257.35)	50	11.7		
Zone D (STA. 257.35 to 332.00)	50	14.4		
8. **RAMP WEIGHT AND MOMENT**	8785	1750.1		
9. Fuel Allowance (for engine start, taxi, and runup)	-35	-7.0		
10. **TO WEIGHT AND MOMENT** (Subtract Step 9 from Step 8)	8750	1743.1		

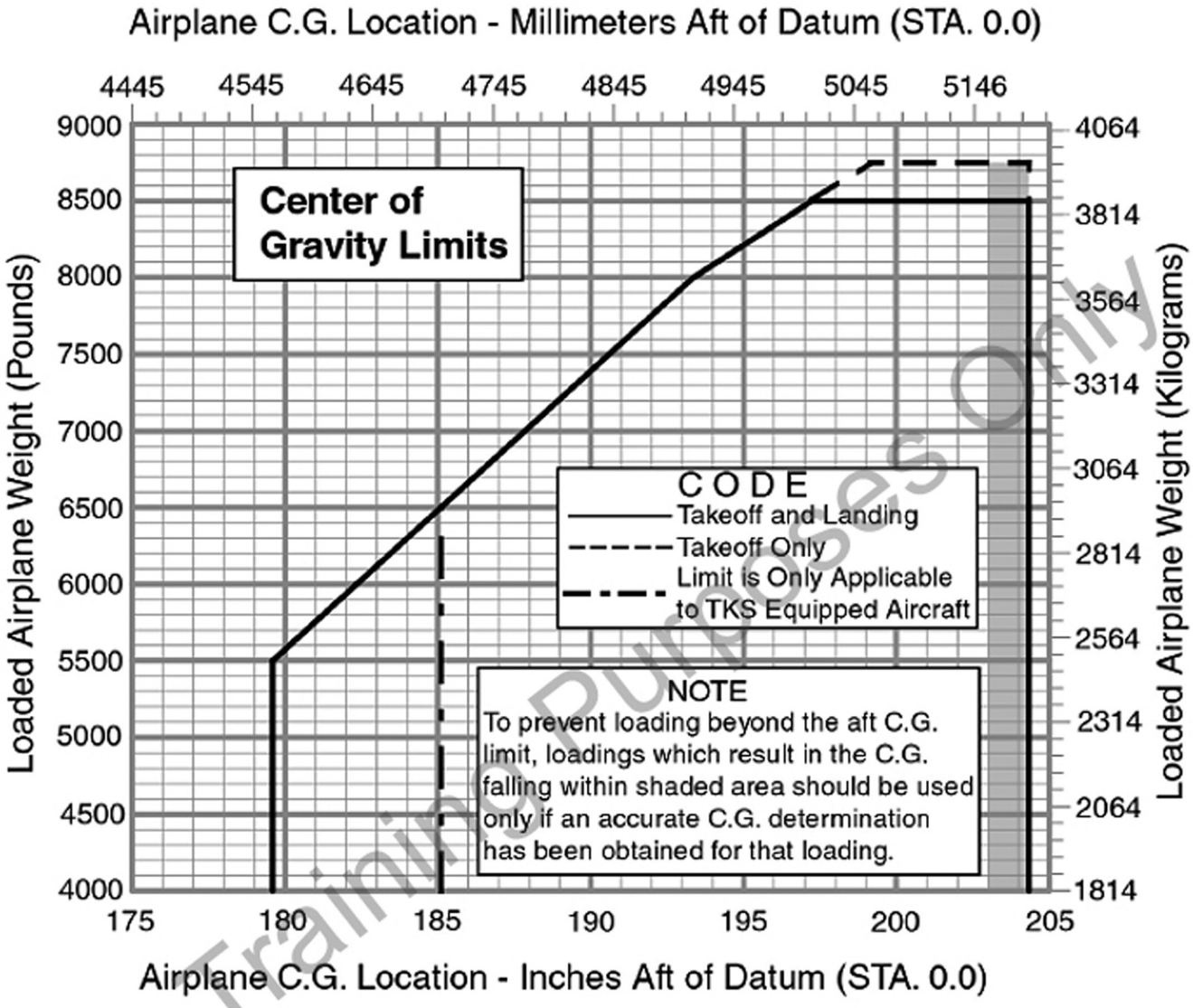
11. Locate this point (8750 at 1743.1) on the Center of Gravity Moment Envelope, and since this point falls within the envelope, the loading is acceptable.

NOTE

Refer to the Weight and Moment Tables for weight and moment of crew, passengers, usable fuel, and cargo being carried. Refer to Cabin Internal Loading Arrangements for aft passengers seating arrangements.

Figure 414

CENTER OF GRAVITY LIMITS

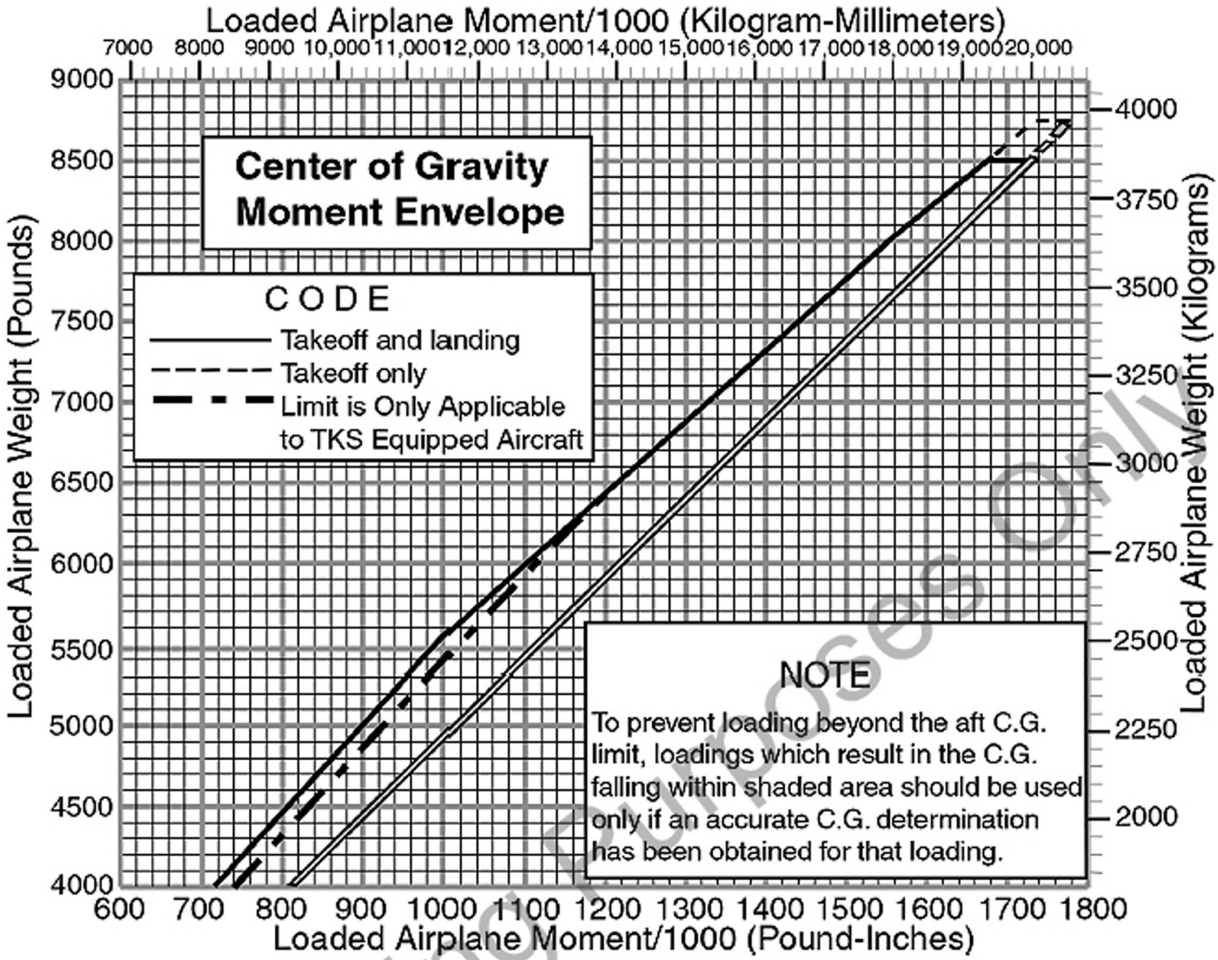


WARNING

It is the responsibility of the pilot to make sure that the airplane is loaded correctly. Operation outside of prescribed weight and balance limitations could result in an accident and serious or fatal injury.

Figure 415

CENTER OF GRAVITY MOMENT ENVELOPE



WARNING

- **Because loading personnel may not always be able to achieve an ideal loading, a means of protecting the C.G envelope is provided by supplying an aft C.G. location warning (shaded area) between 38.33% mac and the maximum aft c.g. of 40.33% mac on the center of gravity moment envelope. Points falling within this shaded area should be used only if accurate C.G. determination for cargo loadings can be obtained.**
- **It is the responsibility of the pilot to make sure that the airplane is loaded correctly. Operation outside of prescribed weight and balance limitations could result in an accident and serious or fatal injury.**

Figure 416

1. INTRODUCTION

Observance of the limitations included in this chapter is mandatory.

2. KINDS OF AIRPLANE OPERATION

The airplane is certified in the transport category for day and night operations, in the following conditions when the equipment and instruments required by the airworthiness and operating regulations are approved, installed and in an operable condition:

- VFR and IFR
- Flight in icing conditions

The airplane is certified for ditching when the safety equipment specified by the applicable regulations is installed.

The airplane is certified capable of RVSM operations in accordance with the FAA "Interim guidance material on the approval of operations / aircraft for RVSM operations", 91-RVSM, dated June 30, 1999 and with the JAA Temporary Guidance Leaflet, TGL No. 6, Revision 1, RVSM. <1030>

NOTE

Compliance with these FAA and JAA standards does not constitute an operational approval. <1030>

RVSM operations must not be commenced or continued unless all of the required equipment specified in the RVSM Required Equipment List table is operational. <1030>

RVSM Required Equipment List <1030>	
Equipment	**Requirements for RVSM**
Autopilot	Must be operational.
Altitude Alerting System	Must be operational.
Altitude Reporting Transponder (2)	One (1) must be operational.
Air Data Computers (2)	Two (2) must be operational.

Effectivity:

- *On airplanes registered in the Republic of Argentina:*
  - The necessary equipment for the different kinds of operations must comply with the applicable Argentinean regulations. <DNA>

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Figure 417

1. STRUCTURAL WEIGHT LIMITATION

Weight	kg	lb	Airplane Option Code
Maximum Ramp Weight (MRW)	36628	80750	
	36613	80719	<2217>
	37108	81810	<2002>
	37535	82750	<2004>
	38222	84265	<2006>
	38555	85000	<2005>
Maximum Take-Off Weight (MTOW)	36514	80500	
	36500	80469	<2217>
	36995	81560	<2002>
	37421	82500	<2004>
	37995	83765	<2006>
	38329	84500	<2005>
Maximum Landing Weight (MLW)	33339	73500	
	34065	75100	<2005> or <2006>
Maximum Zero Fuel Weight (MZFW)	31751	70000	
	32092	70750	<2005> or <2006>
Minimum flight weight	20412	45000	

NOTE

The Maximum Take-Off Weight (MTOW) and/or Maximum Landing Weight (MLW) may be further limited due to performance considerations.

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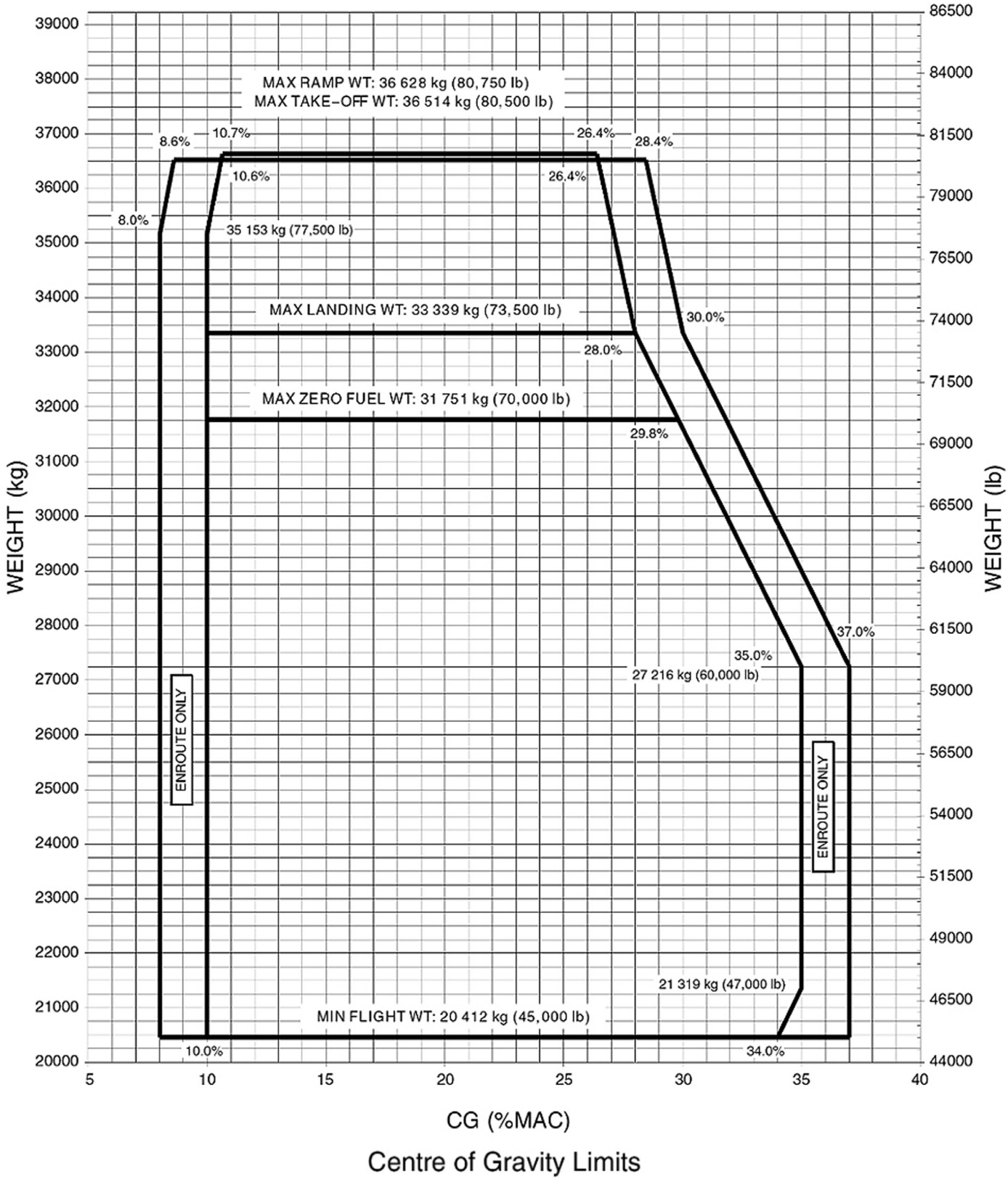
Figure 418

LIMITATIONS
Centre of Gravity



Centre of Gravity Limits

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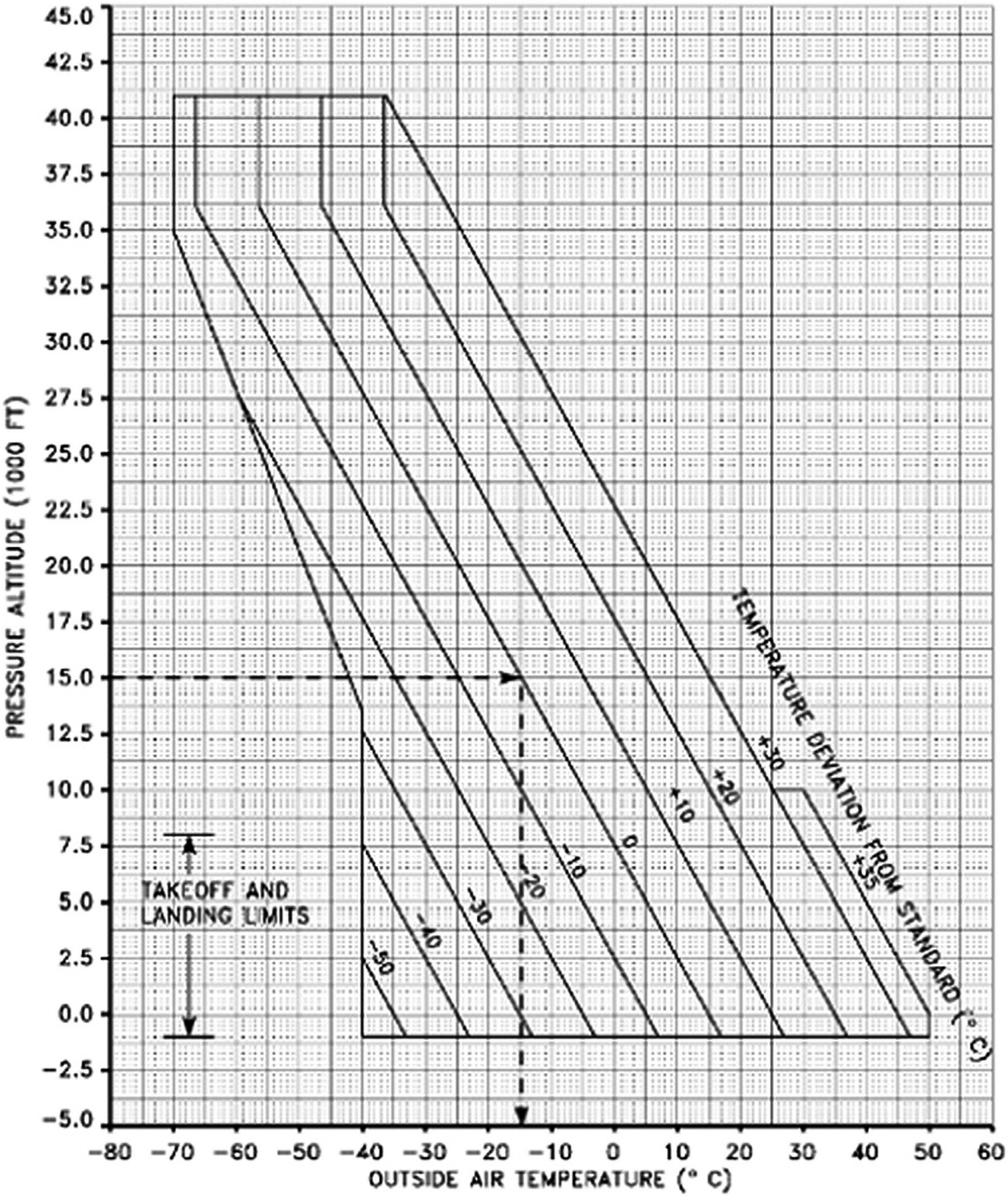
Figure 419



Altitude and Temperature Operating Limits

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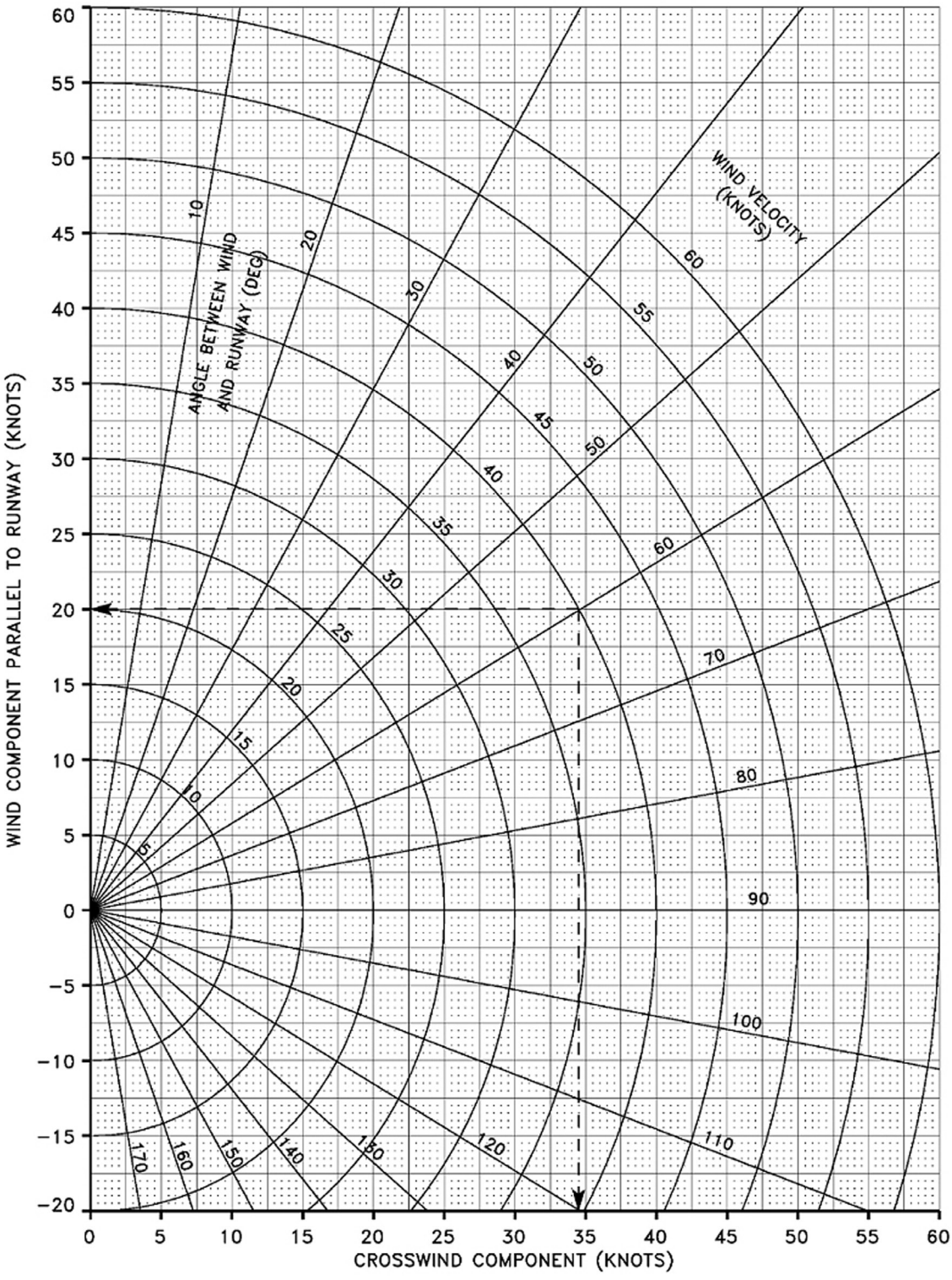
Figure 420



Wind Component

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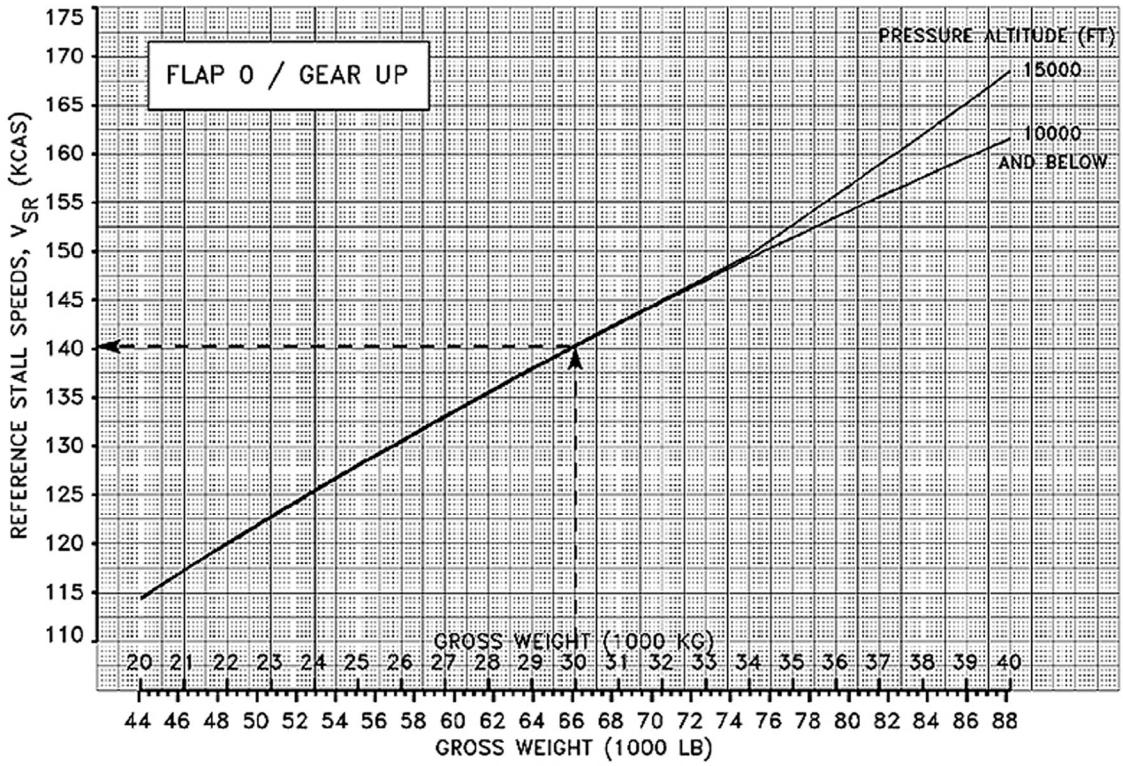
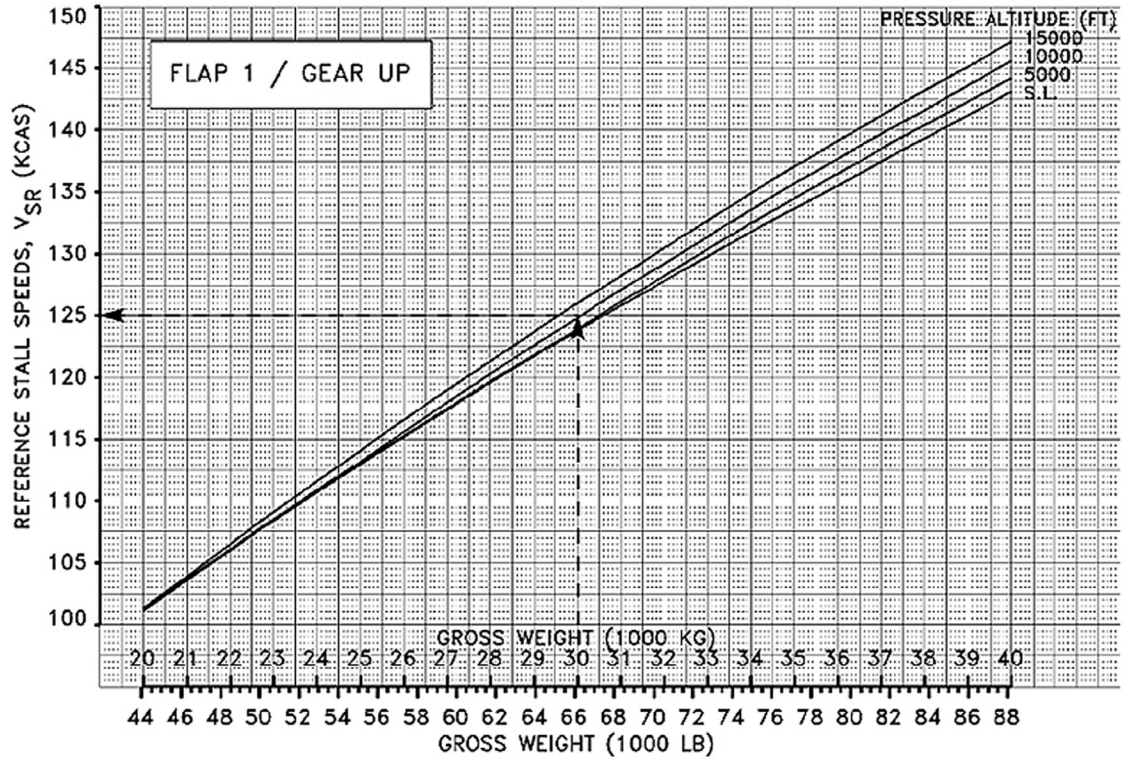
Figure 421





Stall Speeds, V_{SR}

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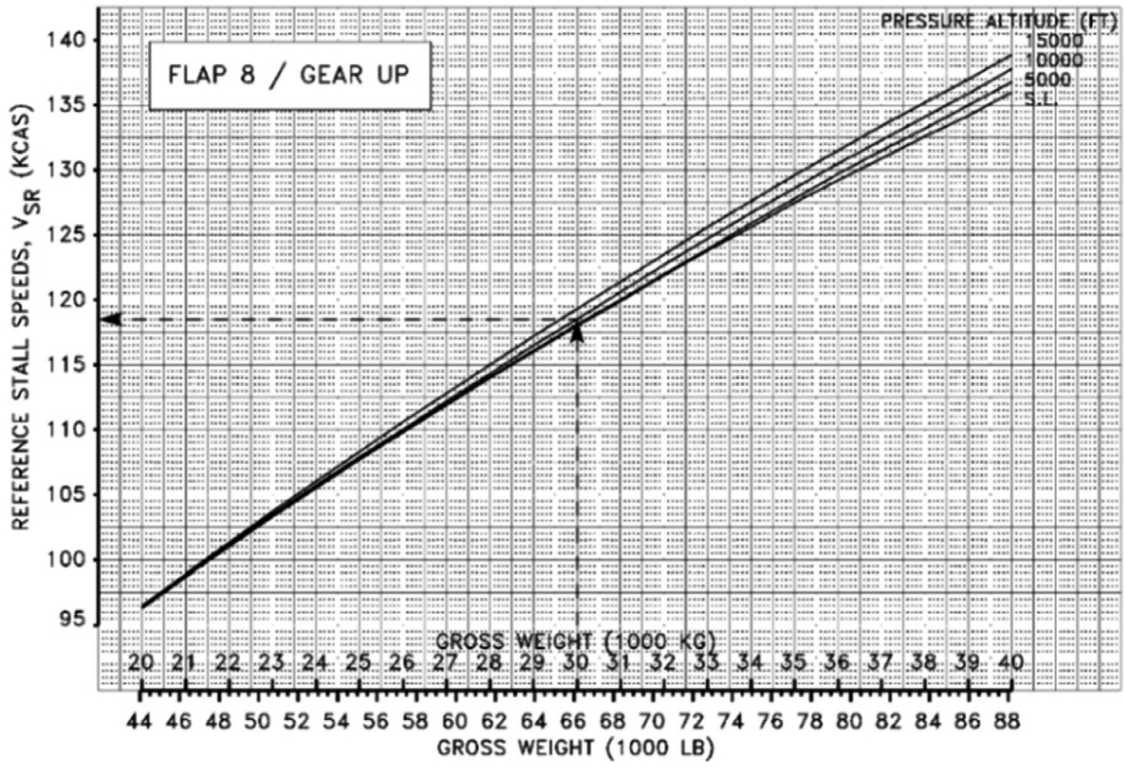
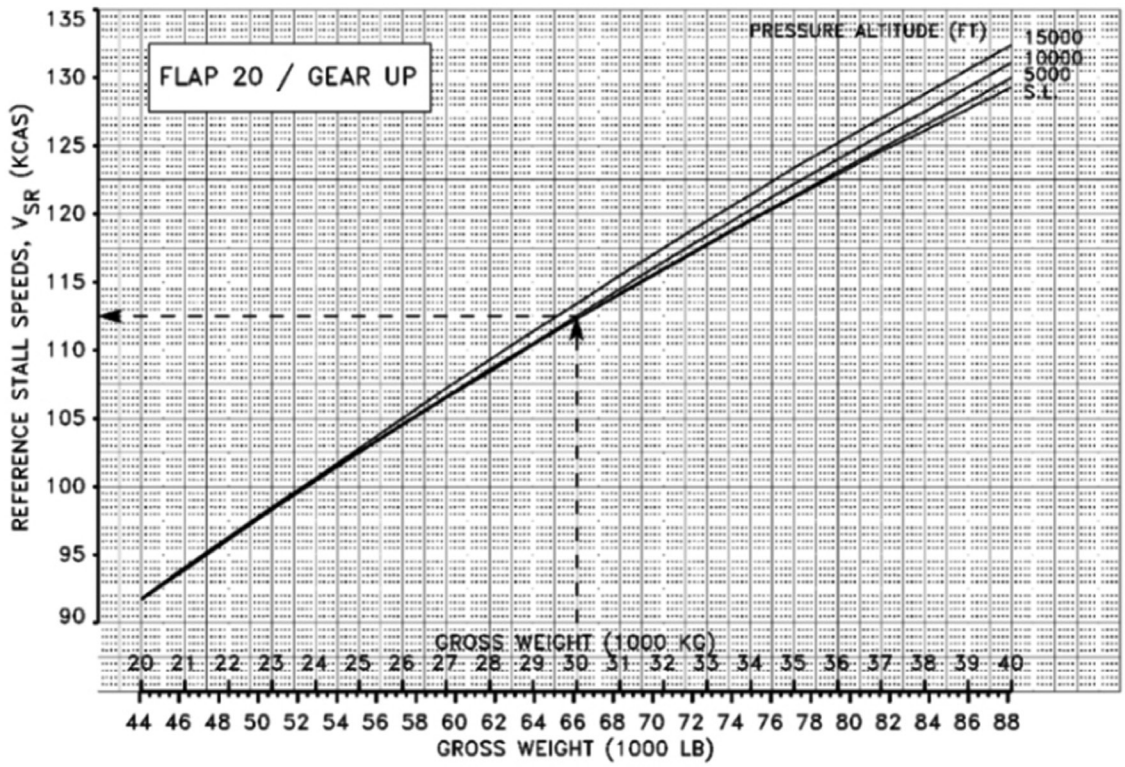
Figure 422





Stall Speeds, V_{SR}

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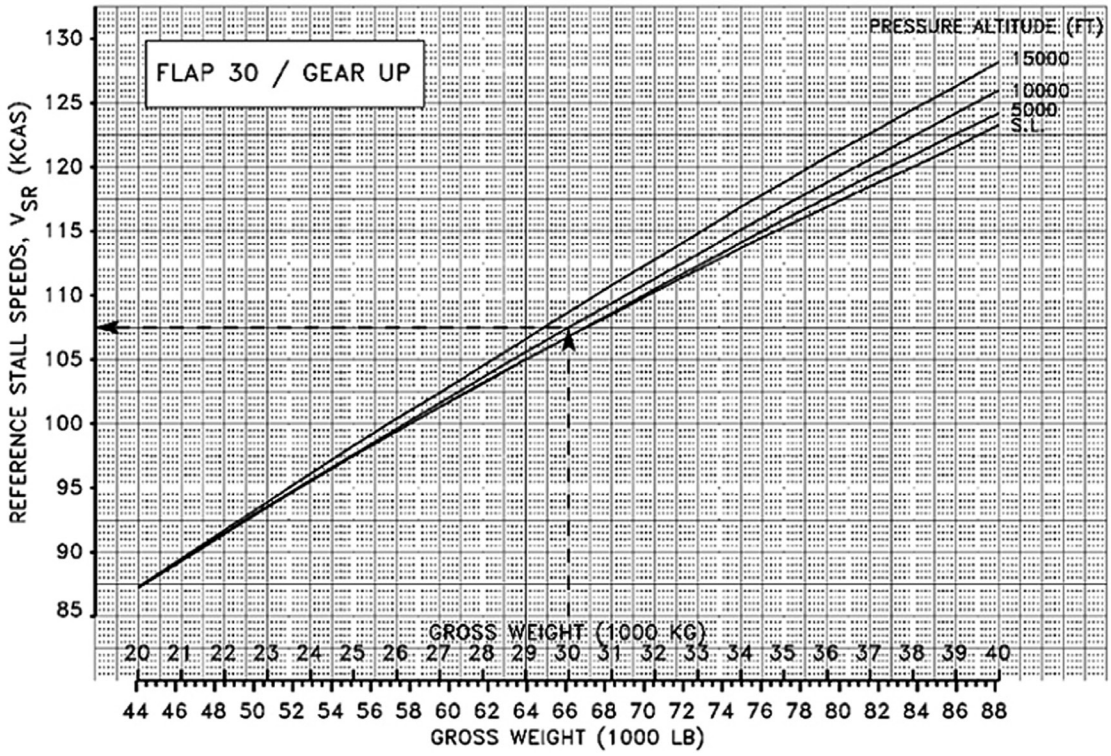
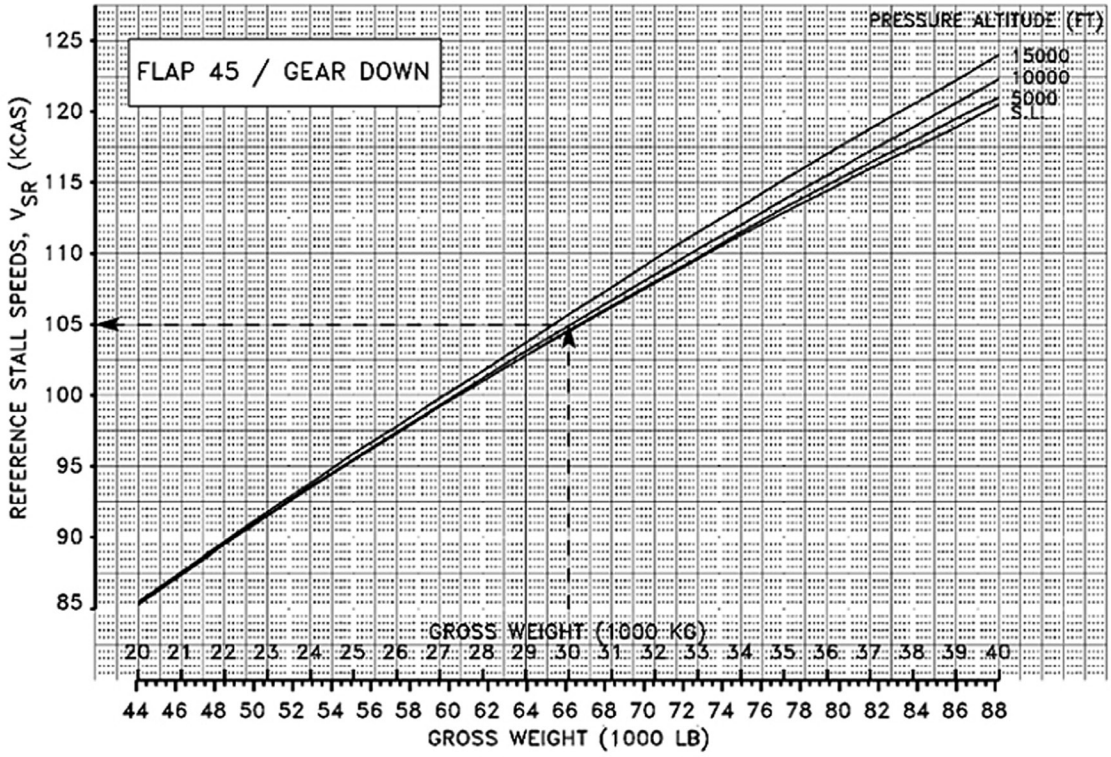
Figure 423





Stall Speeds, V_{SR}

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Figure 424

B. Maneuvering Capabilities

The maneuvering capabilities are shown in Figure 426. Figure 426 shows the maneuver margin (bank angle and/or g-load factor) for a given weight, CG, altitude and speed combination. Alternatively, for a given load factor, Figure 426 shows the altitude and speed margins for a given weight, CG and speed combination.

Maneuvering capability is defined relative to buffet onset or stick shaker activation, whichever occurs first.

Example A:

Associated conditions:

Airplane gross weight	= 33000 kg (72750 lb)
Centre of Gravity (CG)	= 20% MAC
Indicated Mach No.	= 0.770
Pressure altitude	= 35000 feet

Example A in Figure 426, for the given associated conditions (enter Figure 426 from the indicated Mach number scale), shows that the maneuvering capability is equal to 1.70 g or a bank angle of 54 degrees.

Example B:

Associated conditions:

Airplane gross weight	= 33000 kg (72750 lb)
Centre of Gravity (CG)	= 20% MAC
Pressure altitude	= 37000 feet
Required maneuvering capability	= 1.30 g (or approximately 40-degree bank)

Example B in Figure 426, for the given associated conditions (enter Figure 426 from the load factor [or bank angle] scale towards the gross weight scale), shows the following speed margins:

- Low speed = 0.680 M
- High speed = 0.845 M

Operating at a speed greater than 0.680 M and lower than 0.845 M at 37000 feet will ensure that a minimum maneuvering capability of 1.30 g before stick shaker activation or buffet onset, will be maintained for the conditions in Example B.

Following the same example, the maximum altitude at a speed of 0.77 M, before stick shaker activation or buffet onset for the required maneuvering capability of 1.30 g is 40600 feet, as marked by an x in Figure 426.

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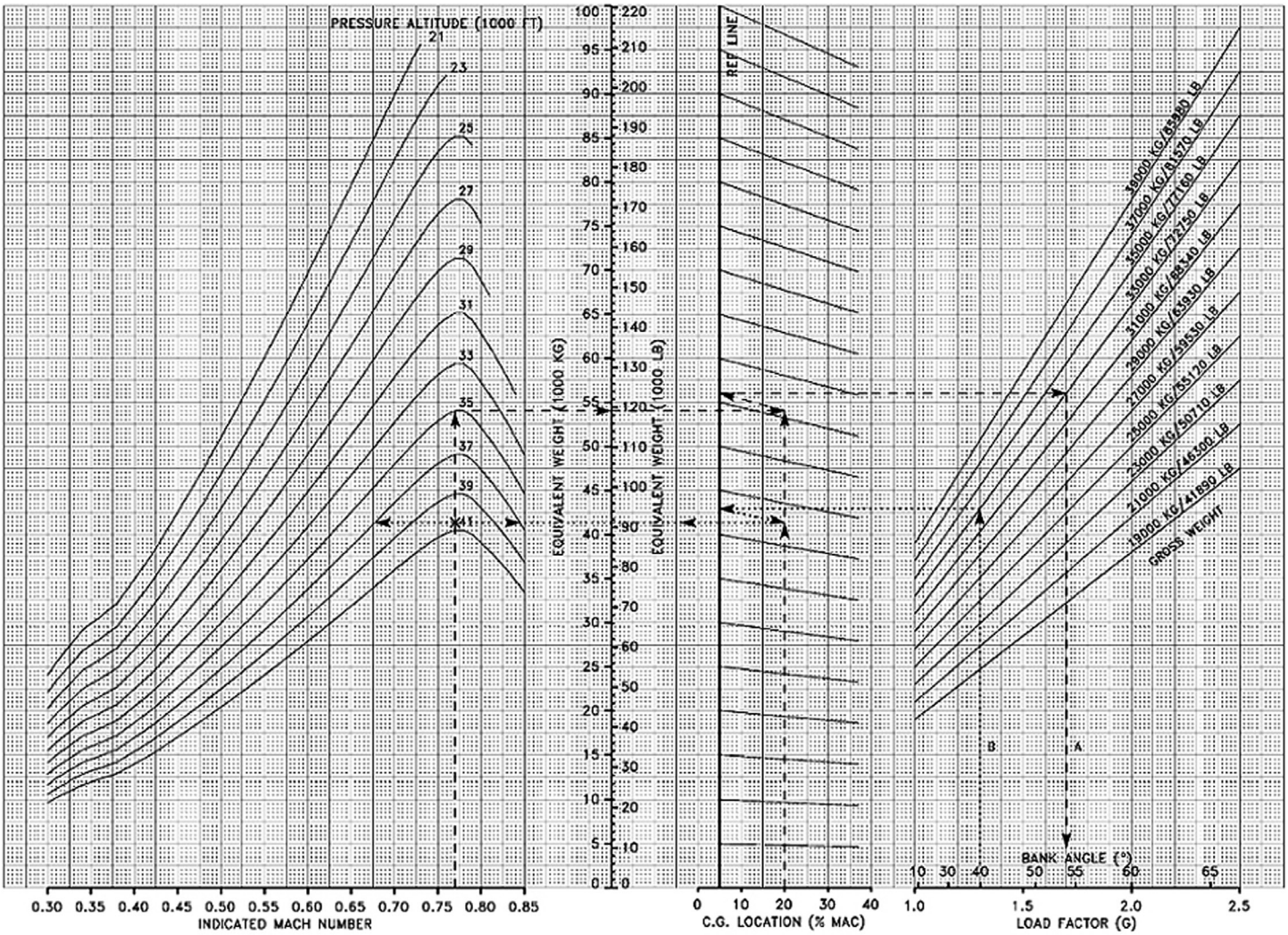
Figure 425



Maneuvering Capabilities

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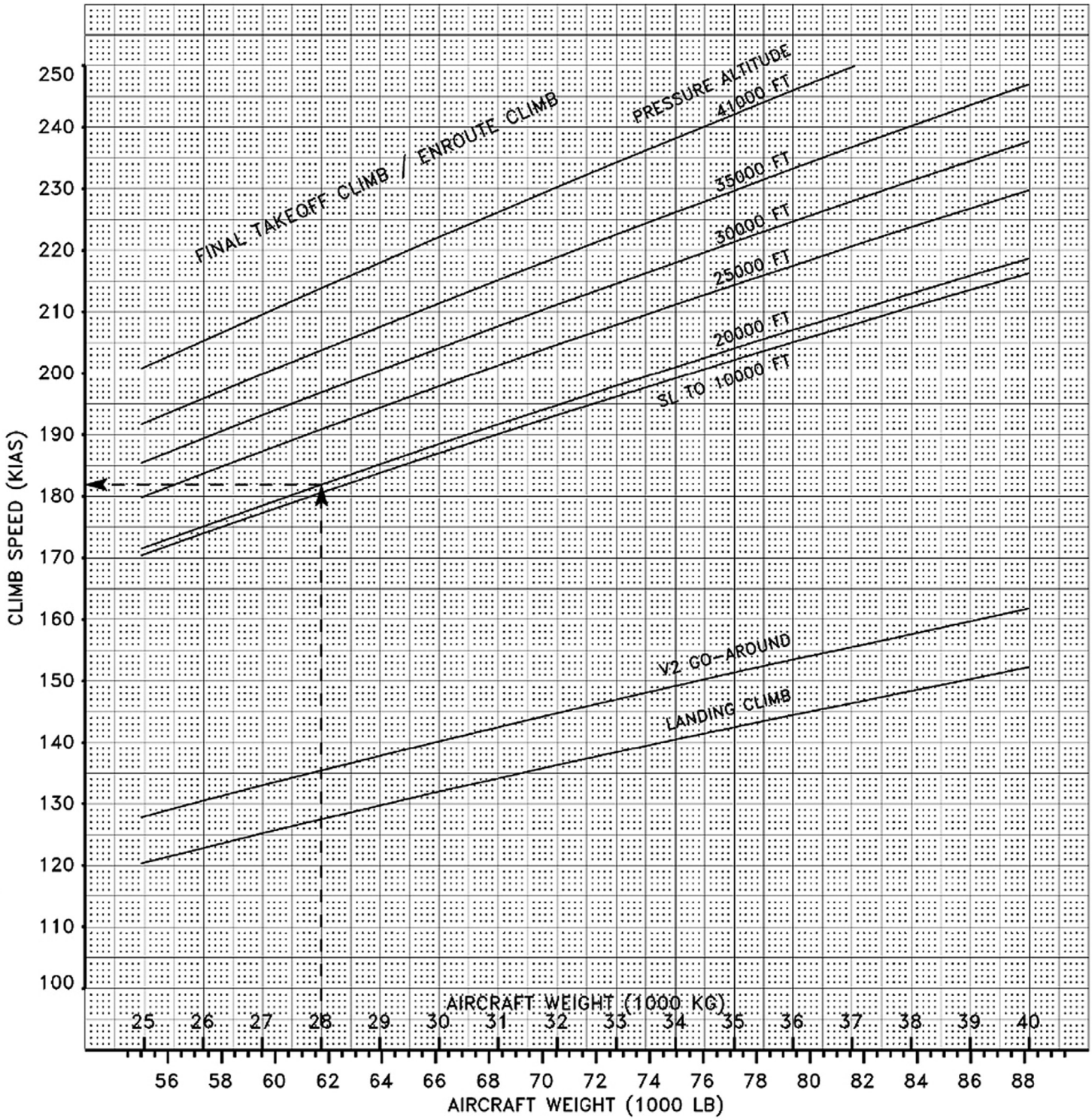
Figure 426



Climb Speeds

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Figure 427

PERFORMANCE
Thrust Settings

OAT		PRESSURE ALTITUDE (Feet)									
(°C)	(°F)	–1000	0	2000	4000	6000	8000	10000	12000	14000	16000
–45	–49								85.1	86.0	85.8
–40	–40	80.0	81.1	81.8	82.8	83.6	84.3	85.2	86.0	86.8	86.6
–35	–31	80.8	81.9	82.7	83.6	84.5	85.2	86.0	86.8	87.7	87.4
–30	–22	81.6	82.7	83.5	84.4	85.3	86.0	86.8	87.6	88.5	88.3
–25	–13	82.4	83.5	84.3	85.2	86.1	86.8	87.6	88.4	89.3	89.1
–20	–4	83.2	84.3	85.1	86.0	86.9	87.6	88.4	89.2	90.1	89.9
–15	5	84.0	85.1	85.9	86.8	87.7	88.4	89.2	90.0	90.9	90.7
–10	14	84.7	85.9	86.7	87.6	88.5	89.2	90.0	90.8	91.7	91.5
–5	23	85.5	86.7	87.5	88.4	89.3	90.0	90.8	91.6	92.4	92.0
0	32	86.3	87.4	88.2	89.2	90.1	90.8	91.6	92.4	93.2	92.1
5	41	87.0	88.2	89.0	90.0	90.8	91.6	92.4	93.2	93.6	91.8
10	50	87.8	88.9	89.8	90.7	91.6	92.3	93.1	93.3	93.2	91.2
15	59	88.5	89.7	90.5	91.5	92.4	92.9	93.0	92.9	92.7	90.6
20	68	89.2	90.4	91.3	92.2	92.7	92.6	92.4	92.4	92.3	90.2
25	77	90.0	91.2	92.0	92.3	92.2	92.1	92.0	91.9	91.7	90.1
30	86	90.7	91.9	91.8	91.7	91.6	91.5	91.4	91.3	91.2	
35	95	90.4	90.9	90.9	91.0	90.9	90.8	90.7	90.6		
40	104	89.3	89.8	89.9	89.9	89.9	90.1				
45	113	88.1	88.6	88.6	88.7	88.9					
50	122	86.8	87.3	87.3	87.4						

Normal Take-off Thrust Setting (All Engines Operating), $\%N_1$ Engine Bleeds Closed - Static to 65 KIAS

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Figure 428

CRJ SERIES Regional Jet

PERFORMANCE
Thrust Settings

OAT		PRESSURE ALTITUDE (Feet)									
(°C)	(°F)	–1000	0	2000	4000	6000	8000	10000	12000	14000	16000
–45	–49								84.2	85.0	84.9
–40	–40	79.4	80.5	81.2	82.1	82.9	83.6	84.3	85.1	85.8	85.7
–35	–31	80.2	81.3	82.1	83.0	83.7	84.4	85.1	85.9	86.6	86.5
–30	–22	81.0	82.1	82.9	83.8	84.6	85.2	86.0	86.7	87.4	87.3
–25	–13	81.8	82.9	83.7	84.6	85.4	86.0	86.8	87.5	88.2	88.1
–20	–4	82.6	83.7	84.5	85.4	86.2	86.8	87.6	88.3	89.0	88.9
–15	5	83.4	84.5	85.3	86.2	87.0	87.6	88.3	89.1	89.8	89.7
–10	14	84.1	85.3	86.0	87.0	87.7	88.4	89.1	89.8	90.6	90.5
–5	23	84.9	86.0	86.8	87.7	88.5	89.1	89.9	90.6	91.3	91.1
0	32	85.6	86.8	87.6	88.5	89.3	89.9	90.6	91.3	92.0	90.9
5	41	86.4	87.5	88.3	89.2	90.0	90.7	91.4	91.9	92.0	90.3
10	50	87.1	88.3	89.1	90.0	90.8	91.4	91.8	91.8	91.4	89.7

Normal Take-off Thrust Setting (All Engines Operating),
$\%N_1$ Cowl Anti-ice On, PACKs On - Static to 65 KIAS

Figure 429

PERFORMANCE
Thrust Settings

OAT		PRESSURE ALTITUDE (Feet)									
(°C)	(°F)	–1000	0	2000	4000	6000	8000	10000	12000	14000	16000
–45	–49								86.4	86.5	87.4
–40	–40	82.3	83.4	84.1	84.9	85.8	86.6	87.2	87.2	87.3	88.2
–35	–31	83.1	84.3	84.9	85.7	86.6	87.4	88.0	88.0	88.2	89.1
–30	–22	83.9	85.1	85.8	86.6	87.4	88.2	88.8	88.8	89.0	89.9
–25	–13	84.7	85.9	86.6	87.4	88.2	89.0	89.6	89.6	89.8	90.7
–20	–4	85.5	86.7	87.4	88.2	89.0	89.8	90.4	90.4	90.6	91.3
–15	5	86.3	87.5	88.2	88.9	89.8	90.6	91.1	90.9	91.0	90.1
–10	14	87.1	88.3	89.0	89.7	90.6	91.4	91.2	91.3	91.3	89.5
–5	23	87.9	89.0	89.7	90.5	91.4	91.5	91.4	91.4	91.4	88.6
0	32	88.6	89.8	90.5	91.3	91.7	91.6	91.5	91.5	91.5	87.4
5	41	89.4	90.6	91.3	91.9	91.8	91.4	91.4	91.2	91.2	86.8
10	50	90.1	91.3	92.0	92.0	91.5	91.1	91.0	90.9	89.9	86.4

Go-around or APR Thrust Setting (One Engine Inoperative),
%N_1 Wing and Cowl Anti-ice On, PACK On - 140 KIAS

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Figure 430

PERFORMANCE
Thrust Settings

SAT		PRESSURE ALTITUDE (Feet)							
(°C)	(°F)	0	5000	10000	15000	20000	25000	30000	35000
–70	–94							87.8	89.0
–65	–85						87.0	88.6	89.9
–60	–76					86.6	87.9	89.5	90.8
–55	–67					87.4	88.8	90.4	91.7
–50	–58				86.4	88.3	89.6	91.2	92.5
–45	–49			85.0	87.2	89.2	90.5	92.1	93.3
–40	–40	81.4	83.7	85.8	88.1	90.0	91.3	92.9	93.1
–35	–31	82.3	84.6	86.7	88.9	90.8	92.2	93.6	92.4
–30	–22	83.1	85.4	87.5	89.7	91.6	93.0	92.8	91.5
–25	–13	83.9	86.2	88.3	90.6	92.5	93.7	92.2	89.9
–20	–4	84.7	87.1	89.2	91.4	93.3	93.4	91.4	89.0
–15	5	85.5	87.9	90.0	92.2	93.8	92.6	90.7	88.8
–10	14	86.3	88.7	90.8	93.0	93.6	91.8	89.9	88.5
–5	23	87.1	89.5	91.5	93.5	92.8	91.1	89.7	
0	32	87.8	90.2	92.3	93.2	92.0	90.3	89.6	
5	41	88.6	91.0	92.7	92.4	91.3	90.0		
10	50	89.4	91.8	92.4	91.7	90.7	89.9		

Maximum Continuous Thrust Setting (One Engine Inoperative),
$\%N_1$ Cowl Anti-ice On, PACK On - 170 KIAS

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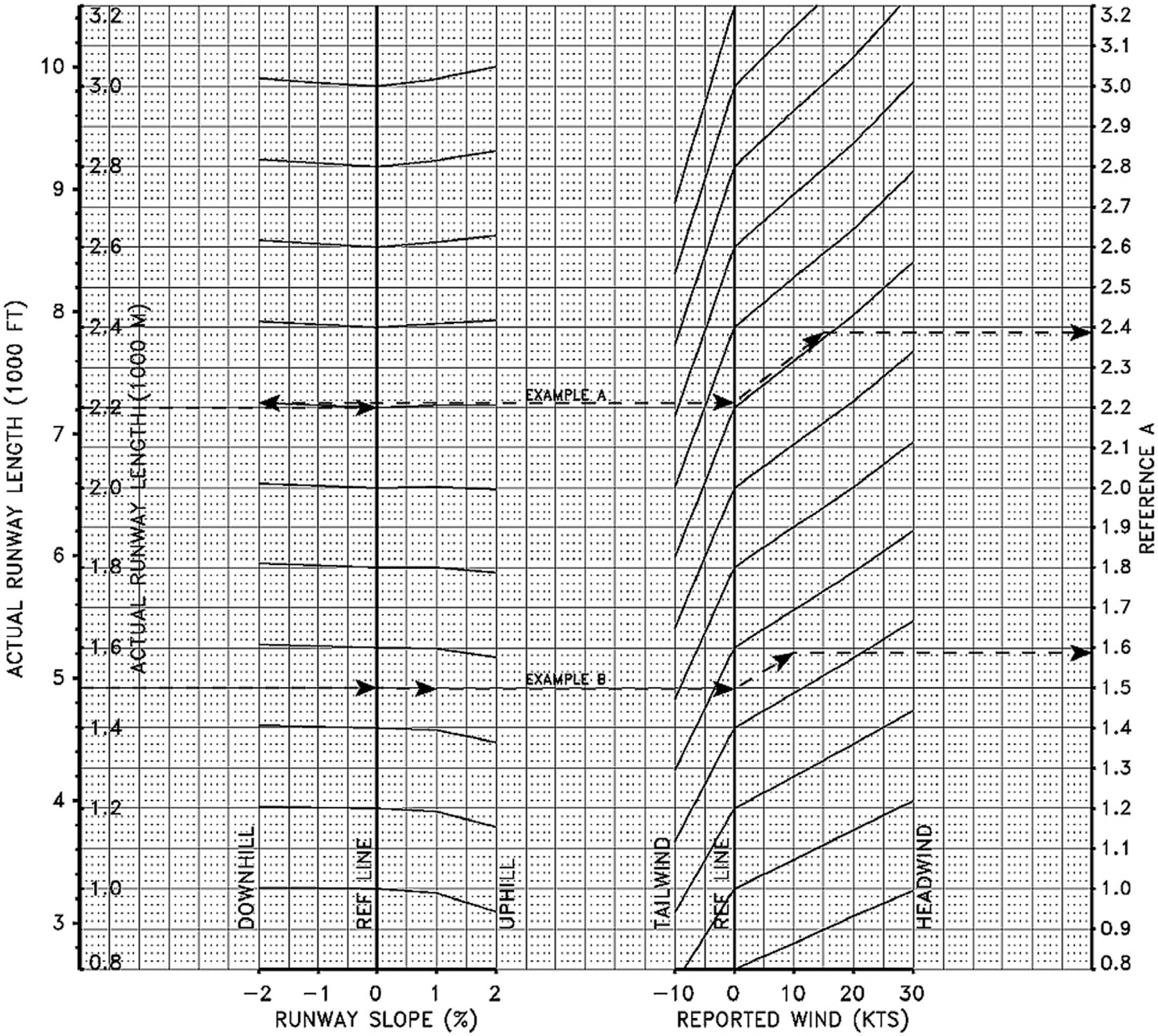
Figure 431

PERFORMANCE
Take–off Performance



FLAPS 8

Take-off Weight Limited by Field Length Requirements, Dry Runway - V_{MC} Limited, FLAPS 8

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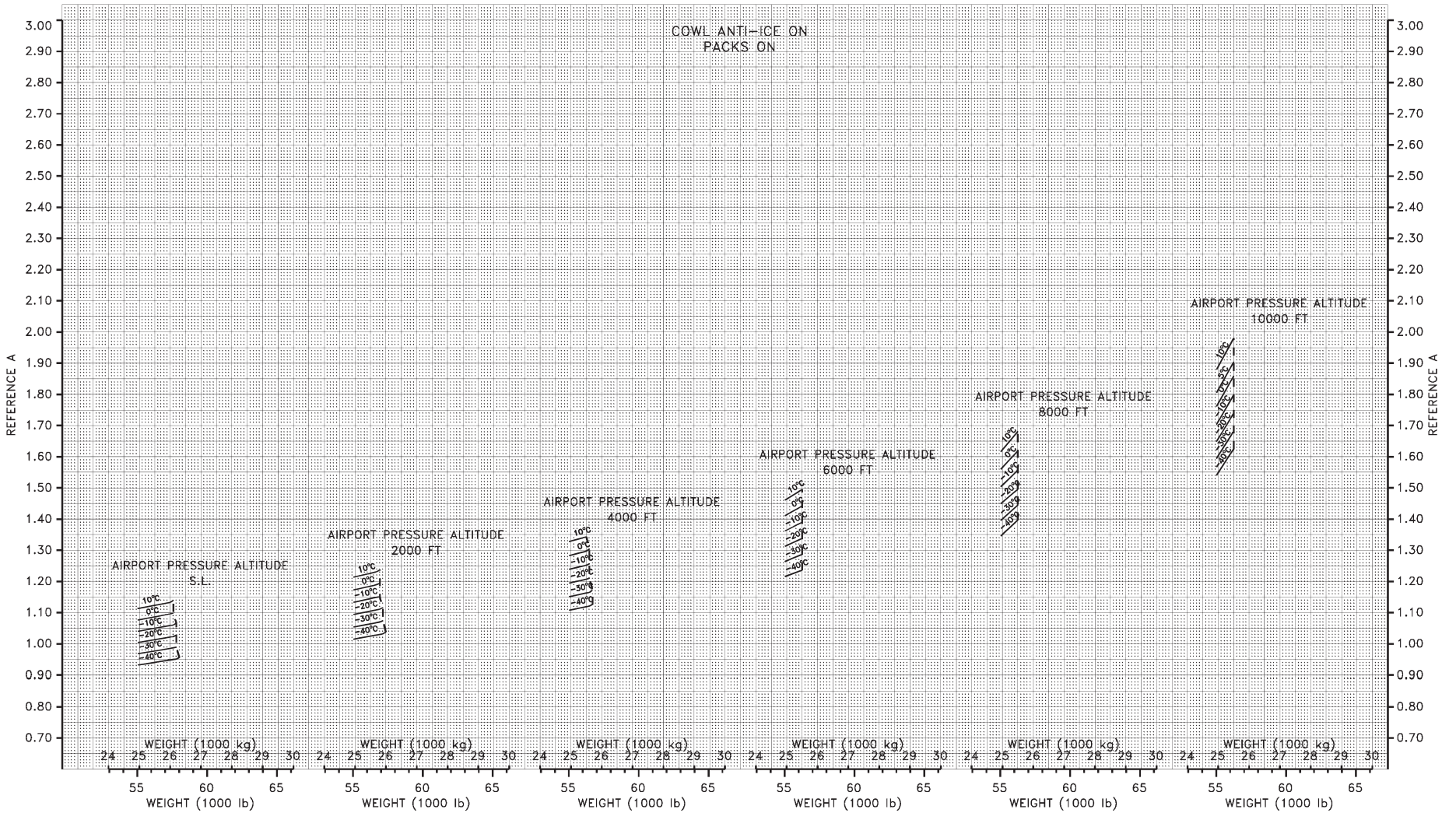
Figure 432

PERFORMANCE
Take-off Performance



Take-off Weight Limited by Field Length Requirements, Dry Runway – V_{MC} Limited, FLAPS 8

Figure 433

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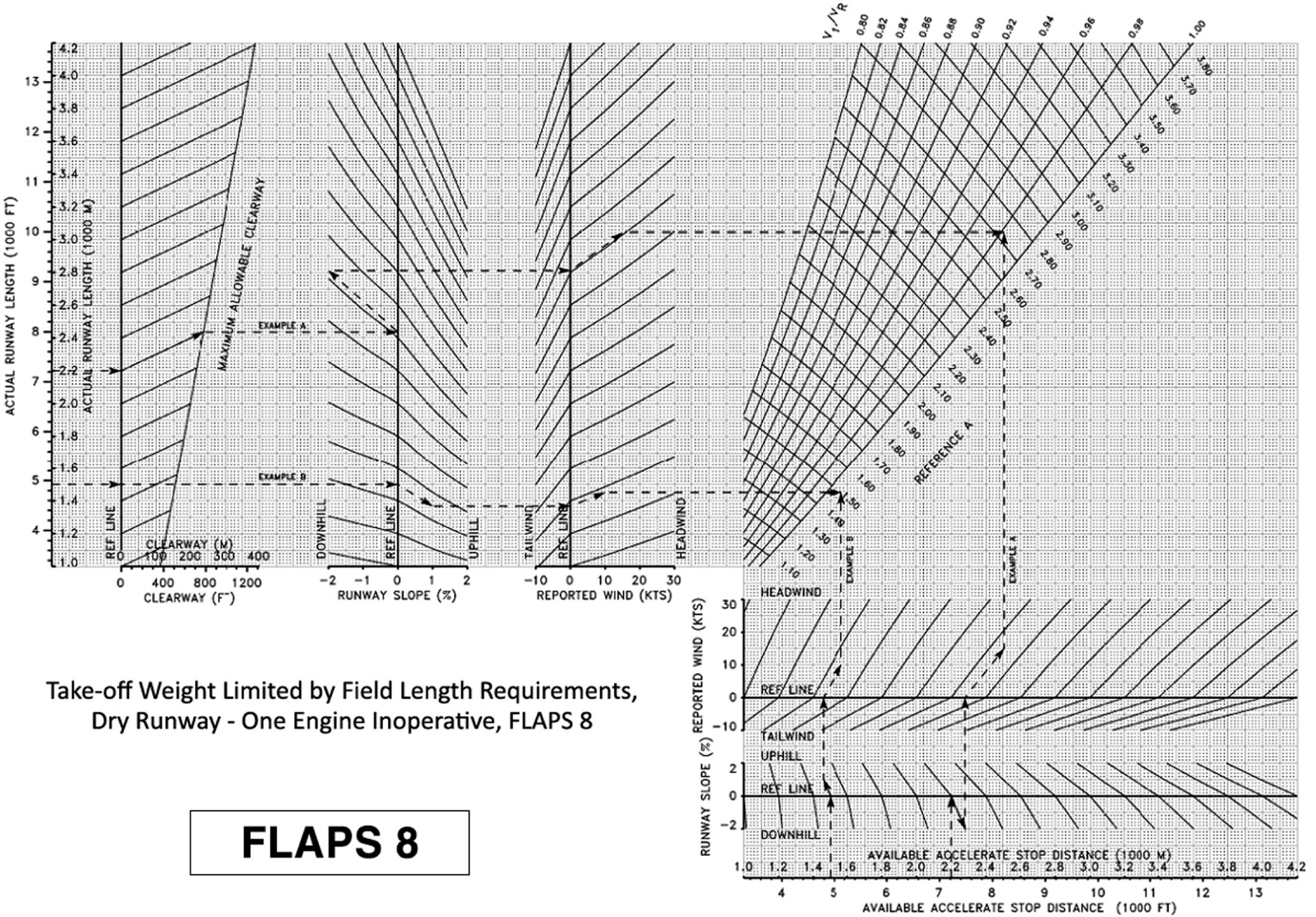
D. Take-off Weight Limited by Field Length Requirements, Dry Runway – One Engine Inoperative, FLAPS 8

The maximum take-off weight limited by field length requirements on a dry runway, with one engine inoperative for a FLAPS 8 take-off, is given by Figure 435, 436, or 437. The following charts take into account the accelerate-stop distance available, the actual length of the runway and the clearway, the airport pressure altitude, and the effects of runway slope, prevailing wind conditions and temperature for varying bleed configurations.

NOTE

1. If a rolling take-off procedure will be performed, subtract 60 metres (200 feet) from the actual runway length and the available accelerate-stop distance, prior to determining the take-off weight.
2. If the intersection of the actual runway length and available accelerate-stop distance falls to the right of the curve for a V_1/V_R of 1, project horizontally to the left from this intersection until the 1.0 V_1/V_R curve is reached. Use a V_1/V_R of 1.0 and the corresponding Reference A value at this point.

Figure 434



Take-off Weight Limited by Field Length Requirements,
Dry Runway - One Engine Inoperative, FLAPS 8

FLAPS 8

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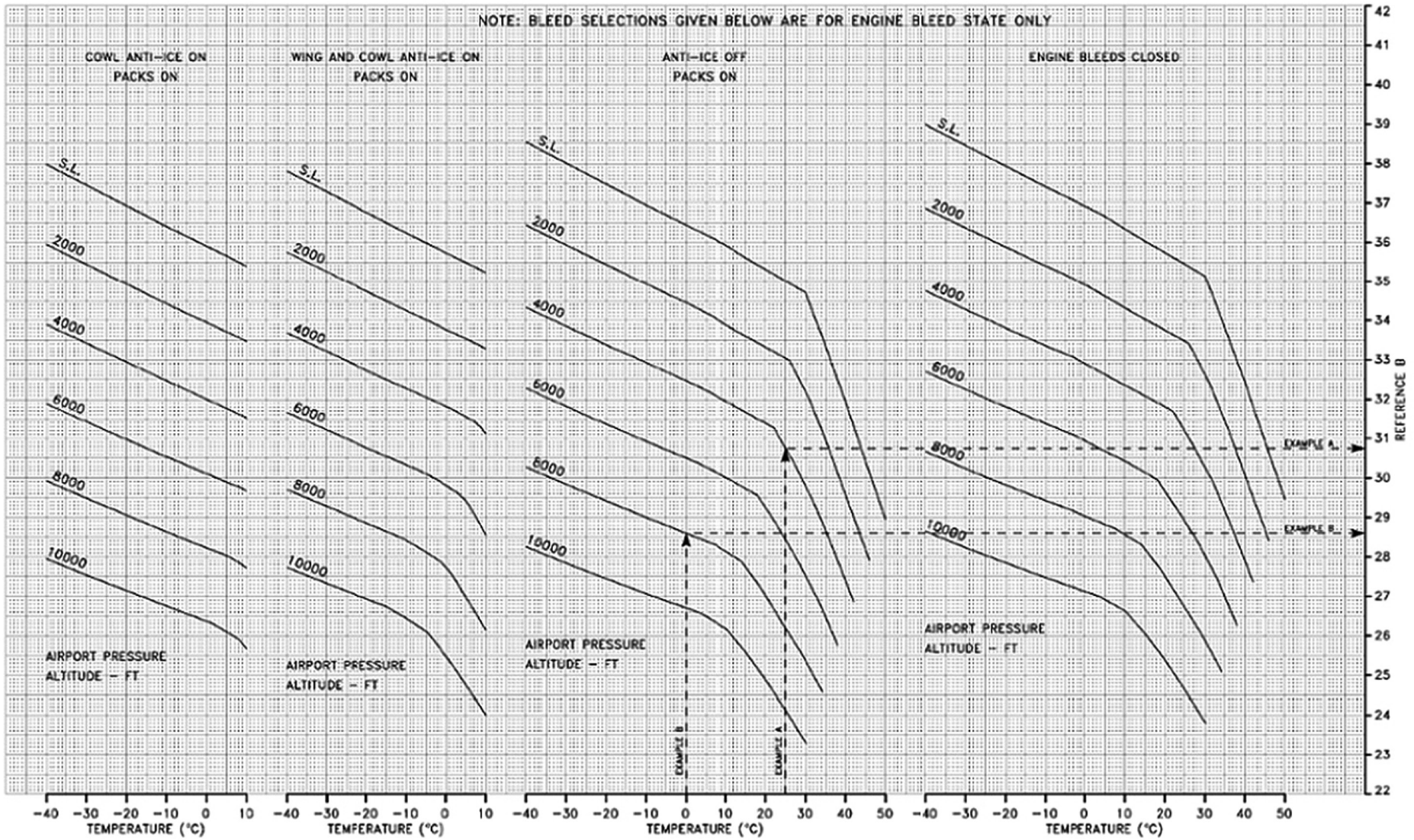
Figure 435

PERFORMANCE
Take–off Performance



Take-off Weight Limited by Field Length Requirements, Dry Runway - One Engine Inoperative, FLAPS 8

FLAPS 8

Figure 436

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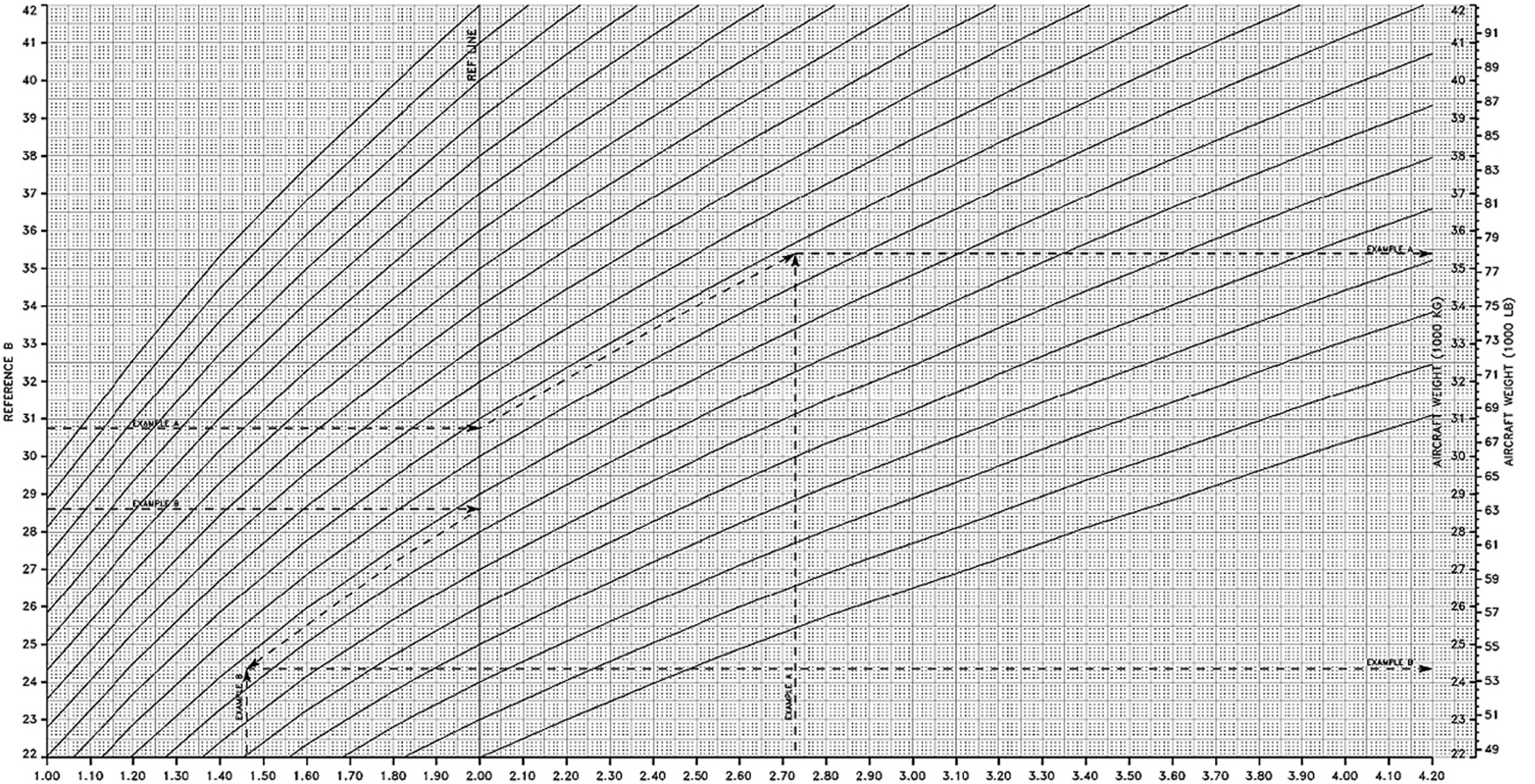

Take-off Weight Limited by Field Length Requirements, Dry Runway - One Engine Inoperative, FLAPS 8

FLAPS 8

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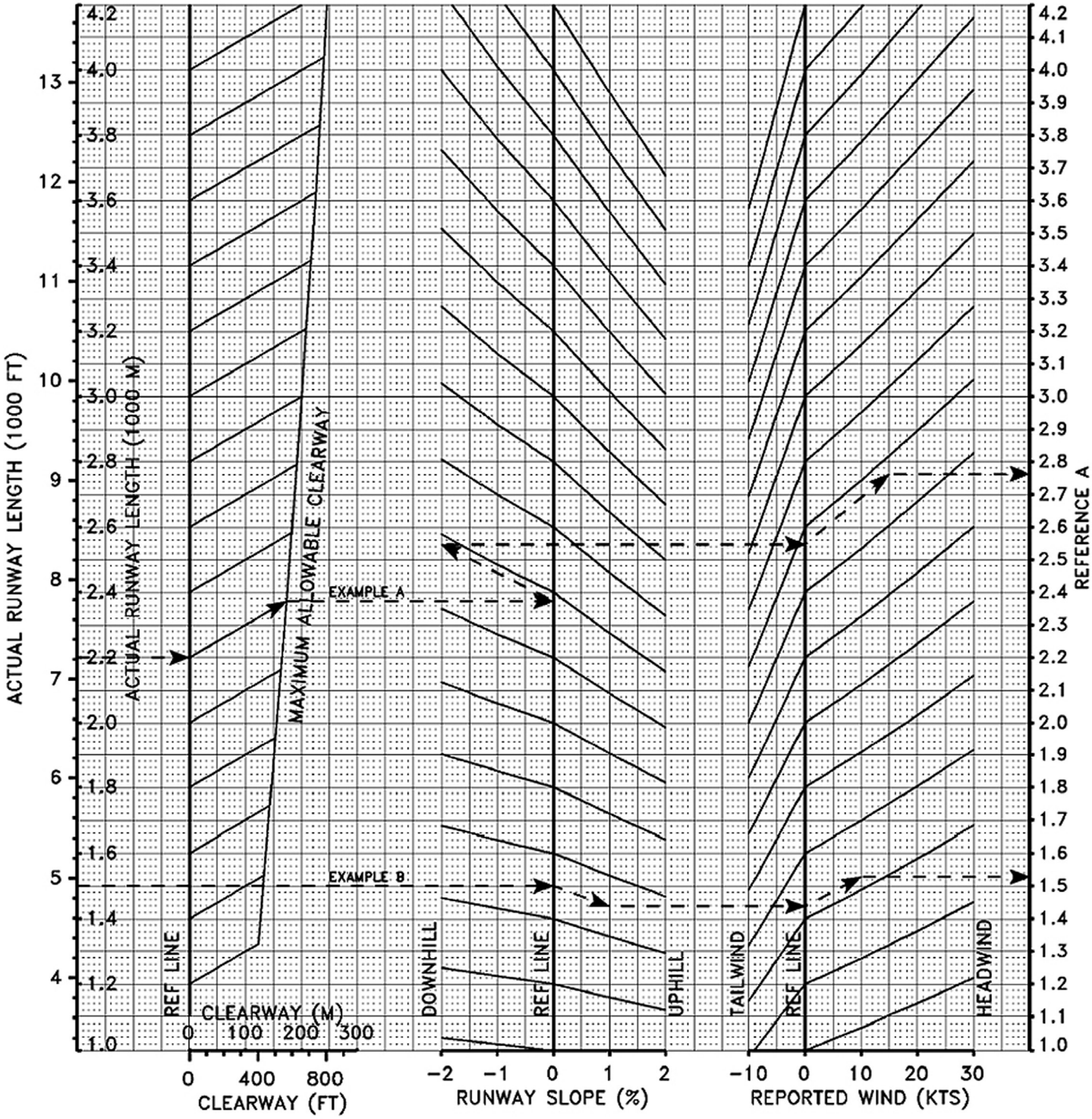
Figure 437



Take-off Weight Limited by Field Length Requirements - All Engines Operating, FLAPS 8

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Figure 438

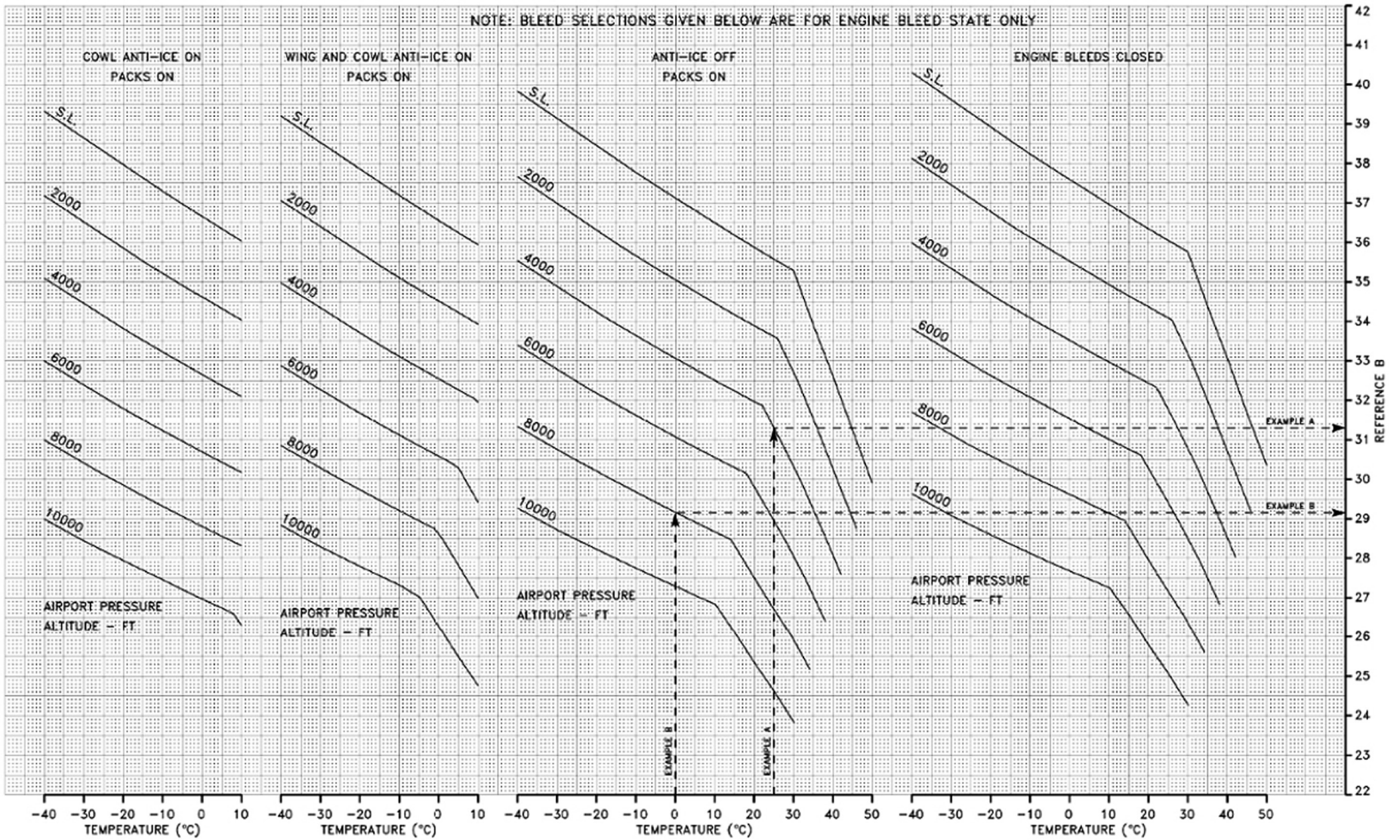

Figure 439

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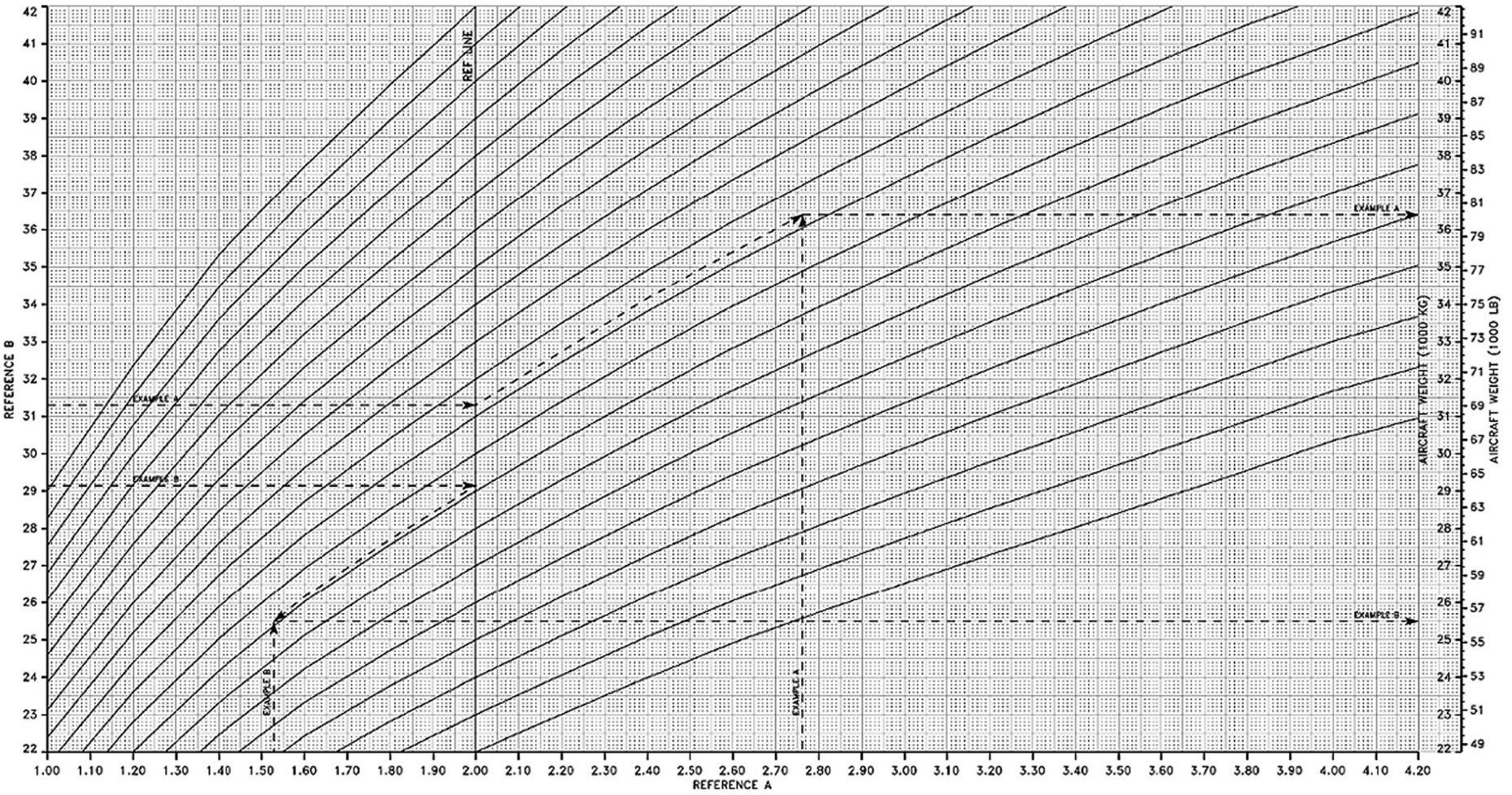
CRJ Regional Jet

PERFORMANCE
Take–off Performance



Take-off Weight Limited by Field Length Requirements - All Engines Operating, FLAPS 8

FLAPS 8

Figure 440

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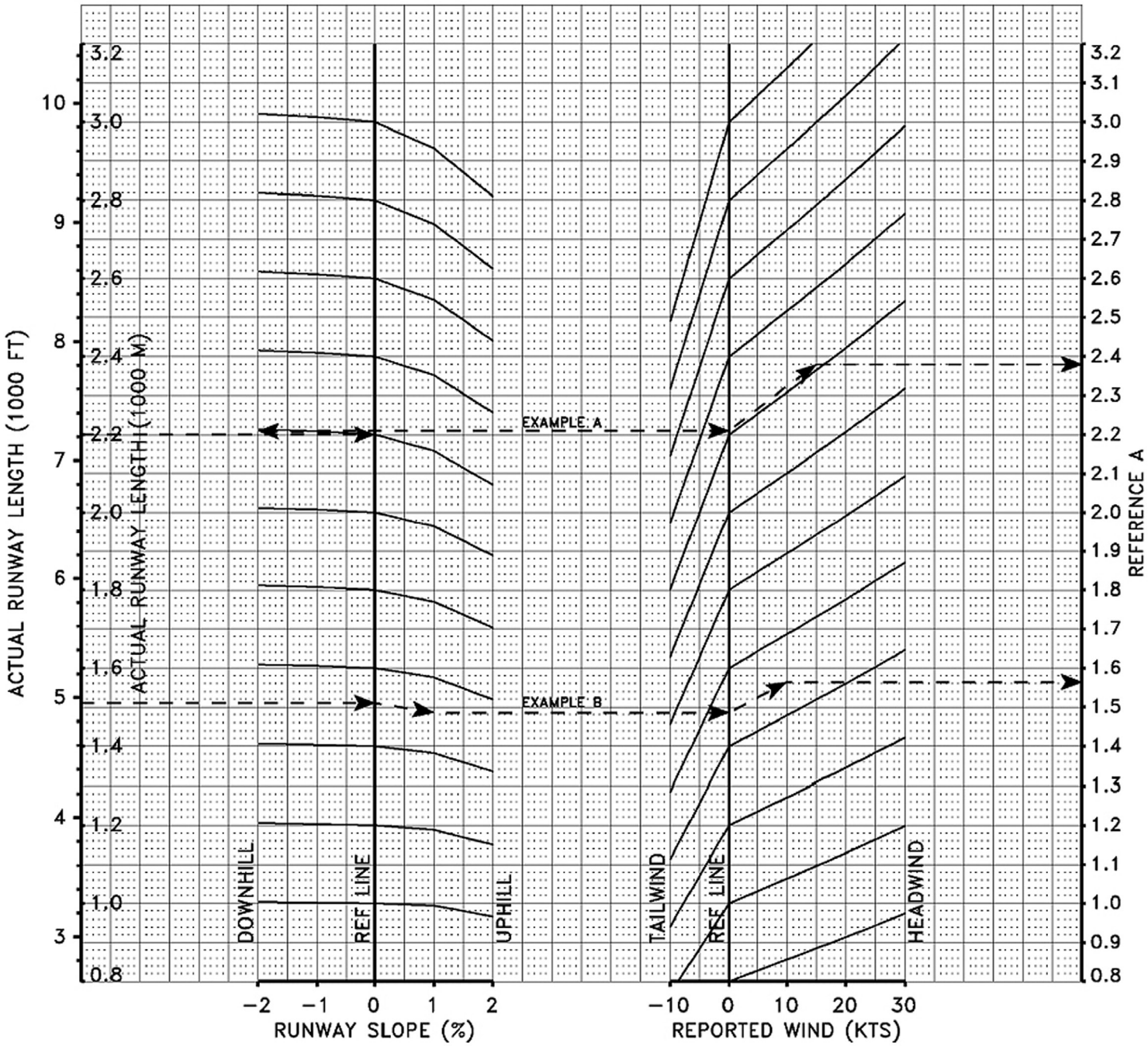
J. Take-off Weight Limited by Field Length Requirements, Dry Runway – Minimum Control Speed (V_{MC}) Limited, FLAPS 20

The maximum take-off weight limited by field length requirements on a dry runway for a FLAPS 20 take-off, limited by V_{MC} is given by Figure 442 or 443. The following charts are applicable to both the all engines operating and one engine inoperative cases. The first chart takes into account the actual length of the runway and the effects of runway slope and prevailing wind conditions. The subsequent charts cater to the effects of airport pressure altitude and temperature for varying bleed configurations to determine the take-off weight.

NOTE

If a rolling take-off procedure will be performed, subtract 60 metres (200 feet) from the actual runway length, prior to determining the take-off weight.

Figure 441



FLAPS 20

Take-off Weight Limited by Field Length Requirements, Dry Runway - V_{MC} Limited, FLAPS 20

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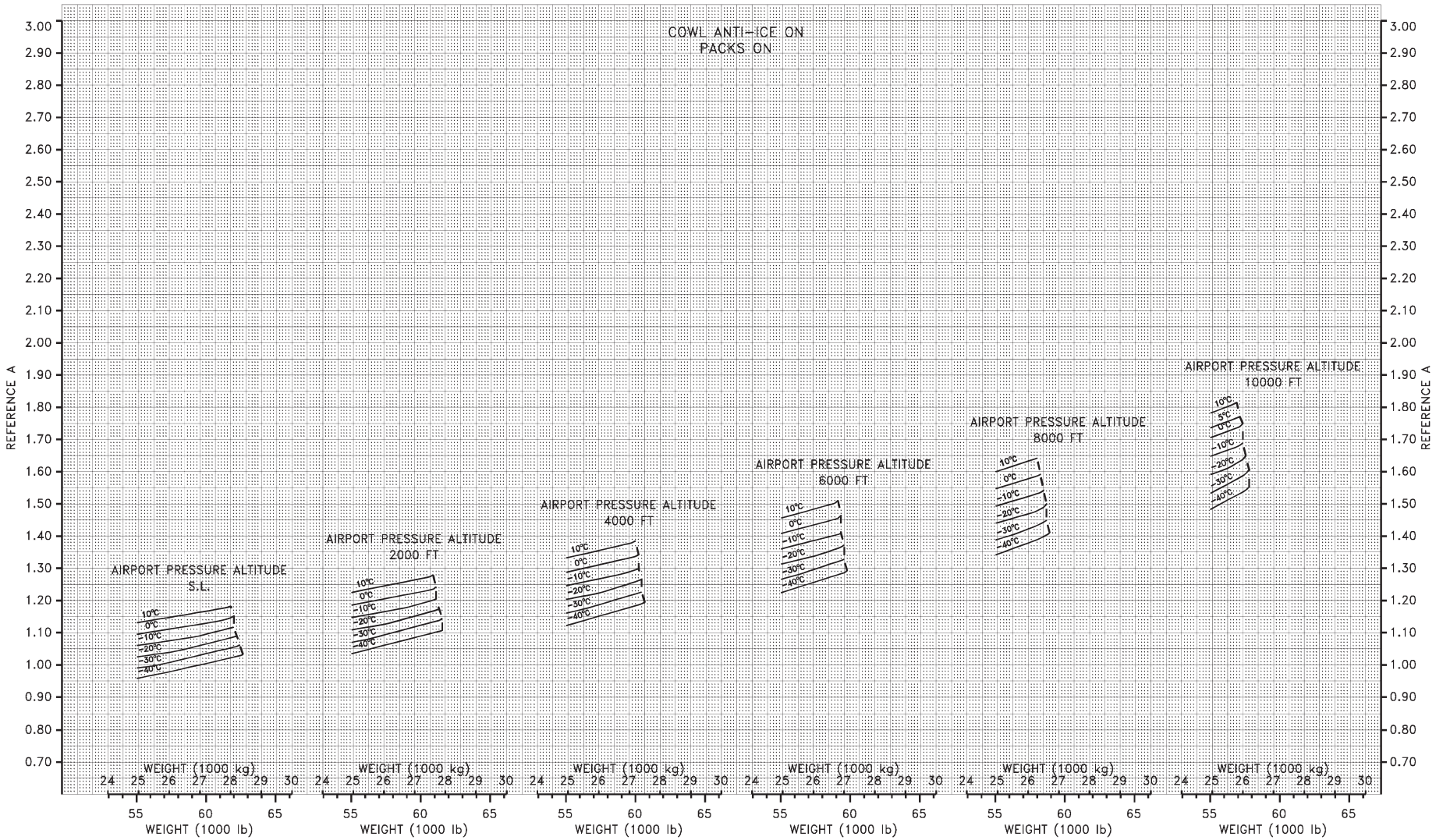
Figure 442

PERFORMANCE
Take-off Performance



Take-off Weight Limited by Field Length Requirements, Dry Runway – V_{MC} Limited, FLAPS 20

FLAPS 20

Figure 443

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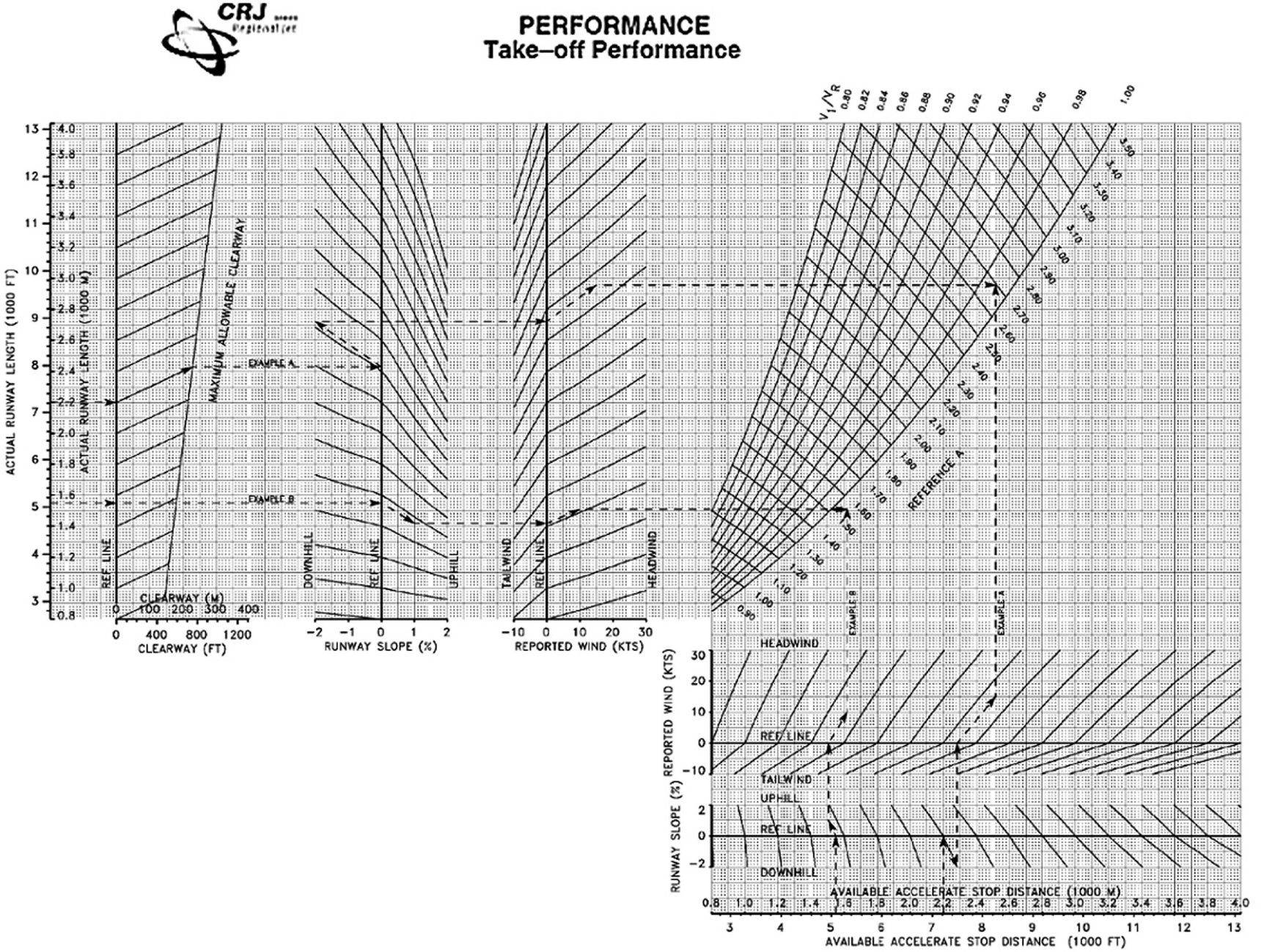

Take-off Weight Limited by Field Length Requirements, Dry Runway - One Engine Inoperative, FLAPS 20

FLAPS 20

Figure 444

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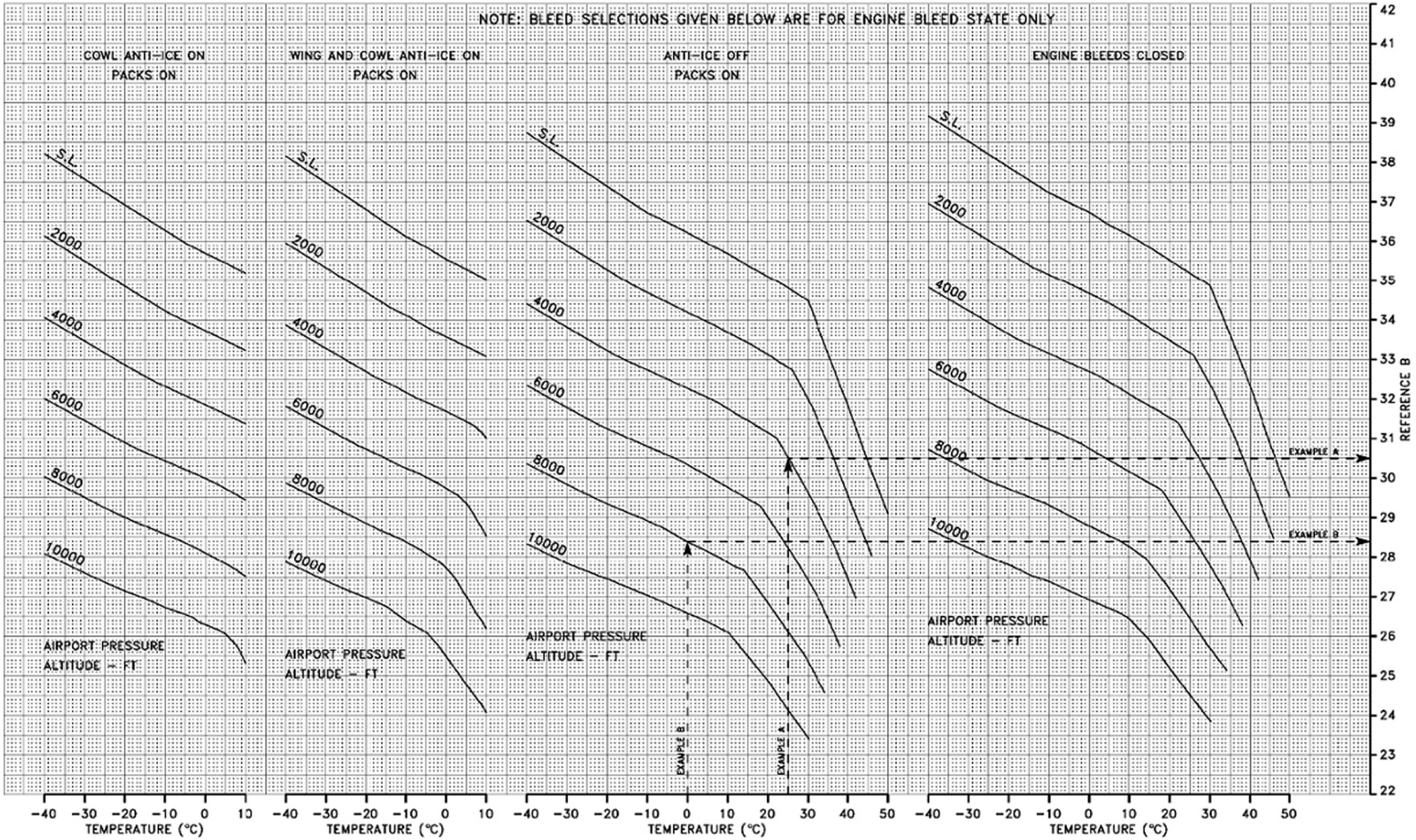
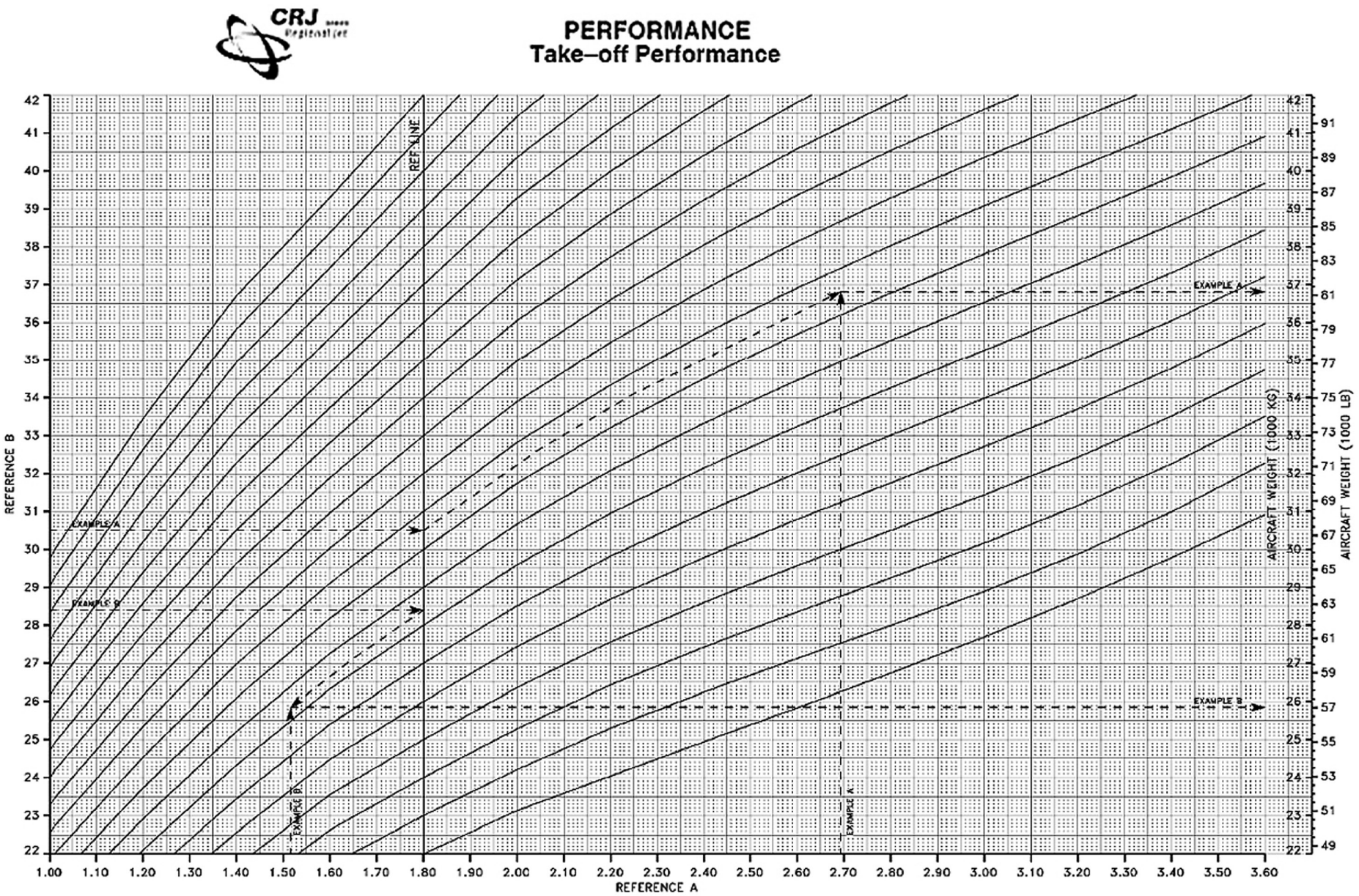


Take-off Weight Limited by Field Length Requirements, Dry Runway - One Engine Inoperative, FLAPS 20

FLAPS 20

Figure 445



Take-off Weight Limited by Field Length Requirements, Dry Runway - One Engine Inoperative, FLAPS 20

FLAPS 20

Figure 446

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S. Take-off Weight Limited by Climb Requirements – FLAPS 8

The maximum take-off weight limited by climb requirements for a FLAPS 8 take-off is determined from Figure 448, for varying conditions of temperature and airport pressure altitude, taking into account the effects of different anti-icing and engine bleed configurations.

NOTE

With the APU on, subtract 350 kg (772 lb) from the weight derived from Figure 448.

Example:

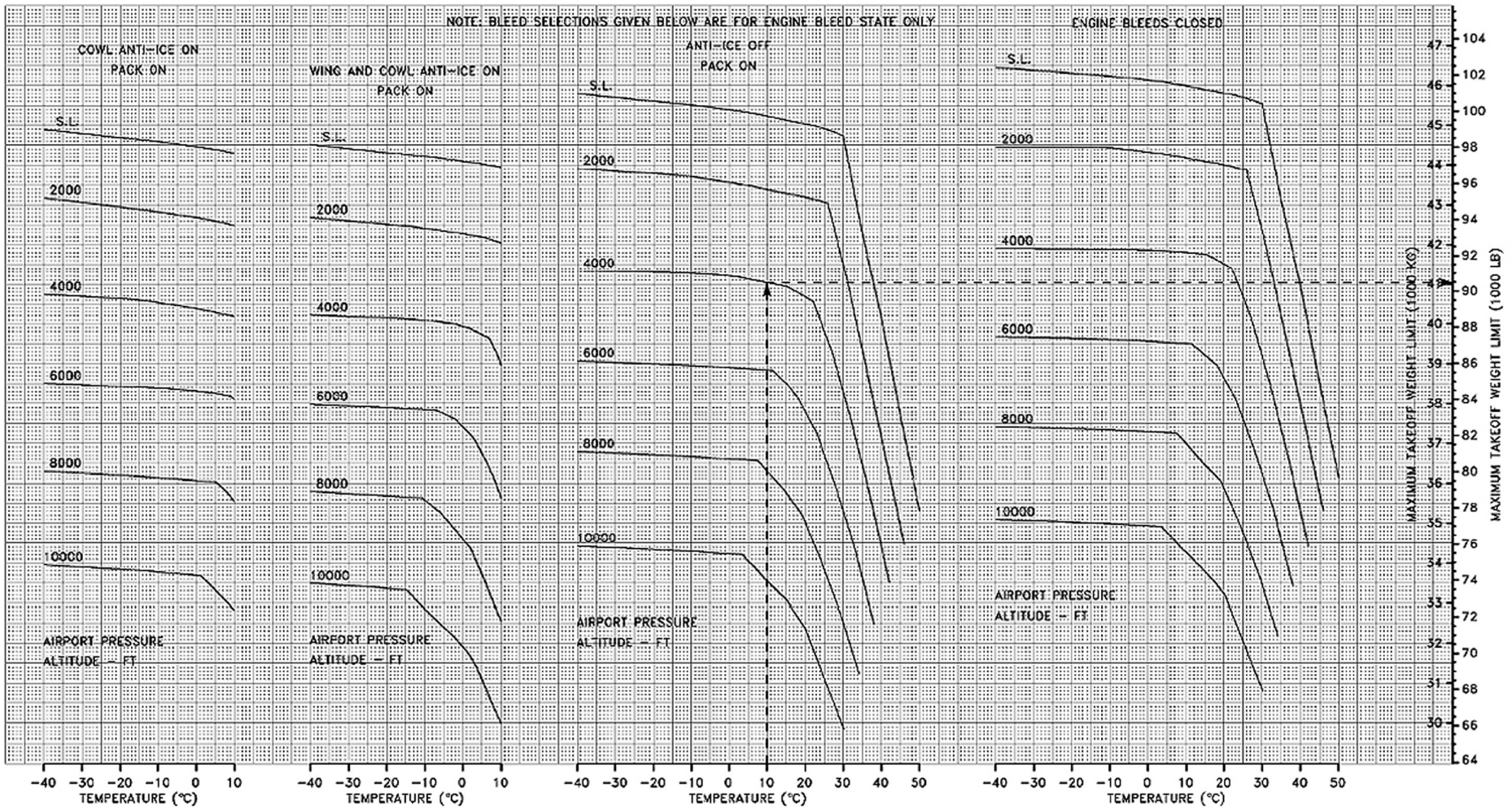
Associated conditions:

Temperature	= 10°C
Airport pressure altitude	= 4000 feet
Wing and cowl anti-ice	= Off
PACK	= On
APU	= Off

Enter Figure 448 from the temperature scale under the appropriate configuration of anti-ice and engine bleeds. As shown in the example, the maximum take-off weight limited by climb requirements is found to be 41050 kg (90490 lb).

Figure 447

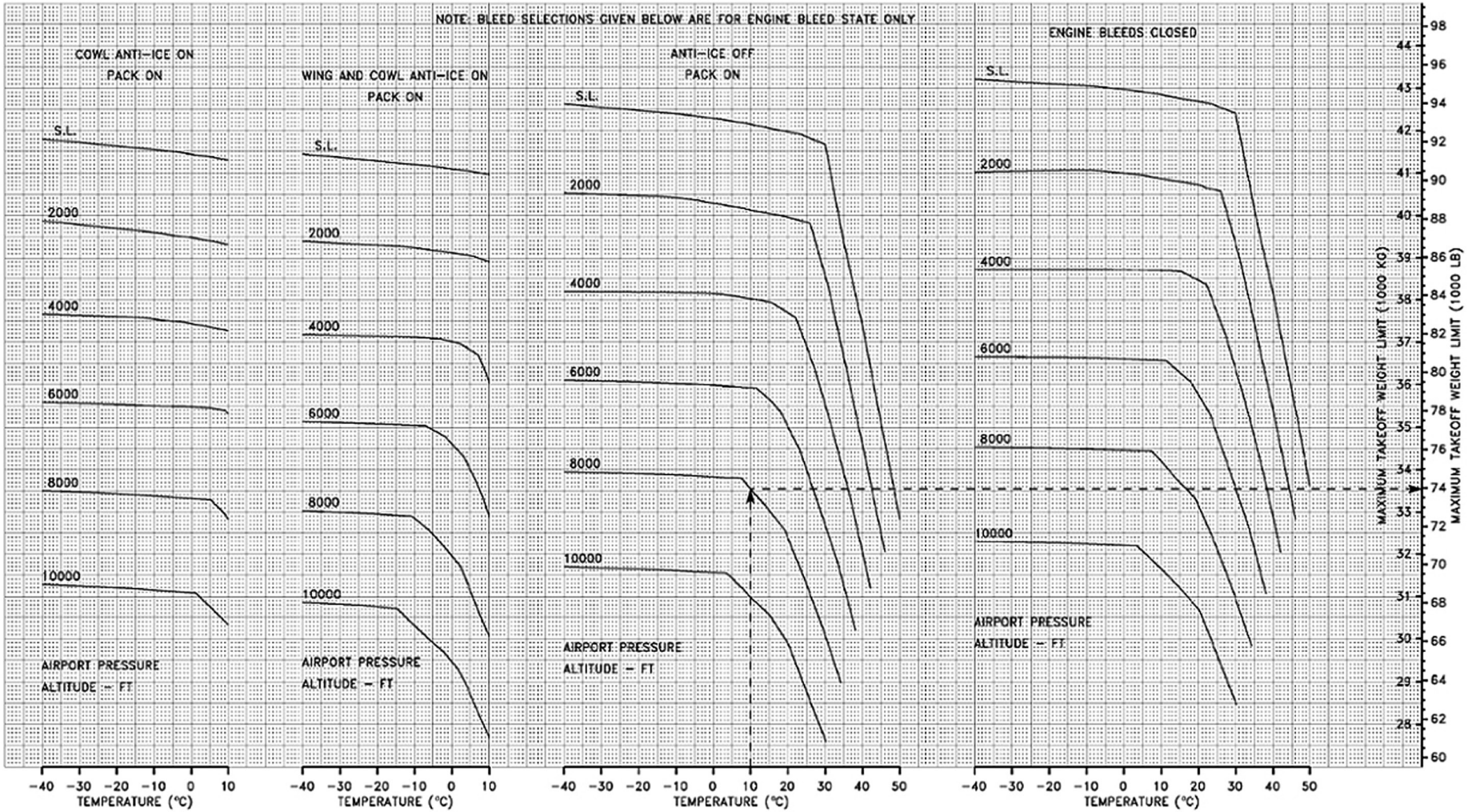
PERFORMANCE
Take–off Performance



Take-off Weight Limited by Climb Requirements - FLAPS 8

FLAPS 8

Figure 448



Take-off Weight Limited by Climb Requirements - FLAPS 20

FLAPS 20

Figure 449

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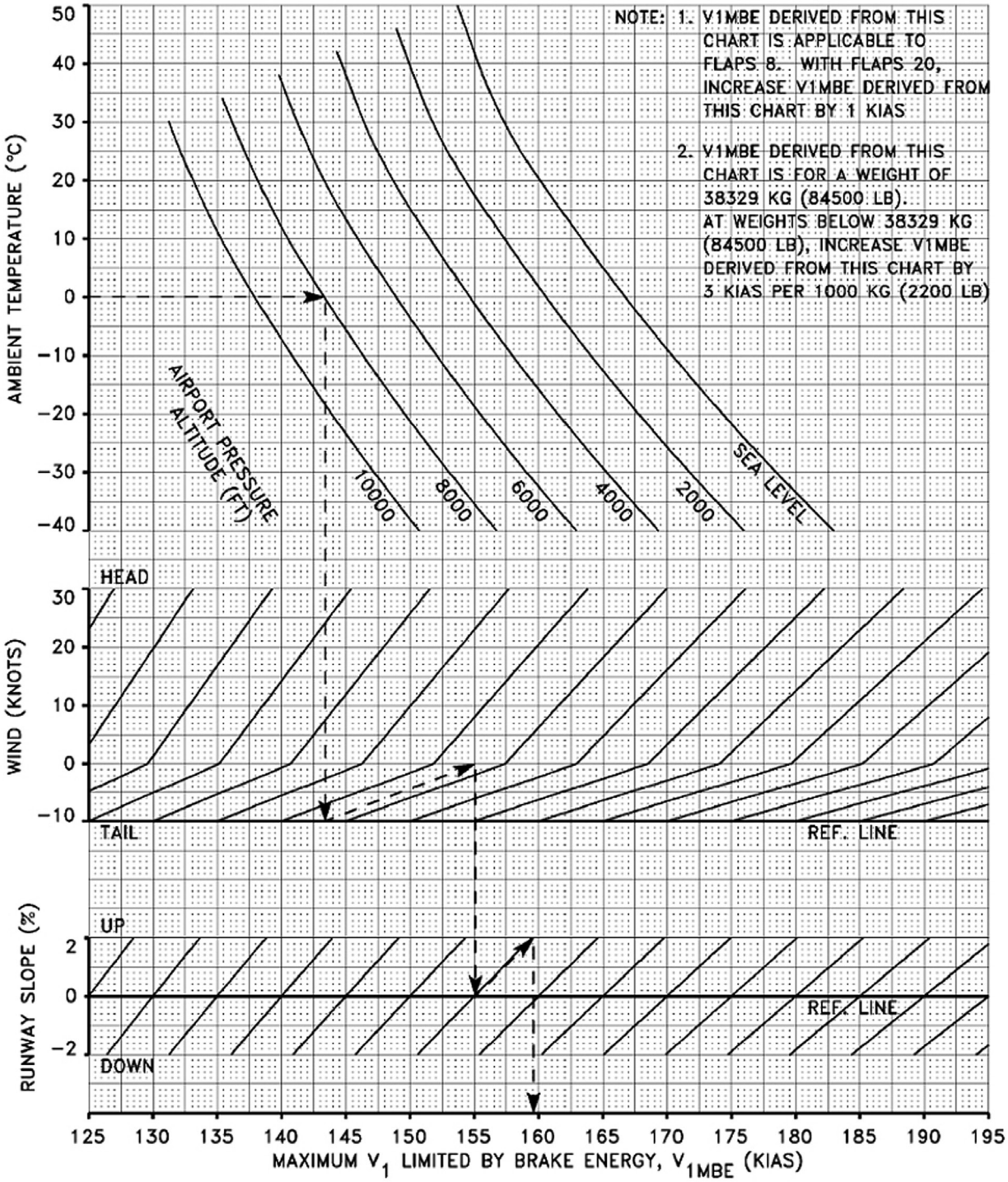
PERFORMANCE
Take–off Performance



FLAPS 8

Maximum V_1 Limited by Brake Energy (V_{1MBE}) - FLAPS 8

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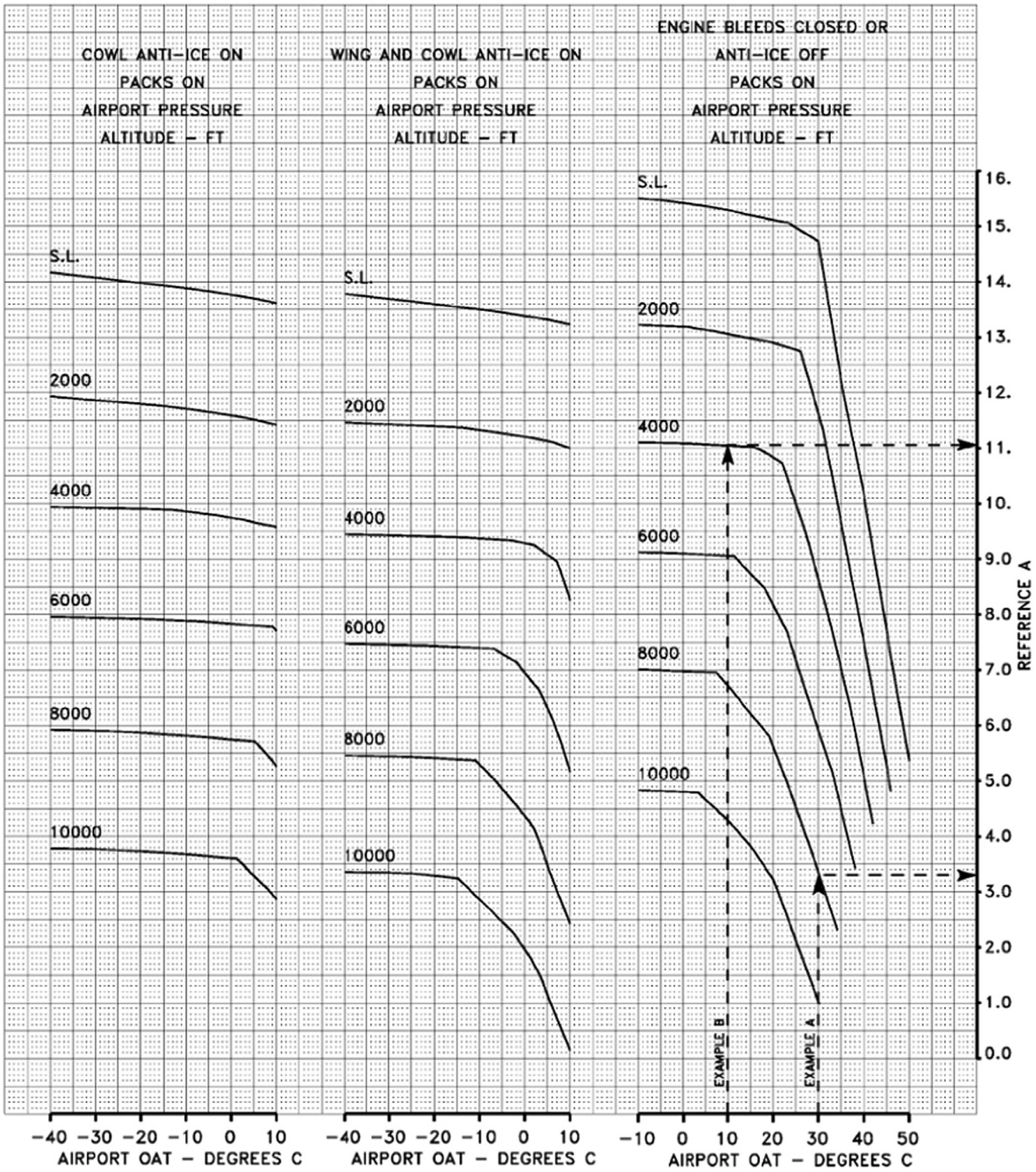
Figure 450

PERFORMANCE
Take–off Performance



FLAPS 8

Take-off Speeds - FLAPS 8

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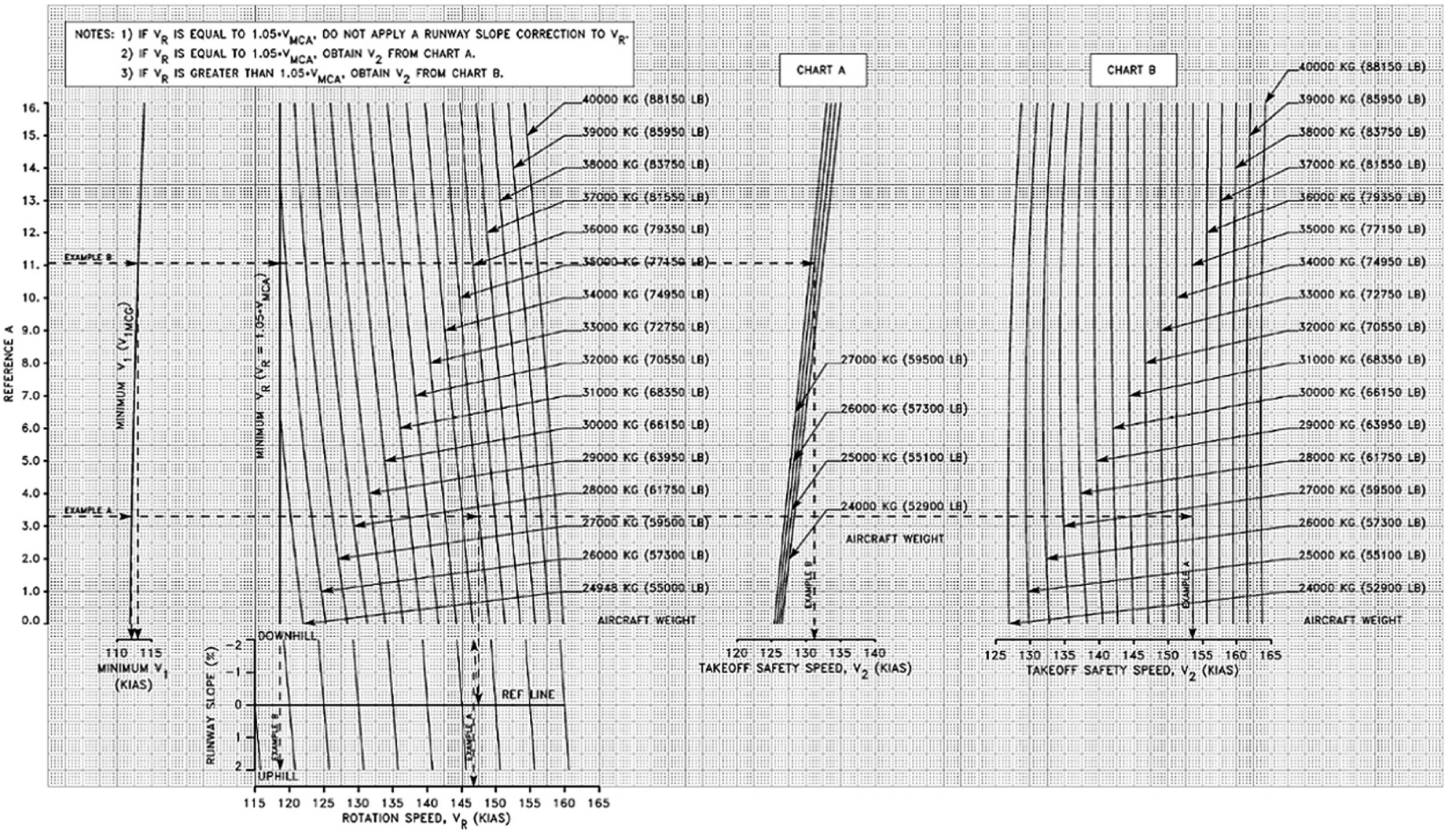
Figure 451

CRJ Regional Jet

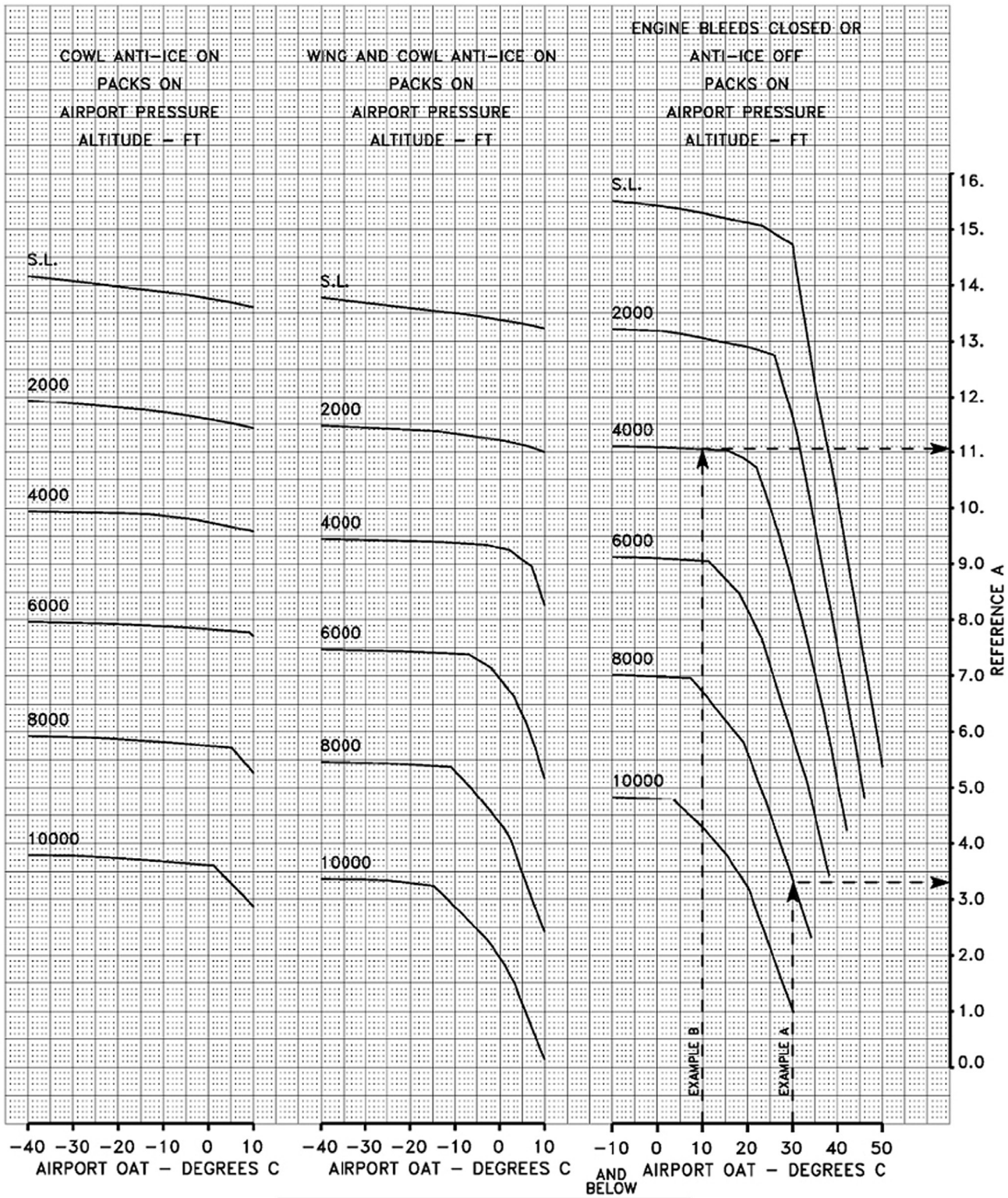
PERFORMANCE
Take–off Performance



Take-off Speeds - FLAPS 8

FLAPS 8

Figure 452



FLAPS 20

Take-off Speeds - FLAPS 20

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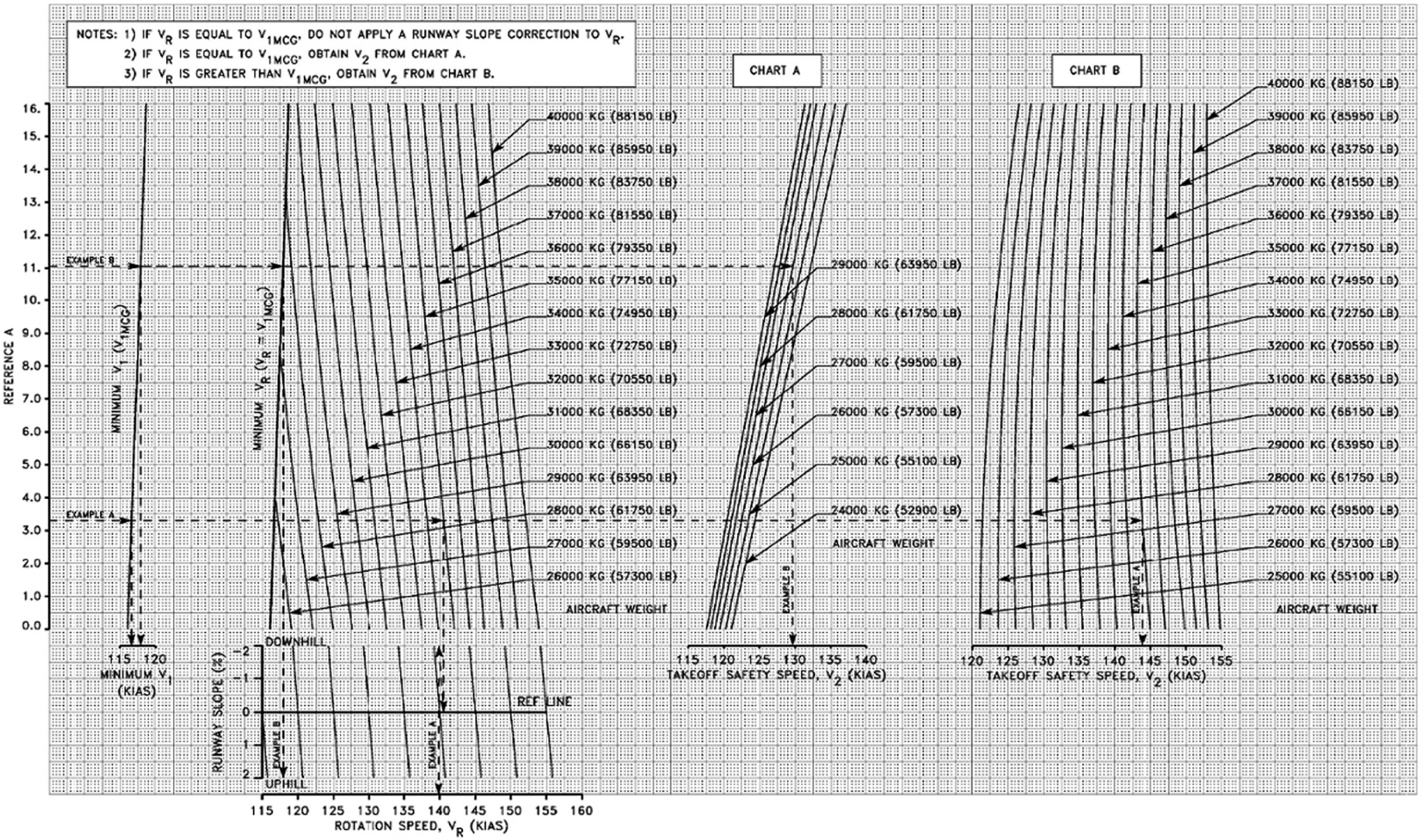
Figure 453



Take-off Speeds - FLAPS 20

FLAPS 20

Figure 454

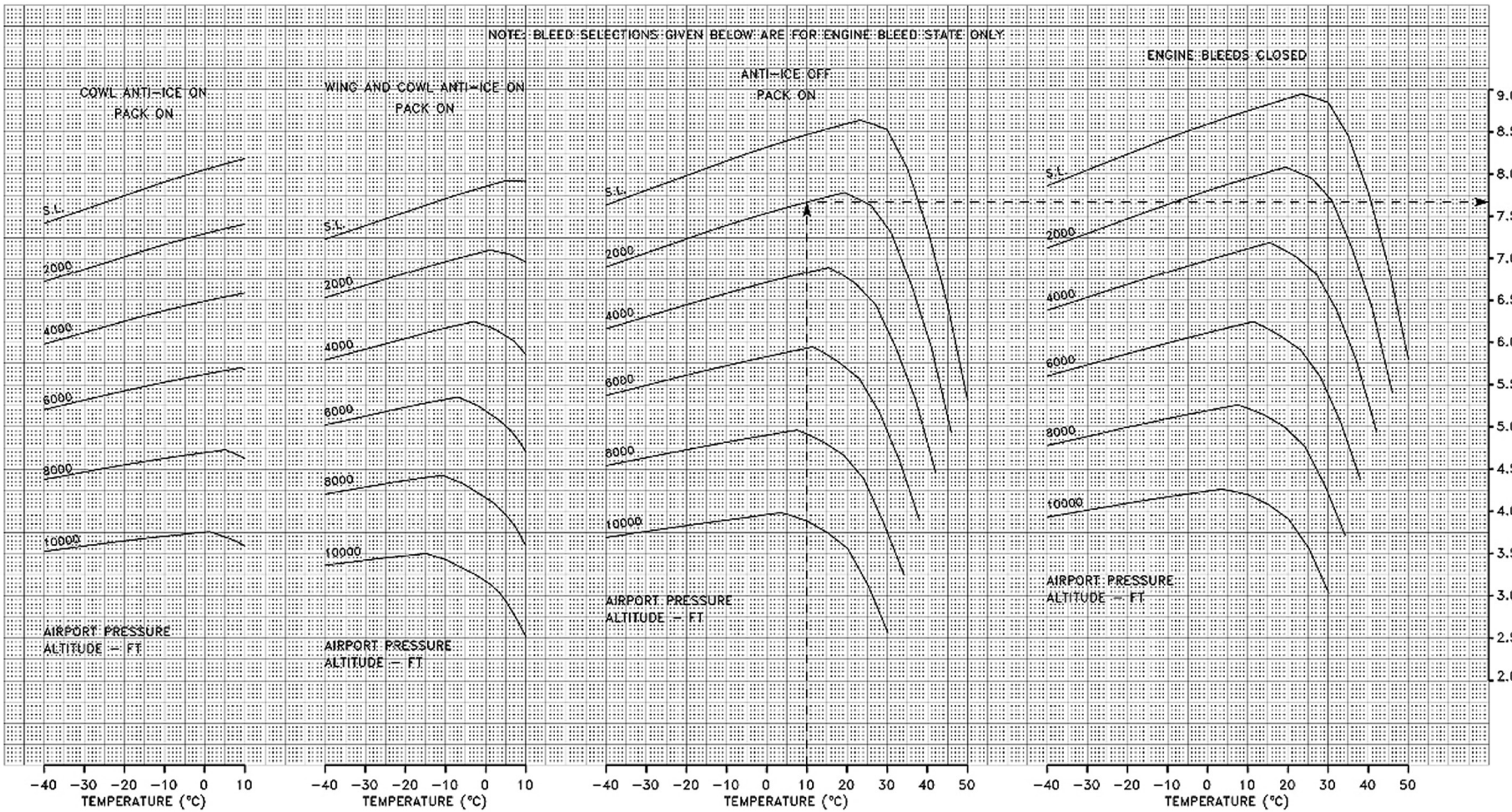


Figure 455

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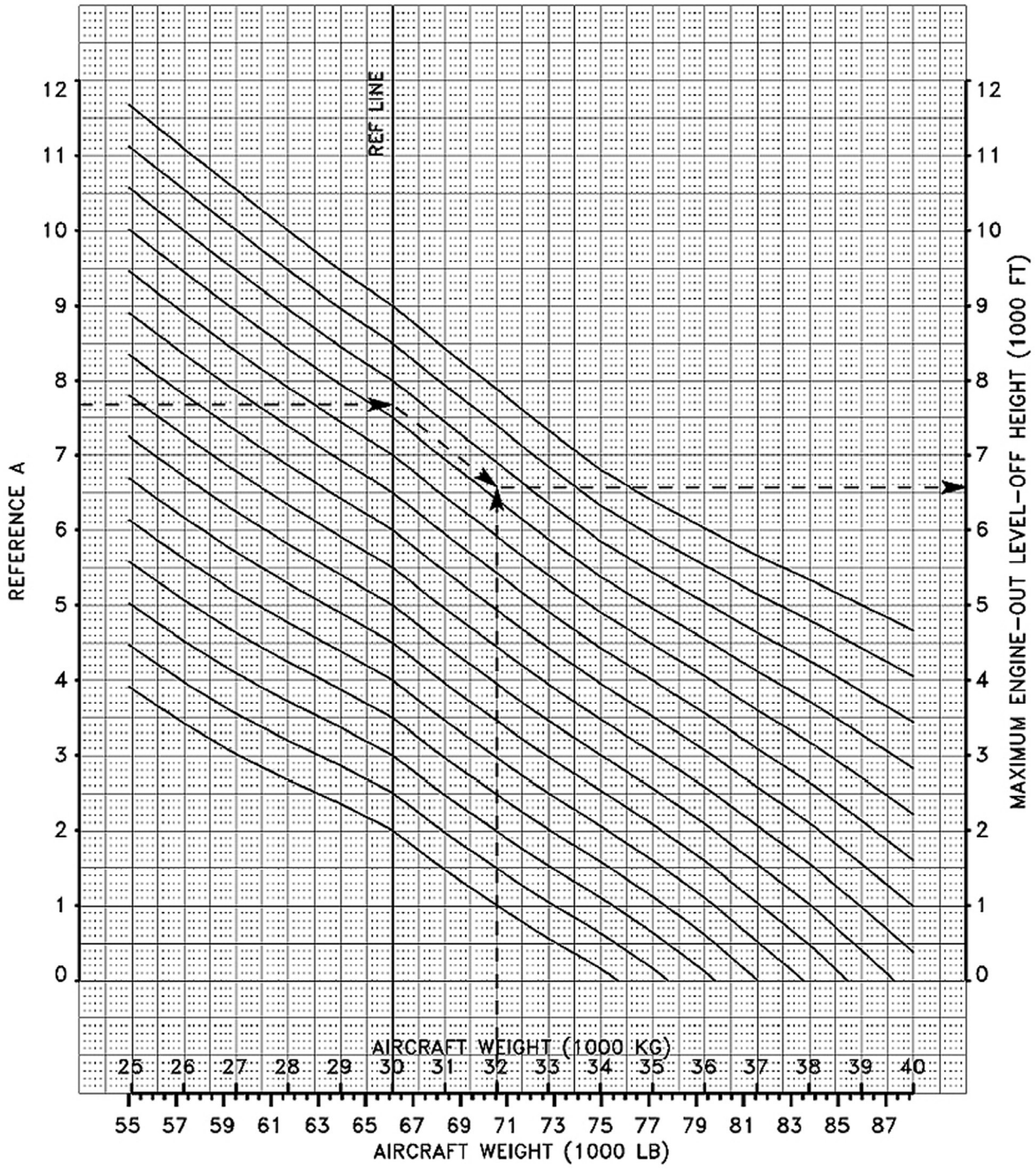
Maximum Engine-out Level-off Height - FLAPS 8

FLAPS 8



FLAPS 8

Maximum Engine-out Level-off Height - FLAPS 8

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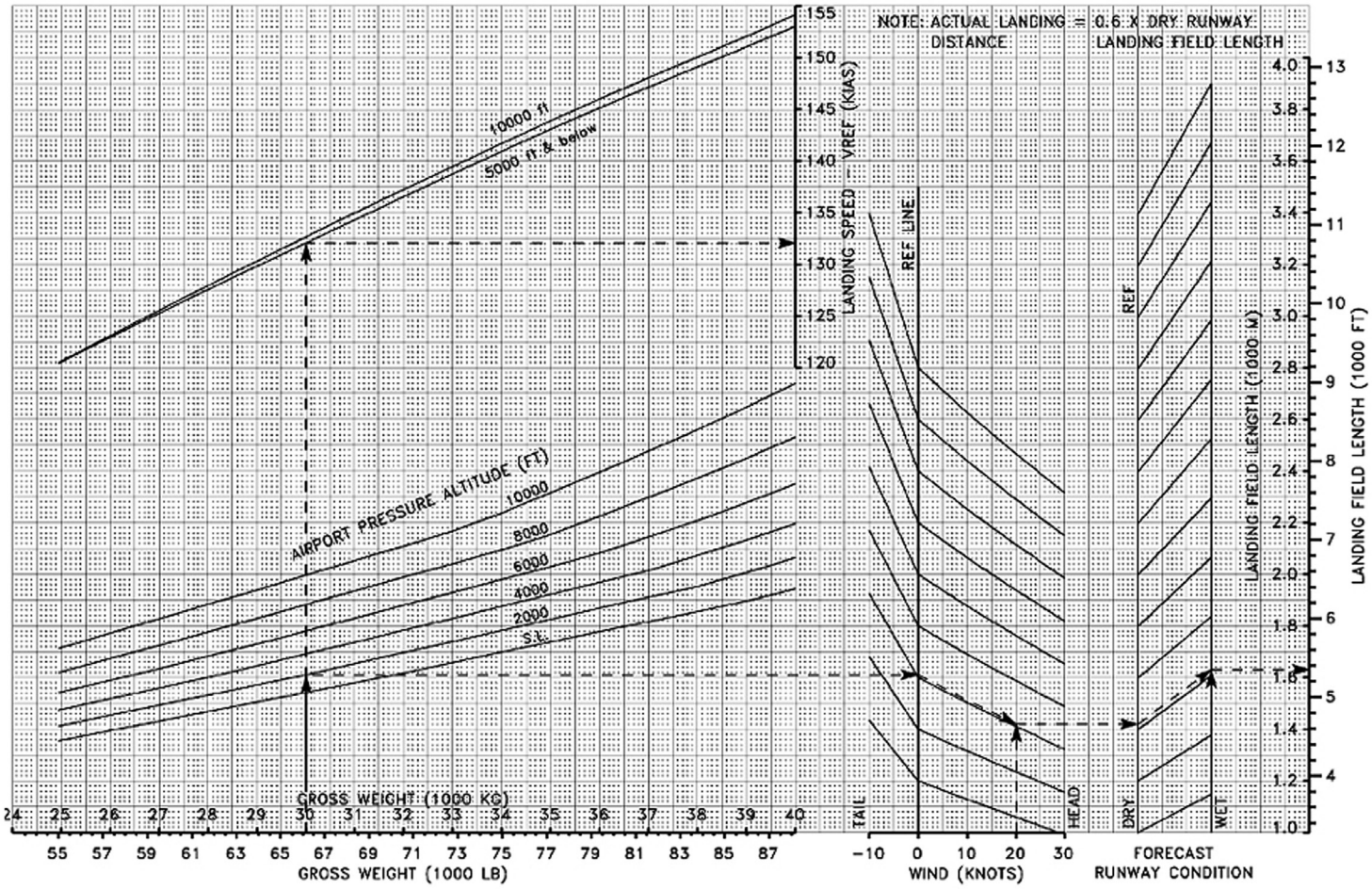
Figure 456



Landing Field and Landing Speed - FLAPS 45

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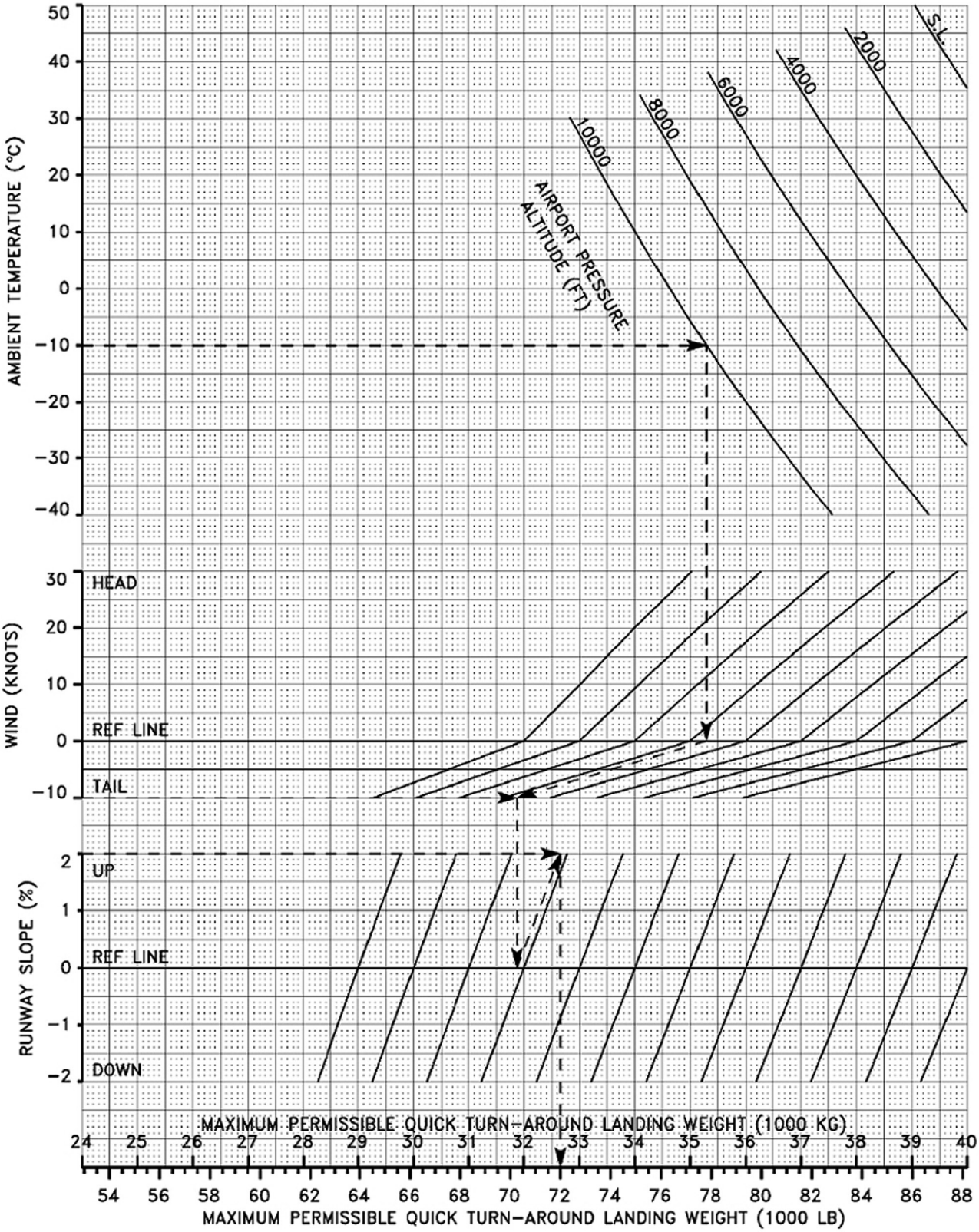
Figure 457



Maximum Permissable Quick Turn-around Landing Weight

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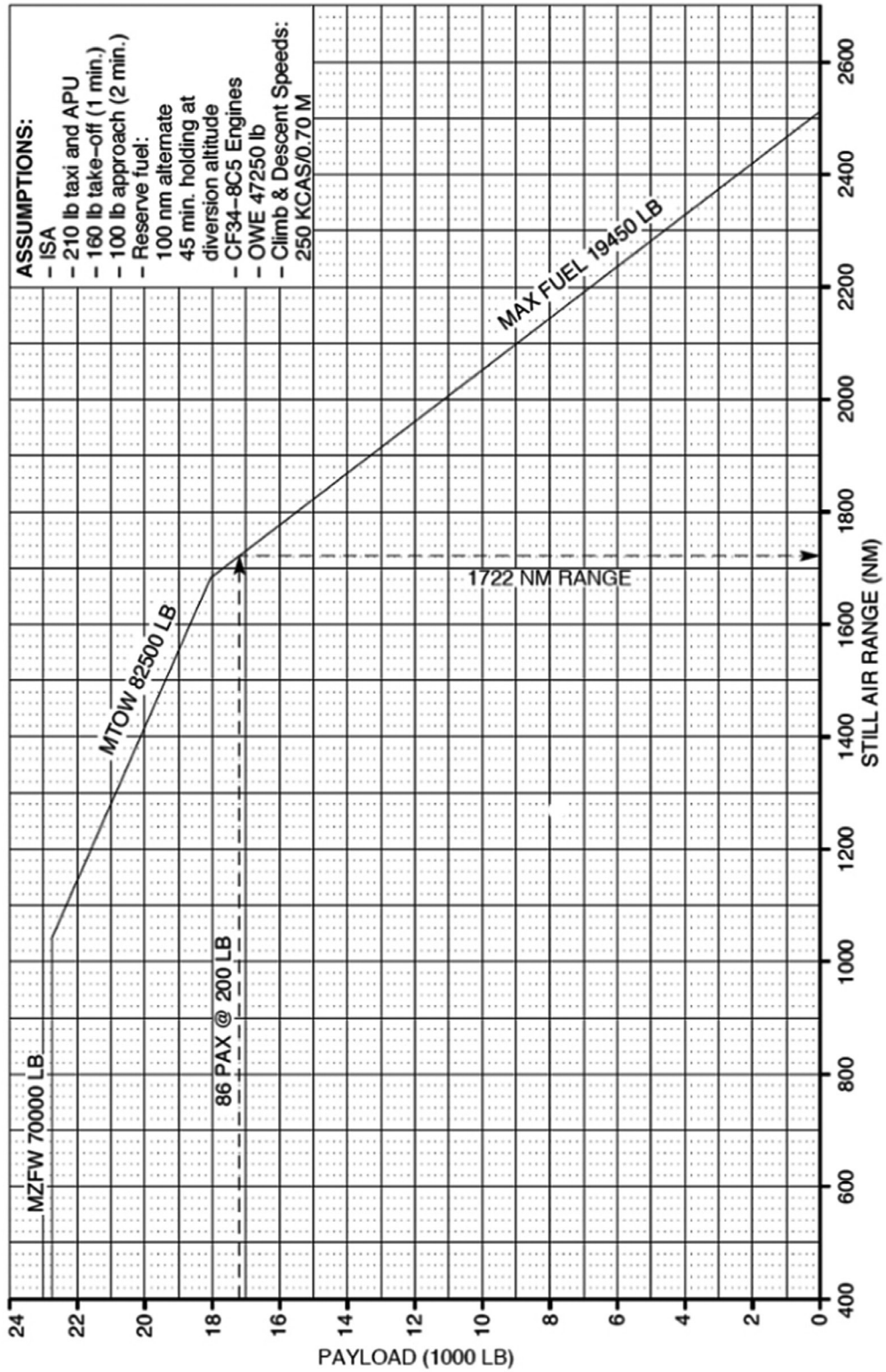
Figure 458



Payload/Range

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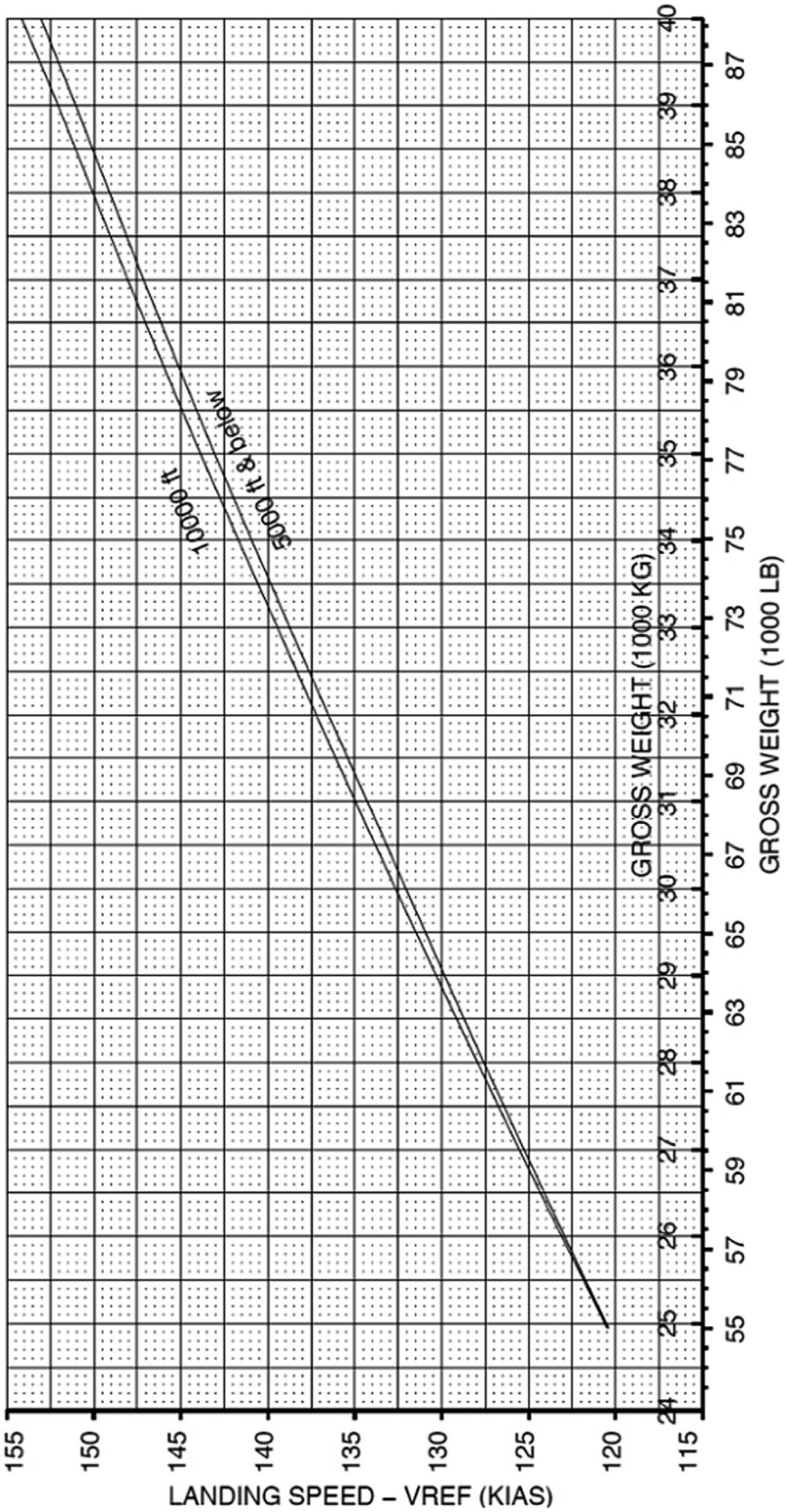
Figure 459



Landing Speed - Flaps at 45 Degrees/Slats Extended

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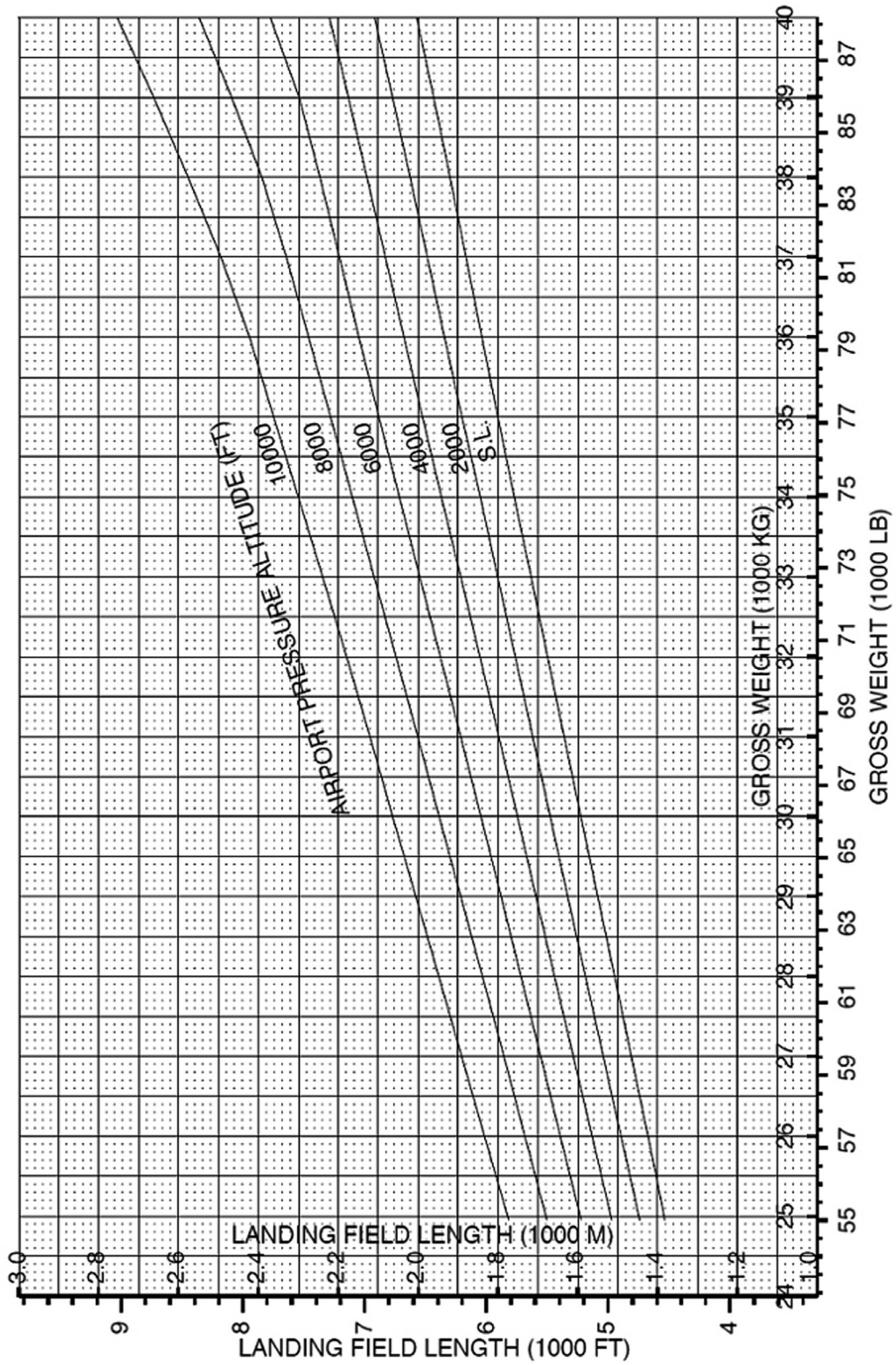
Figure 460



Landing Field Length - Flaps at 45 Degrees/Slats Extended

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Figure 461

2.2 WEIGHT AND LOADING

2.2.1 MAXIMUM STRUCTURAL WEIGHT LIMITS

	Basic Gross Weight MS 4-201539	Intermediate Gross Weight MS 4-308807	High Gross Weight MS 4-308907	Enhanced High Gross Weight MS 4-309238
Ramp Weight	28,077 kg (61,900 lb)	29,089 kg (64,130 lb)	29,347 kg (64,700 lb)	29,665 kg (65,400 lb)
Maximum Take-off Weight	27,987 kg (61,700 lb)	28,998 kg (63,930 lb)	29,257 kg (64,500 lb)	29,574 kg (65,200 lb)
Maximum Landing Weight	27,442 kg (60,500 lb)	28,009 kg (61,750 lb)	28,009 kg (61,750 lb)	28,123 kg (62,000 lb)
Maximum Zero Fuel Weight	25,174 kg (55,500 lb)	25,855 kg (57,000 lb)	25,855 kg (57,000 lb)	26,308 kg (58,000 lb)
Minimum Structural Design Weight	14,403 kg (31,753 lb)	14,403 kg (31,753 lb)	14,403 kg (31,753 lb)	14,403 kg (31,753 lb)

NOTE

Maximum take-off weight and maximum landing weight may be reduced by performance requirements of Section 5.

2.2.2 CENTRE OF GRAVITY LIMITS (LANDING GEAR DOWN)

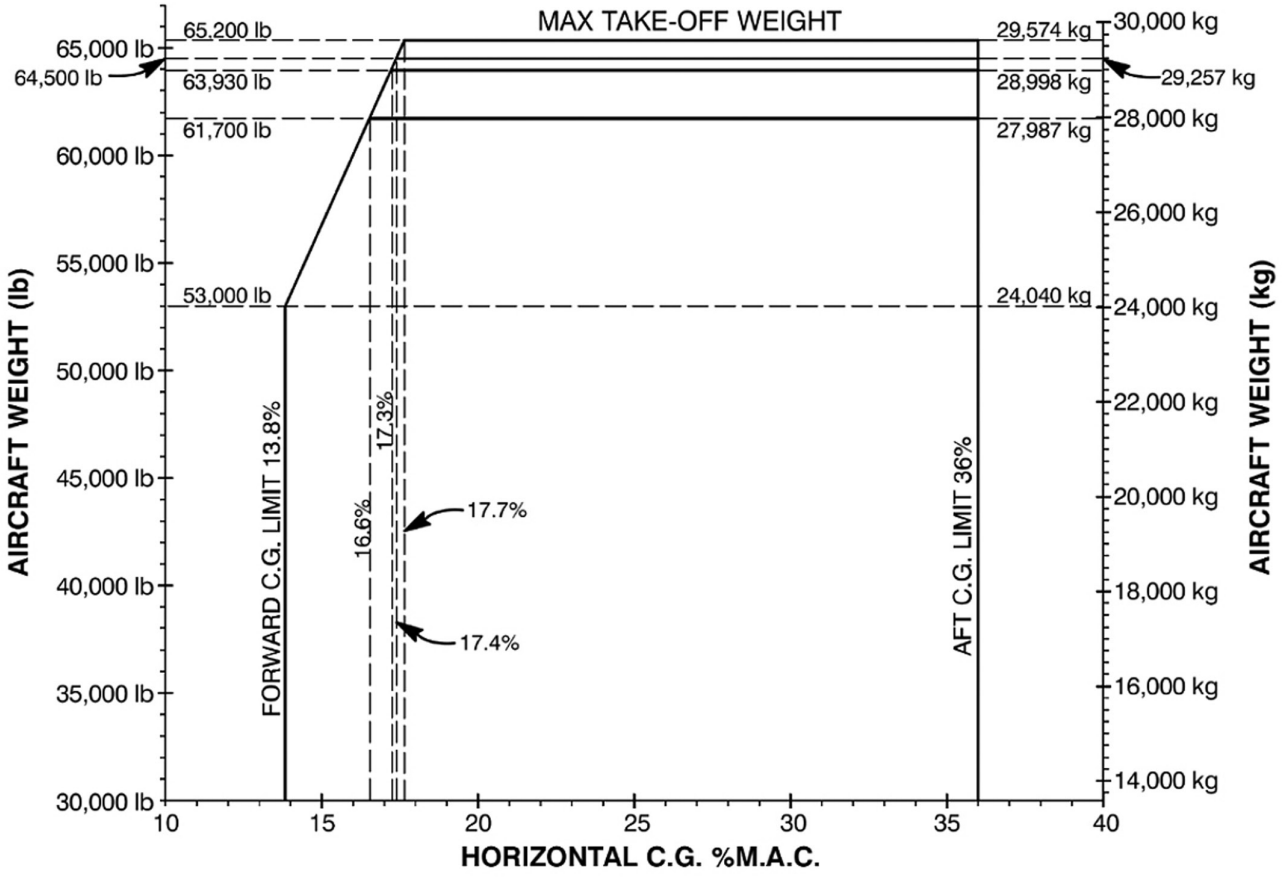

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Figure 462

The Centre of Gravity (C.G.) limits at all weights with landing gear extended are as follows:

1. Forward limit:

   387.16 inches aft of the reference datum (13.8% M.A.C.) for all weights up to 24,040 kg (53,000 lb).

   Slopes from 387.16 inches aft of the reference datum (13.8% M.A.C.) at 24,040 kg (53,000 lb) to 390.84 inches (17.7% M.A.C.) at 29,574 kg (65,200 lb).

2. Aft limit:

   408.14 inches aft of the reference datum (36.0% M.A.C.) at all weights.

If these C.G. limits are met with the airplane landing gear extended, safe limits in flight are automatically achieved (see Figure 2–2–1, CG Limits).

2.2.3 LOADING INSTRUCTIONS

The airplane must always be loaded (i.e. crew, passengers, fuel, freight and baggage) to remain within the weight and centre of gravity limits in paragraphs 2.2.1 and 2.2.2.

Procedures for calculating weight and centre of gravity of a loaded airplane are contained in the Weight and Balance Manual (PSM 1–84–8 or 1–84–8M).

2.2.4 LOADING LIMITS

For baggage compartment loading limits for the various configurations, refer to the Cargo Loading Manual (PSM 1–84–8A).

2.2.5 MANEUVERING LIMIT LOAD FACTORS

The following maneuvering limit load factors limit the permissible angle of bank in turns and limit the severity of pull-up and push-over maneuvers.

Flap retracted	+2.5 g −1.0 g
Flap extended	+2.0 g 0.0 g

2.2.6 MAXIMUM LATERAL ASYMMETRY

Maximum fuel imbalance between contents of main fuel tanks is 272 kg (600 lb).

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Figure 463

d. The maximum permissible take – off and landing weights may be further limited by available runway lengths (sub-Sections 5.5 and 5.11), obstacle clearance (sub-Section 5.6) and brake energy (sub – section 5.12).

e. The maximum permissible take-off and landing weight is not limited by maximum tire speed at weight-altitude-temperatures, wind speeds and runway gradients shown on the performance charts included in this section.

5.1.5 MINIMUM CONTROL SPEEDS

The minimum control speeds, air, are as follows:

V_{MCA}	(Flap 15°)	91 kt CAS
	(Flap 10°)	95 kt CAS
	(Flap 5°)	98 kt CAS
	(Flap 0°)	113 kt CAS
V_{MCL}	(Flap 35°)	92 kt CAS
	(Flap 15°)	96 kt CAS
	(Flap 10°)	99 kt CAS
	(Flap 5°)	100 kt CAS

The minimum control speeds, ground, are as follows:

V_{MCG}	(Flap 15°)	89 kt CAS
	(Flap 10°)	89 kt CAS
	(Flap 5°)	89 kt CAS

5.1.6 USE OF PERFORMANCE DATA AND CHARTS

a. Altitudes: All altitudes are pressure altitudes.

b. Outside Air Temperature (OAT) is the ambient air temperature. In flight, cockpit indicated Static Air Temperature (SAT) is equal to OAT. At rest, on the ground,the indicated SAT may be higher than the OAT.

c. Performance data given at a weight of 18,000 kg (39,680 lb) must be used for weights below 18,000 kg (39,680 lb).

d. Performance data shown at ISA –20°C must be used for temperatures below ISA –20°C.

e. Performance data shown for 20 kt headwind must be used for headwinds greater than 20 kt.

f. Performance data shown for altitudes at sea level must be used for altitudes below sea level.

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Figure 464

REFERENCE STALL SPEEDS (V_{SR})

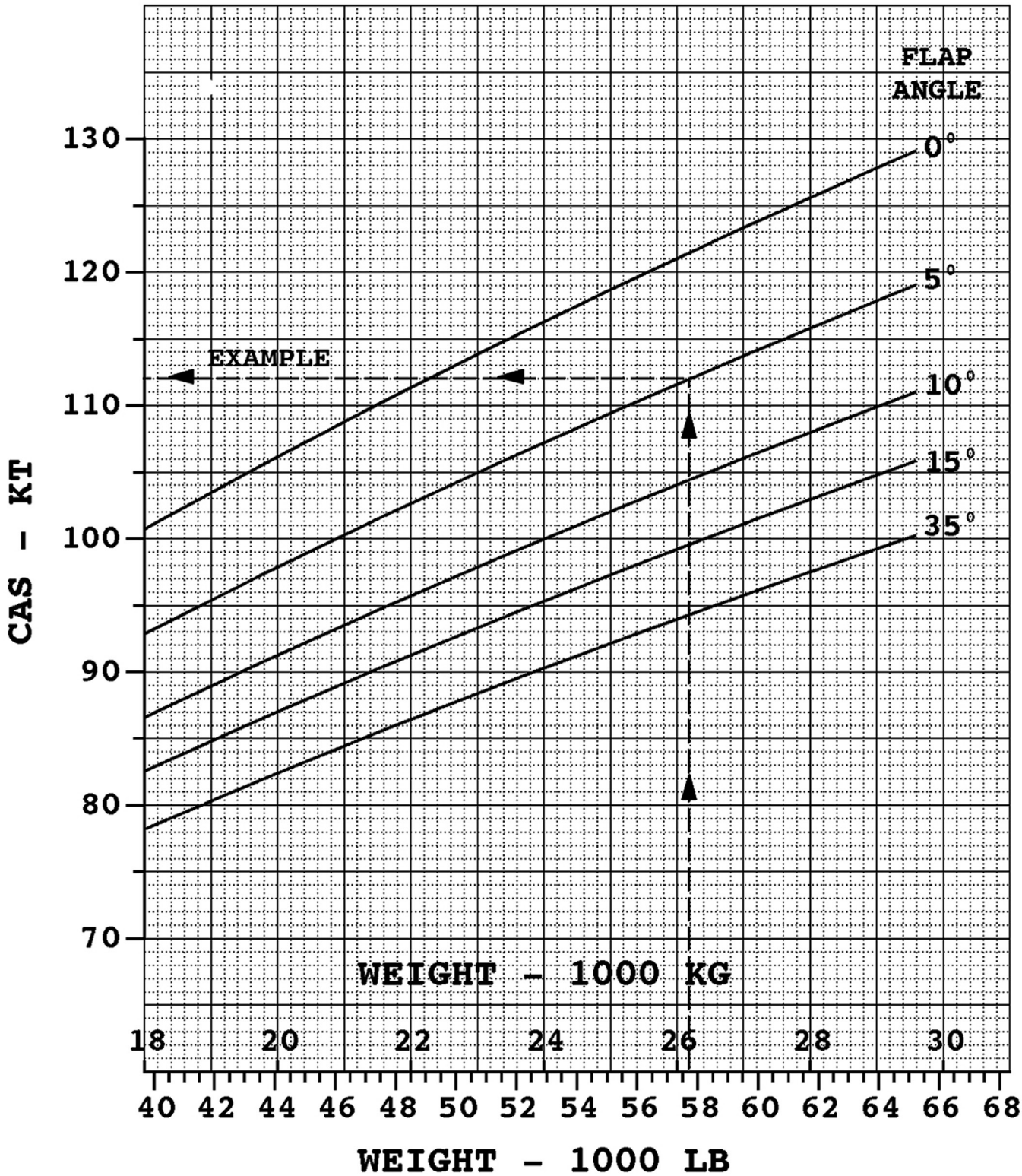

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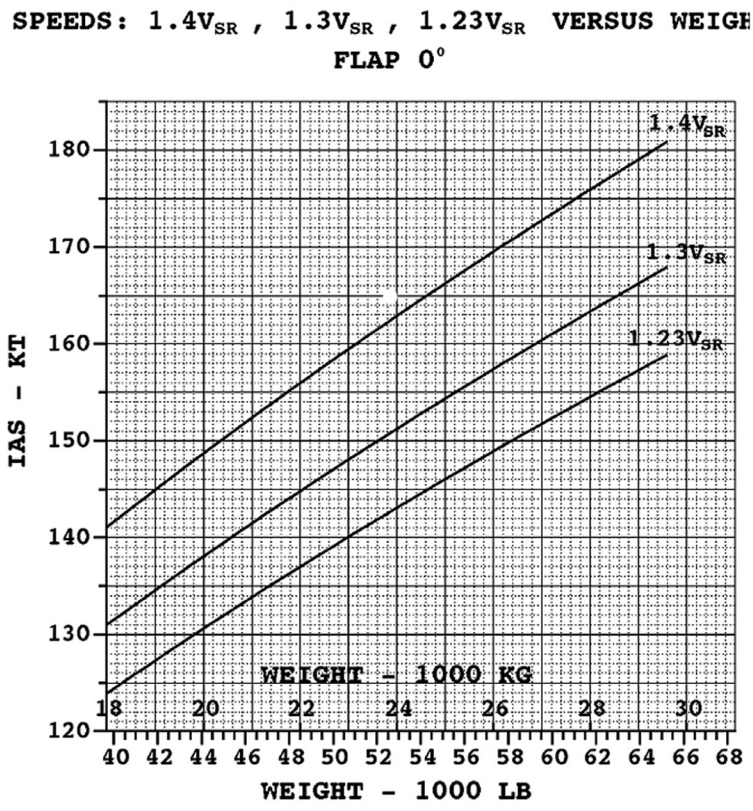
Figure 465



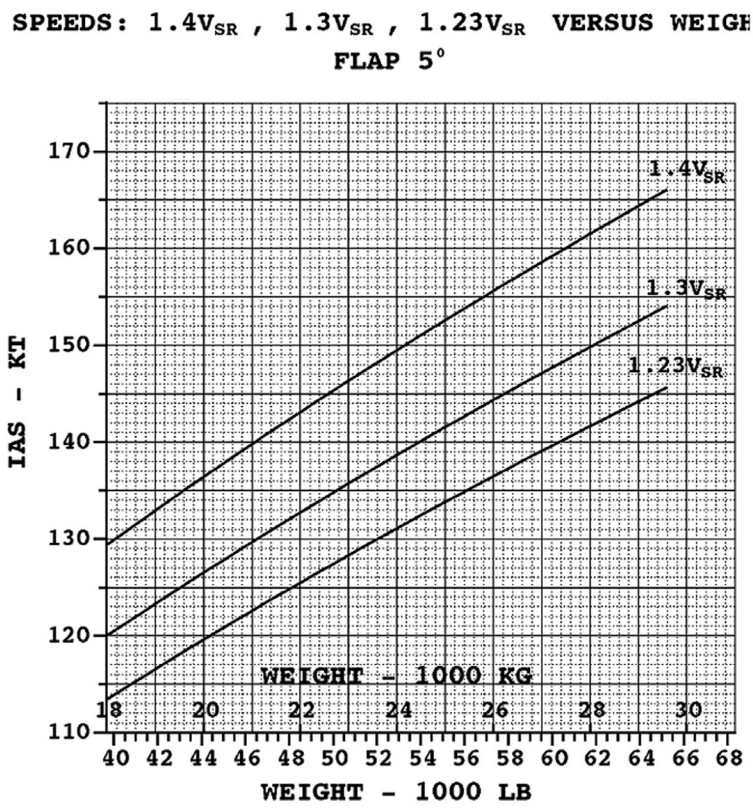


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Figure 466

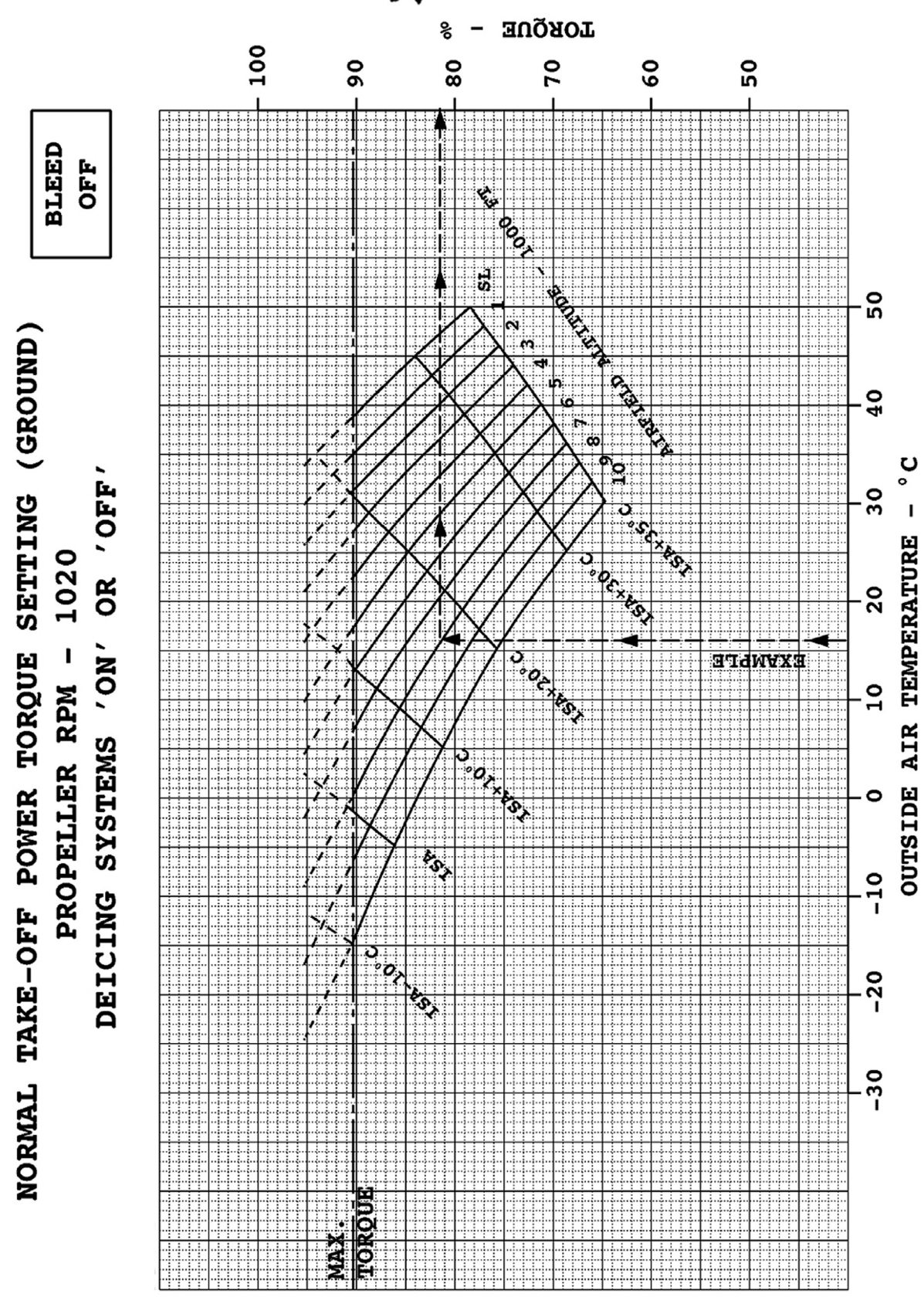

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Figure 467

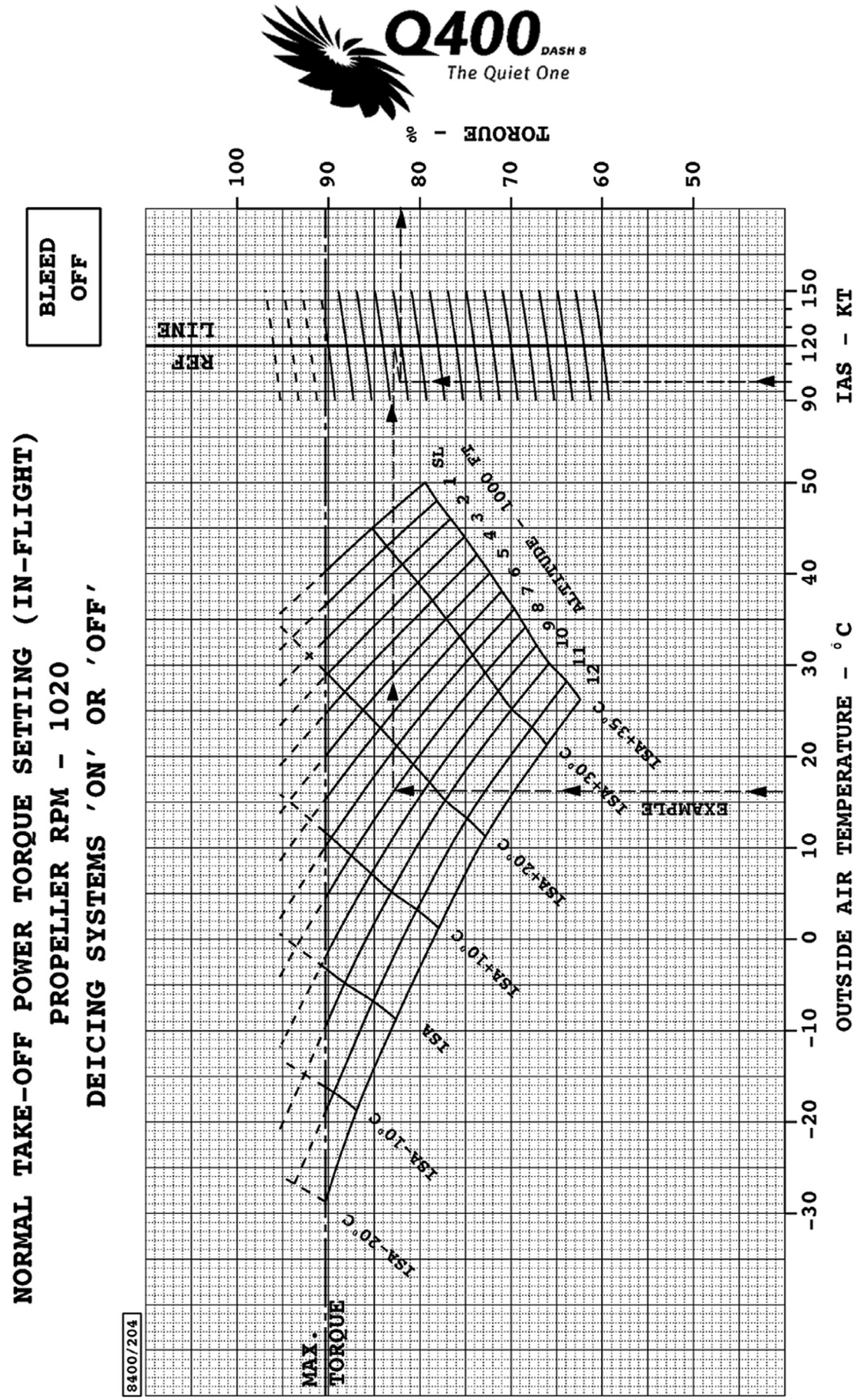

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Figure 468

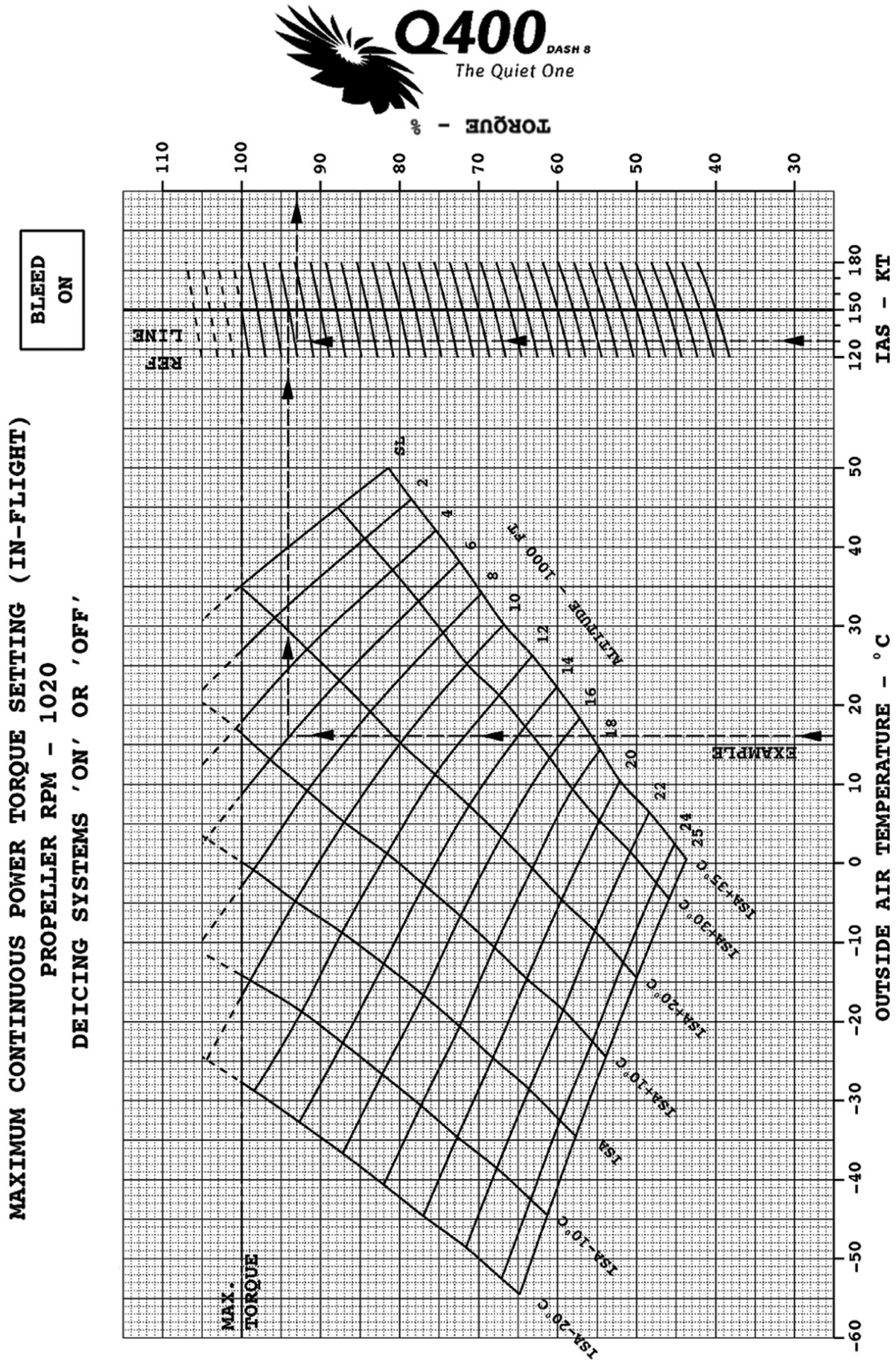

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Figure 469

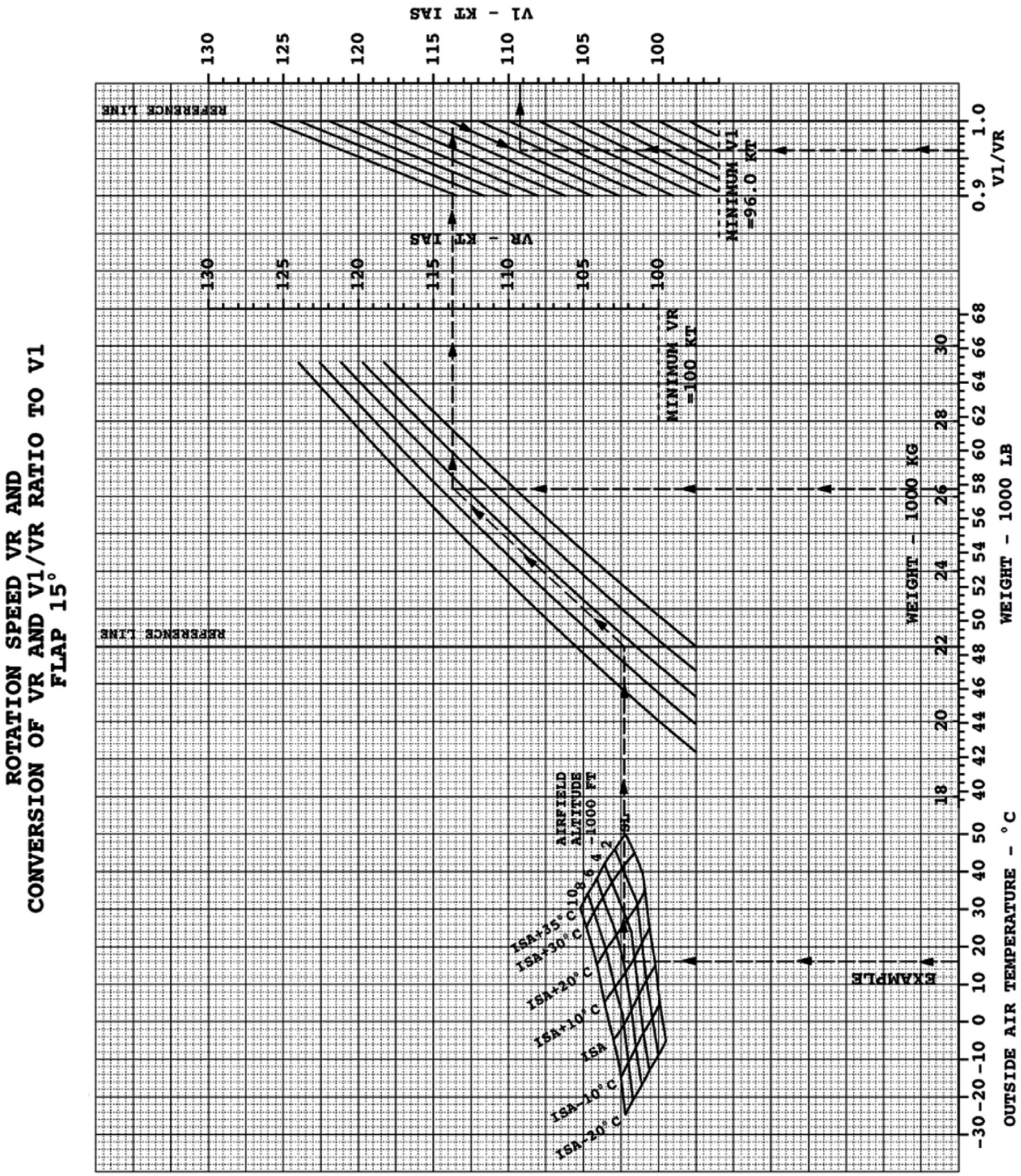

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Figure 470

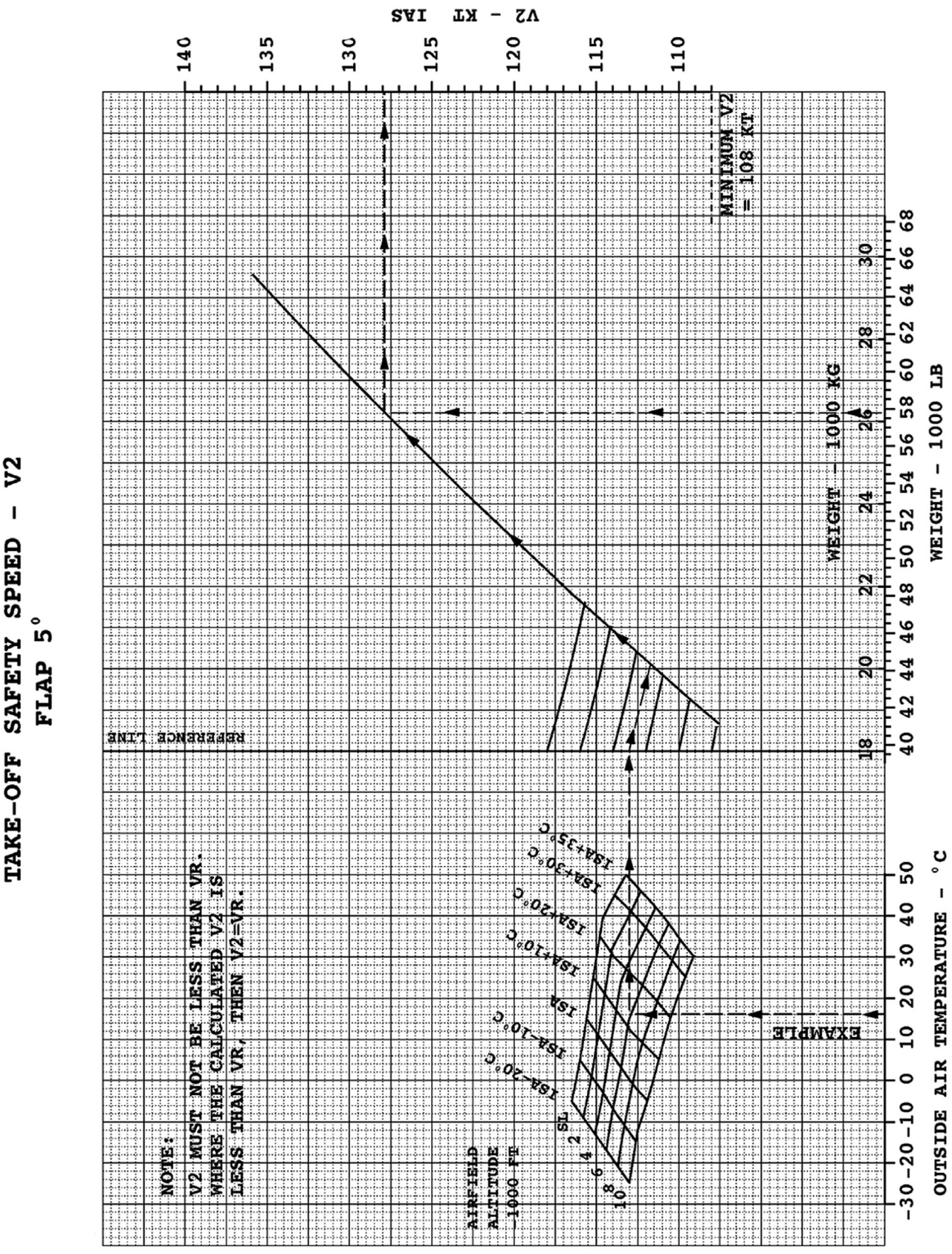

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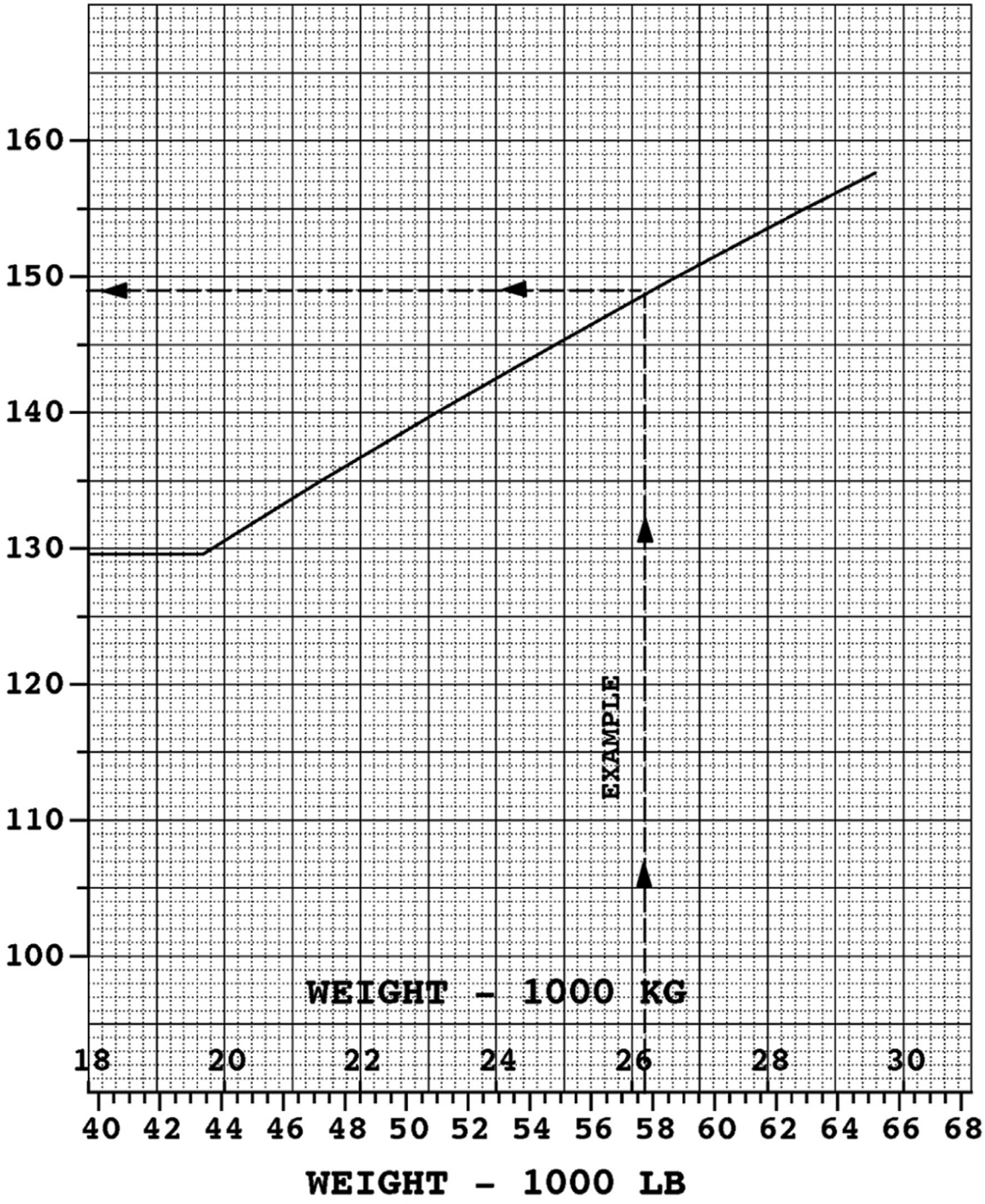
Figure 471

FINAL TAKE-OFF CLIMB SPEED
FLAP 0°



NOTE: SPEED APPLIES TO ALL ALTITUDES AND TEMPERATURES

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Figure 472

MAXIMUM PERMISSIBLE TAKE-OFF WEIGHT (WAT LIMIT)
TAKE-OFF FLAP 5°

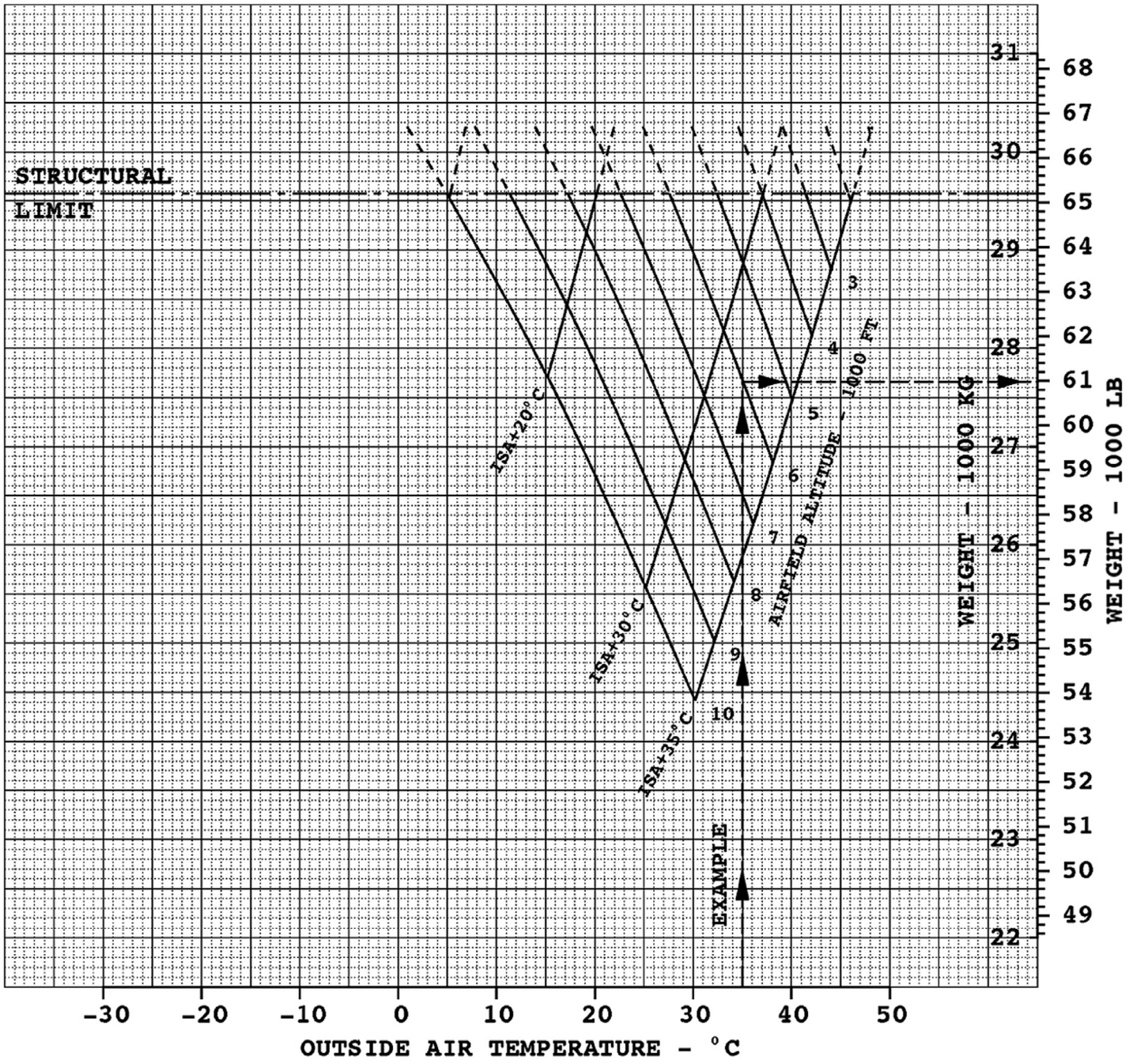

Figure 473

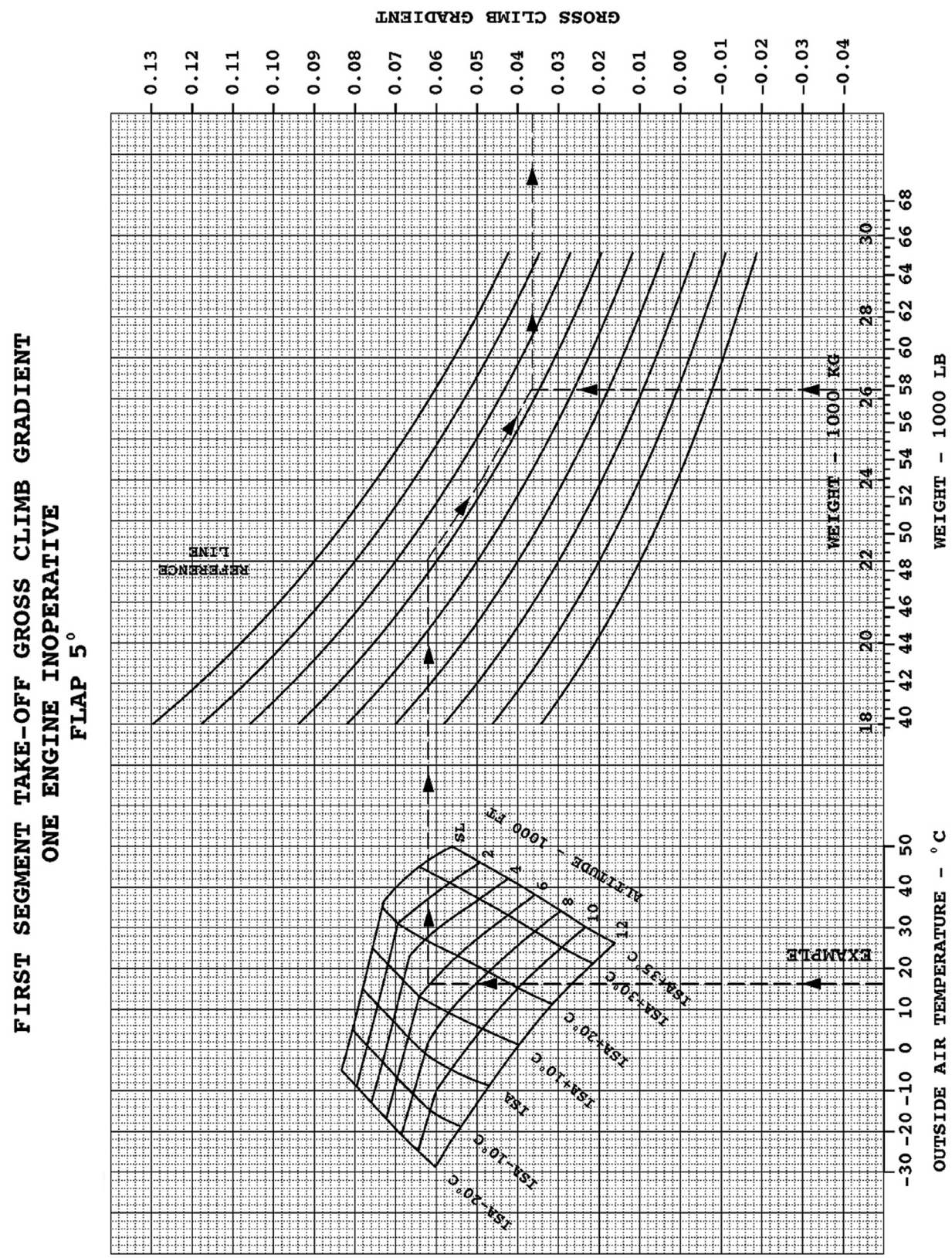

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Figure 474

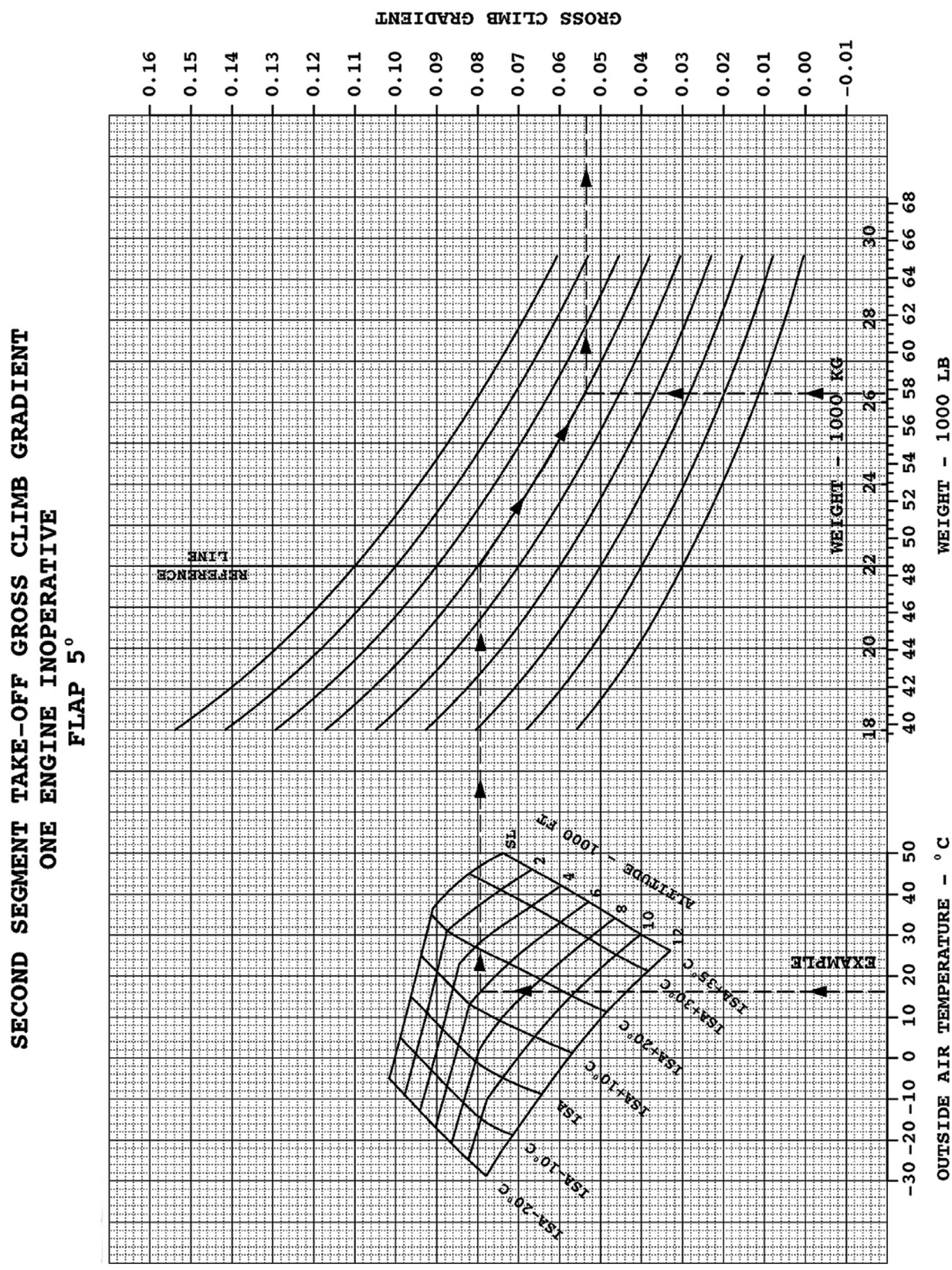

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Figure 475

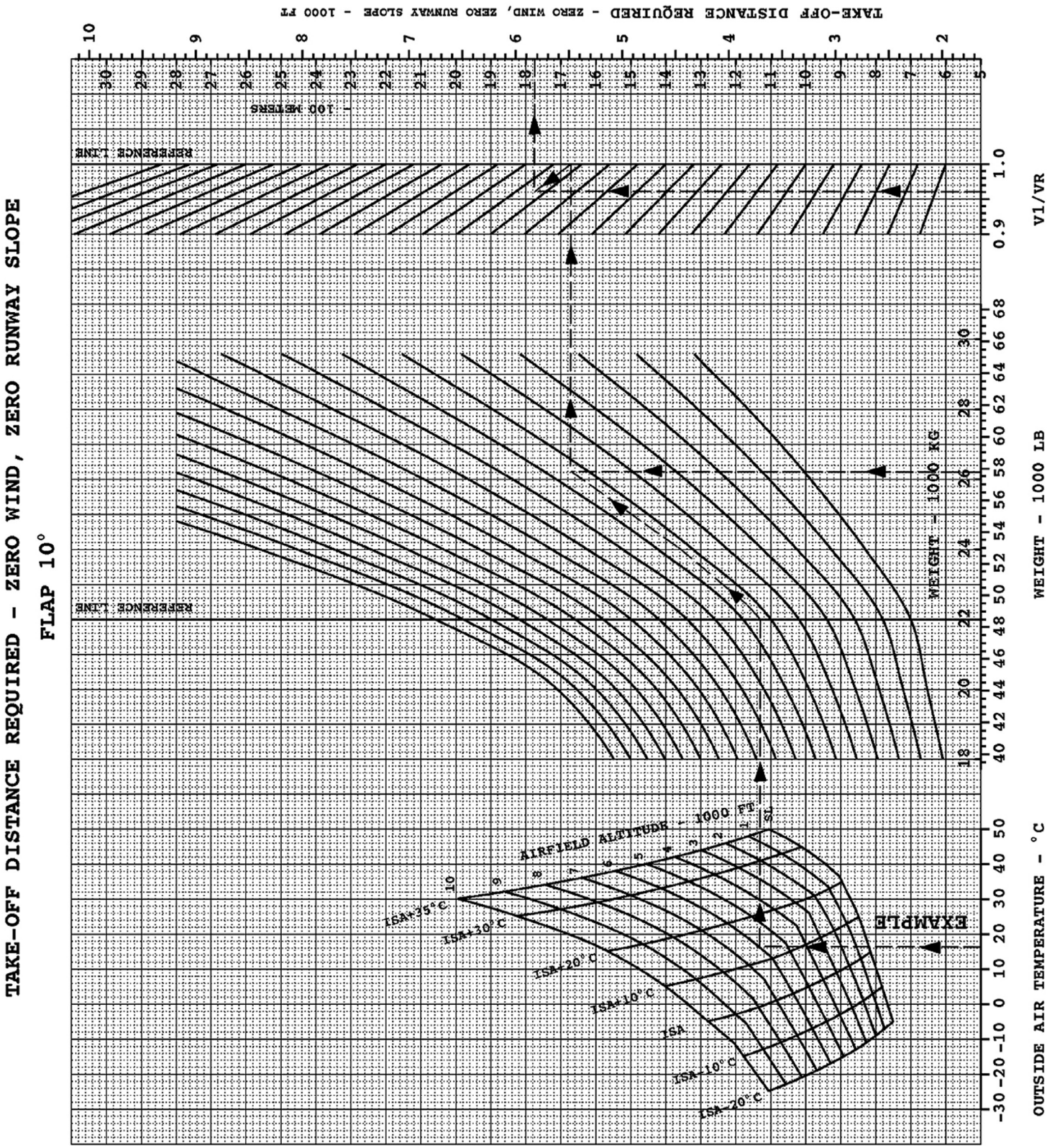

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Figure 476

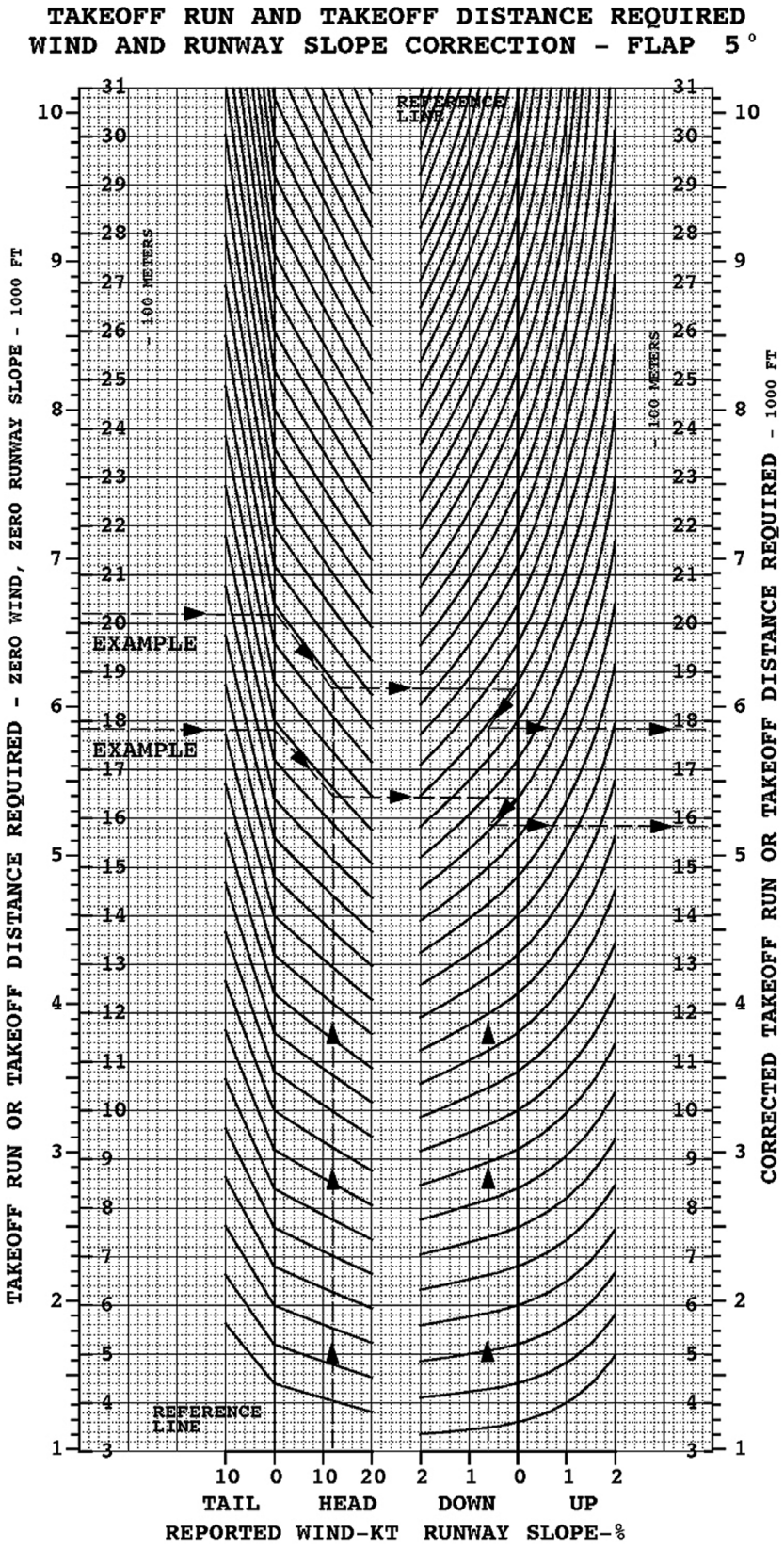

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Figure 477

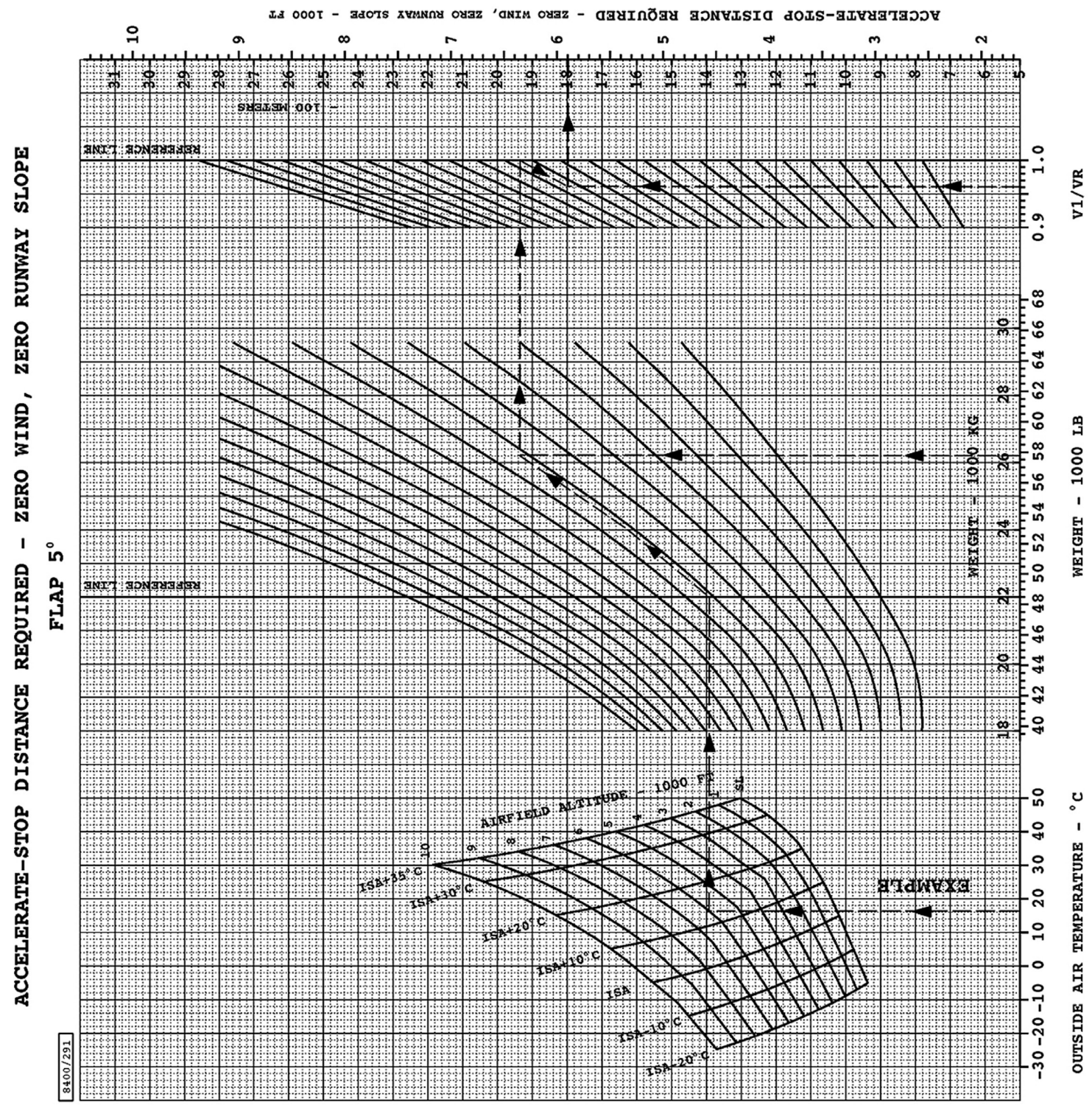

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Figure 478

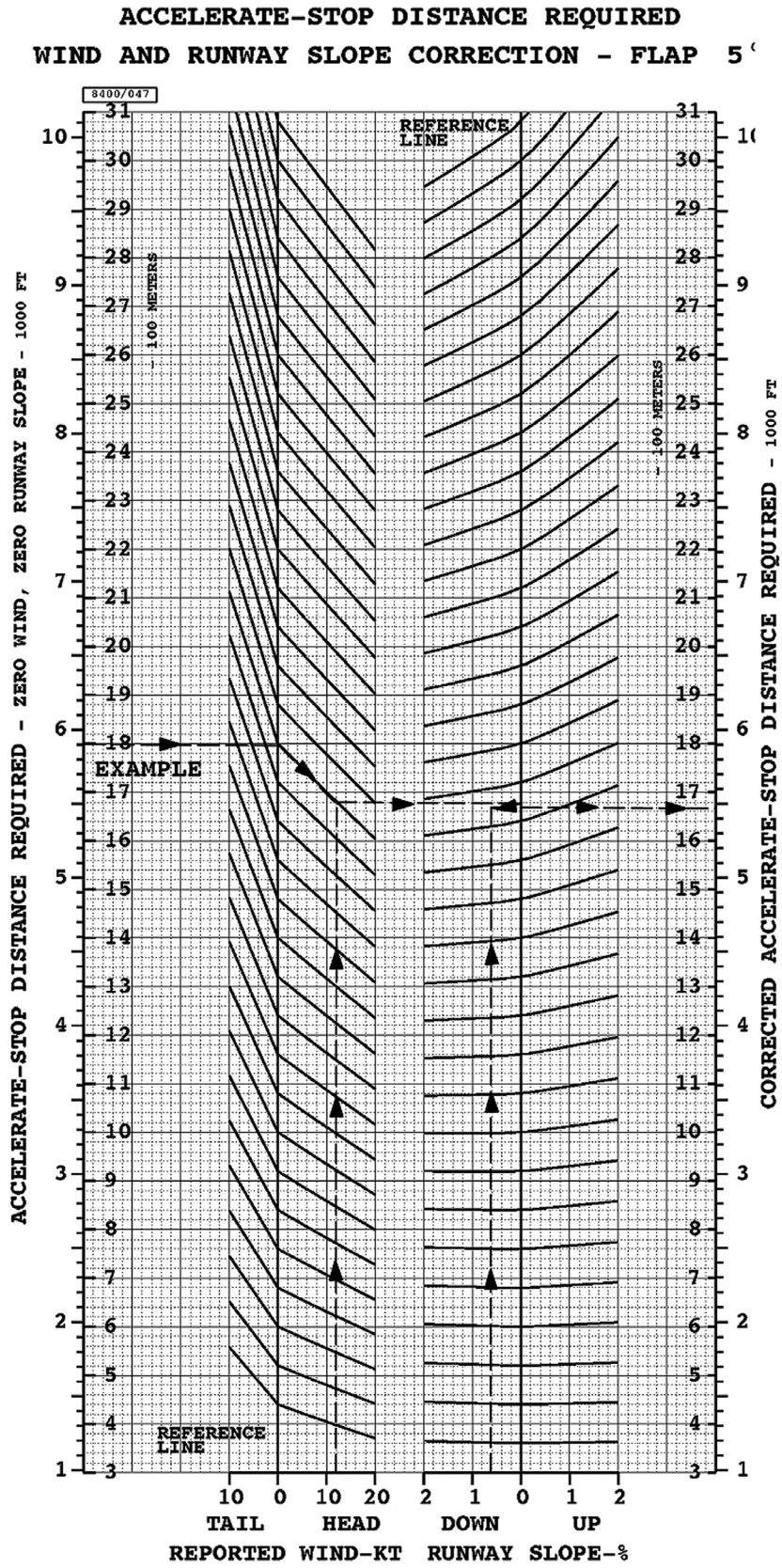

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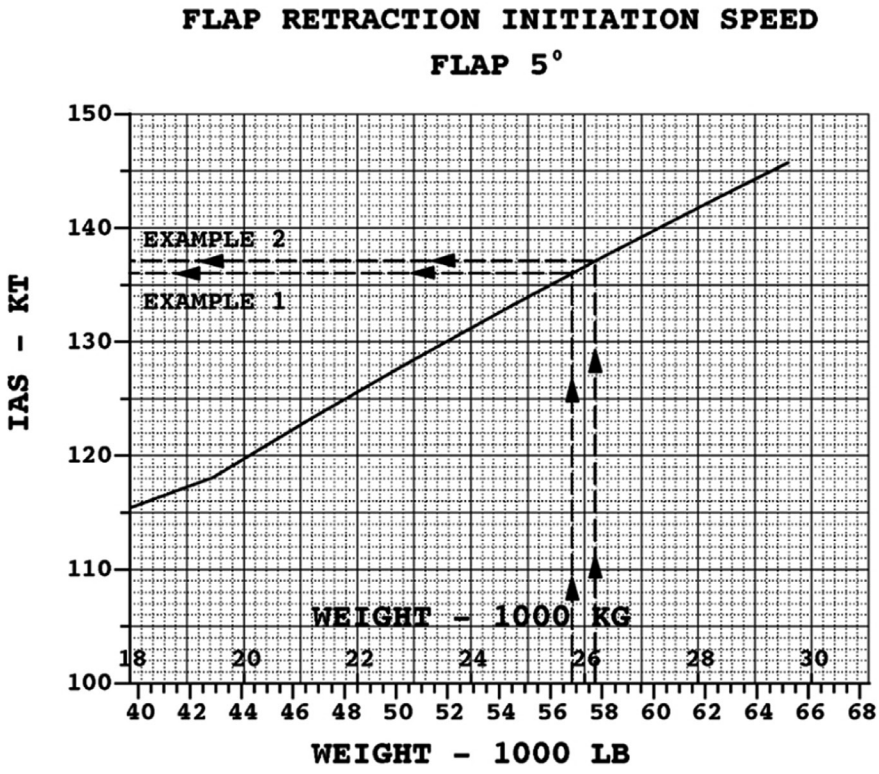
Figure 479



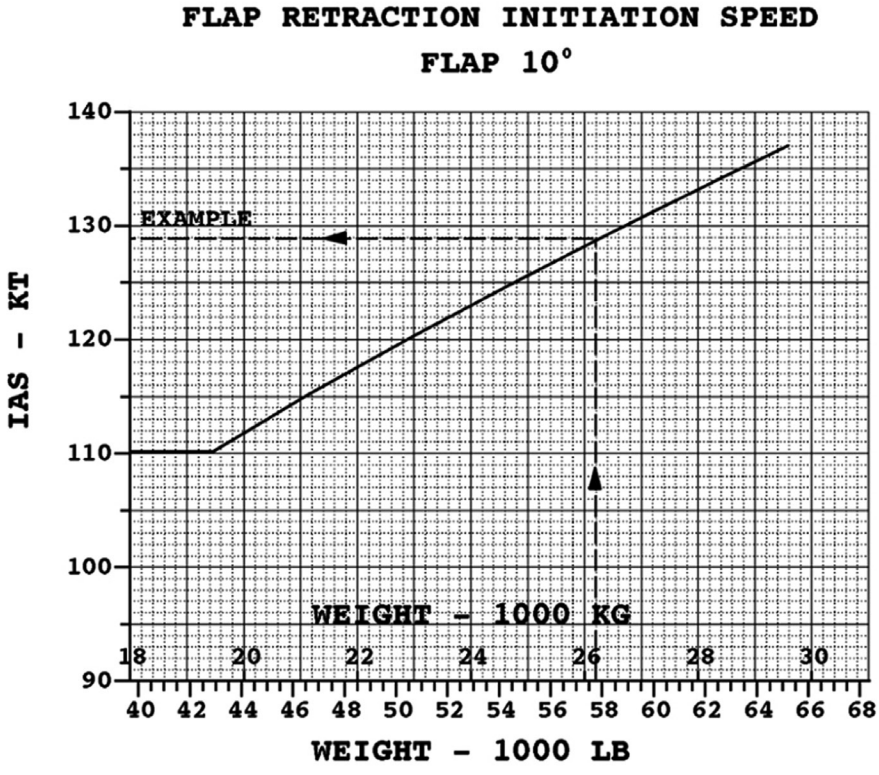


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Figure 480

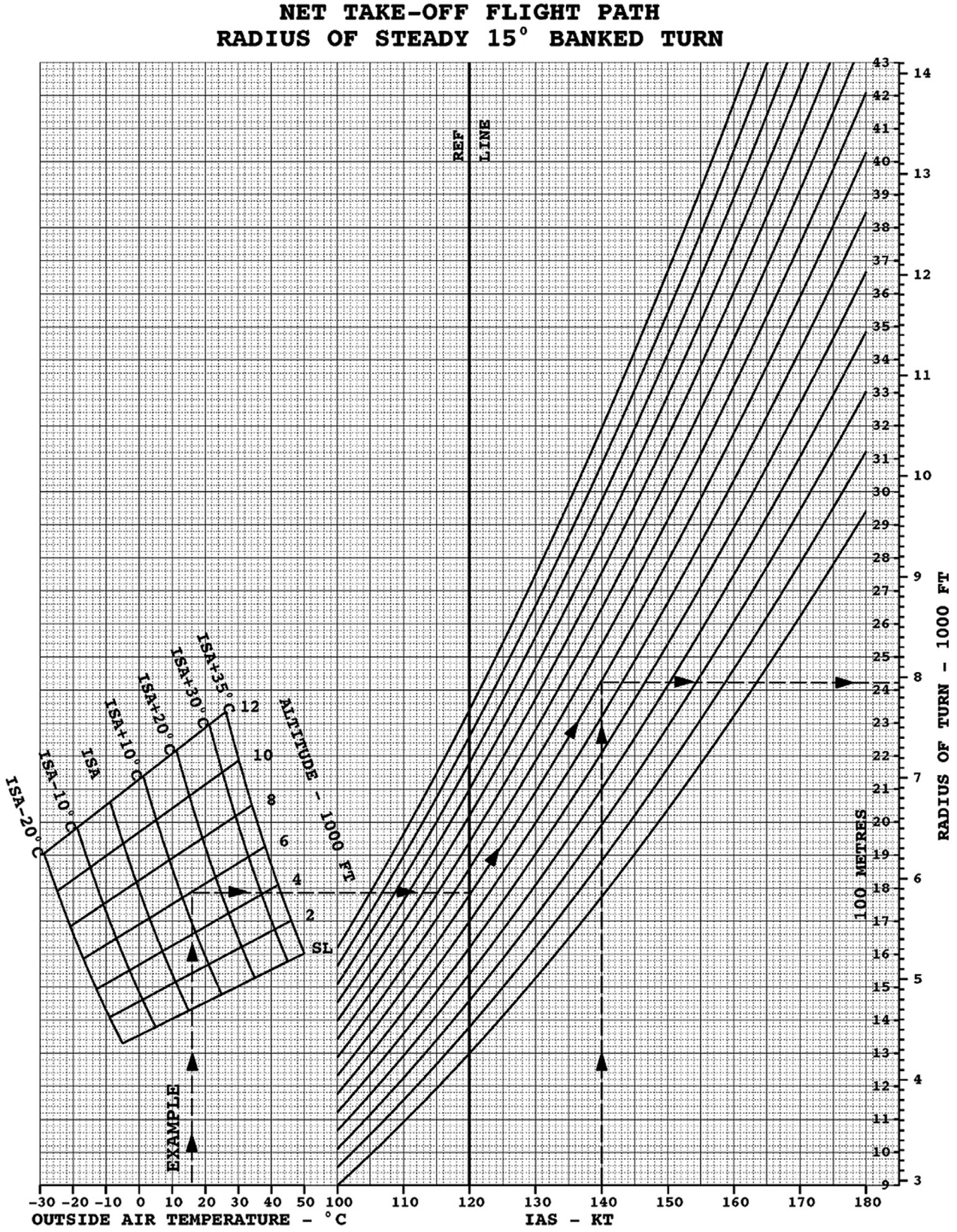

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Figure 481

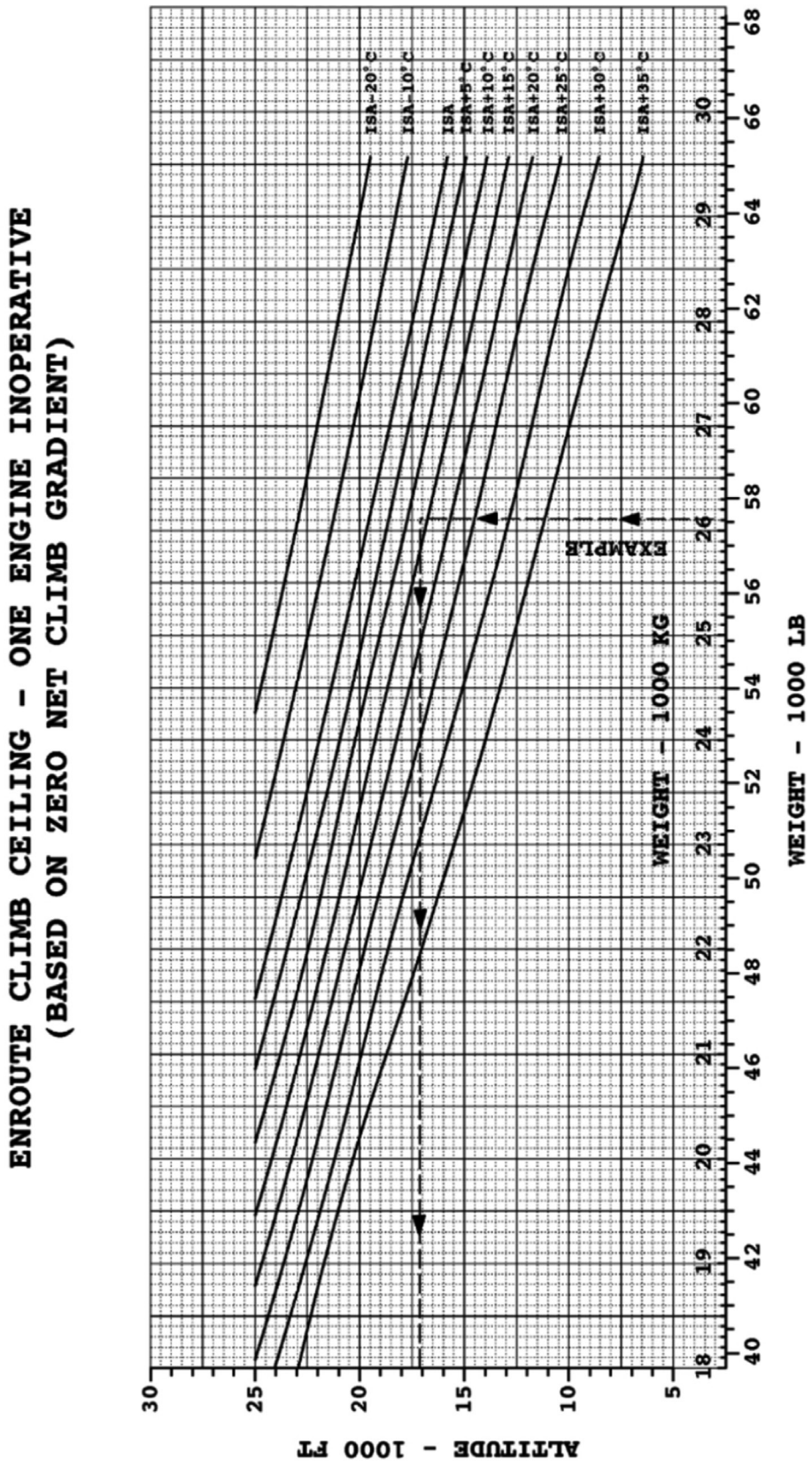

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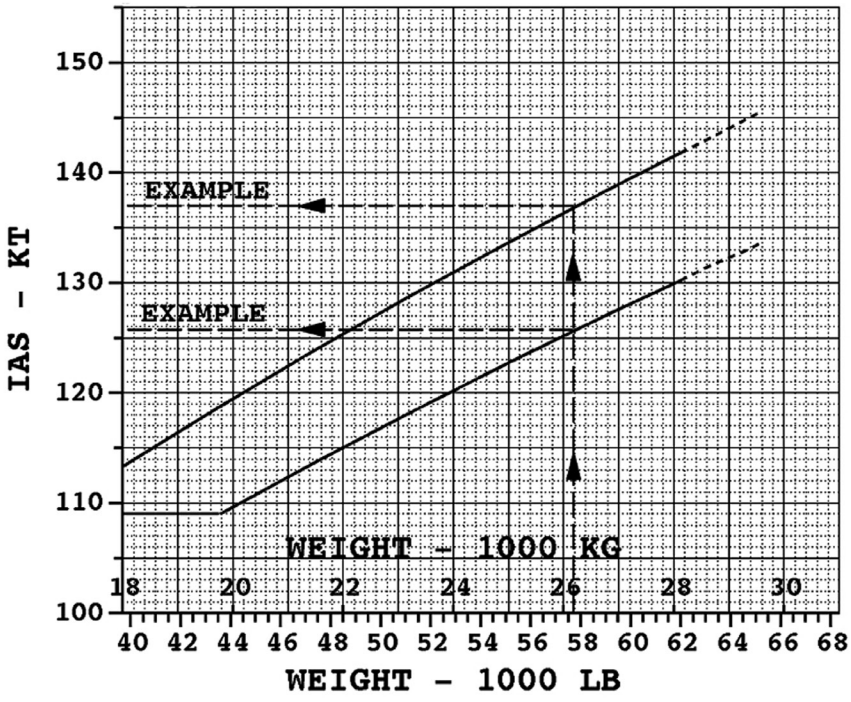
Figure 482

LANDING SPEEDS

APPROACH AND GO-AROUND SPEED
FLAP 5°



V_{REF}
FLAP 10°

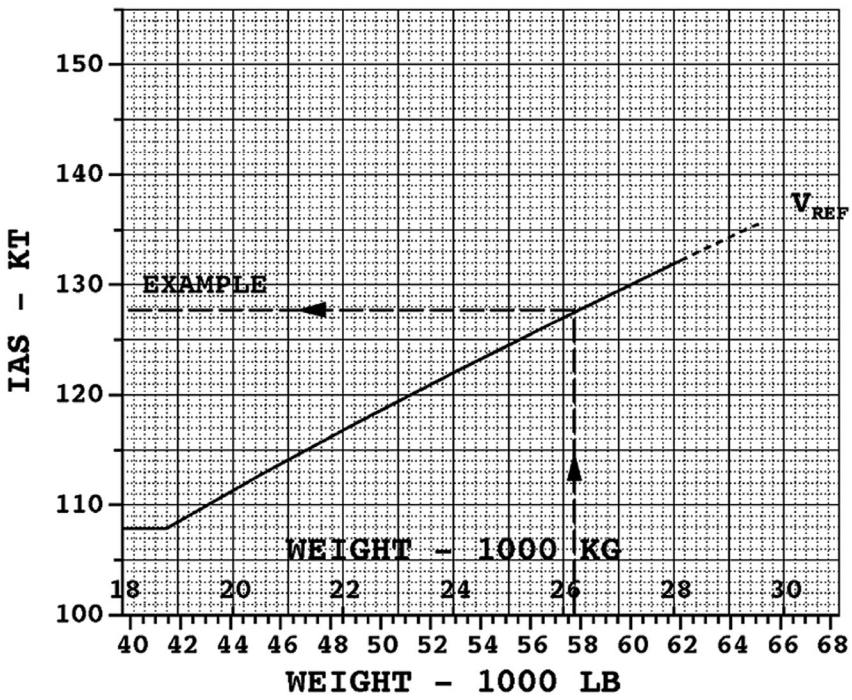


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Figure 483

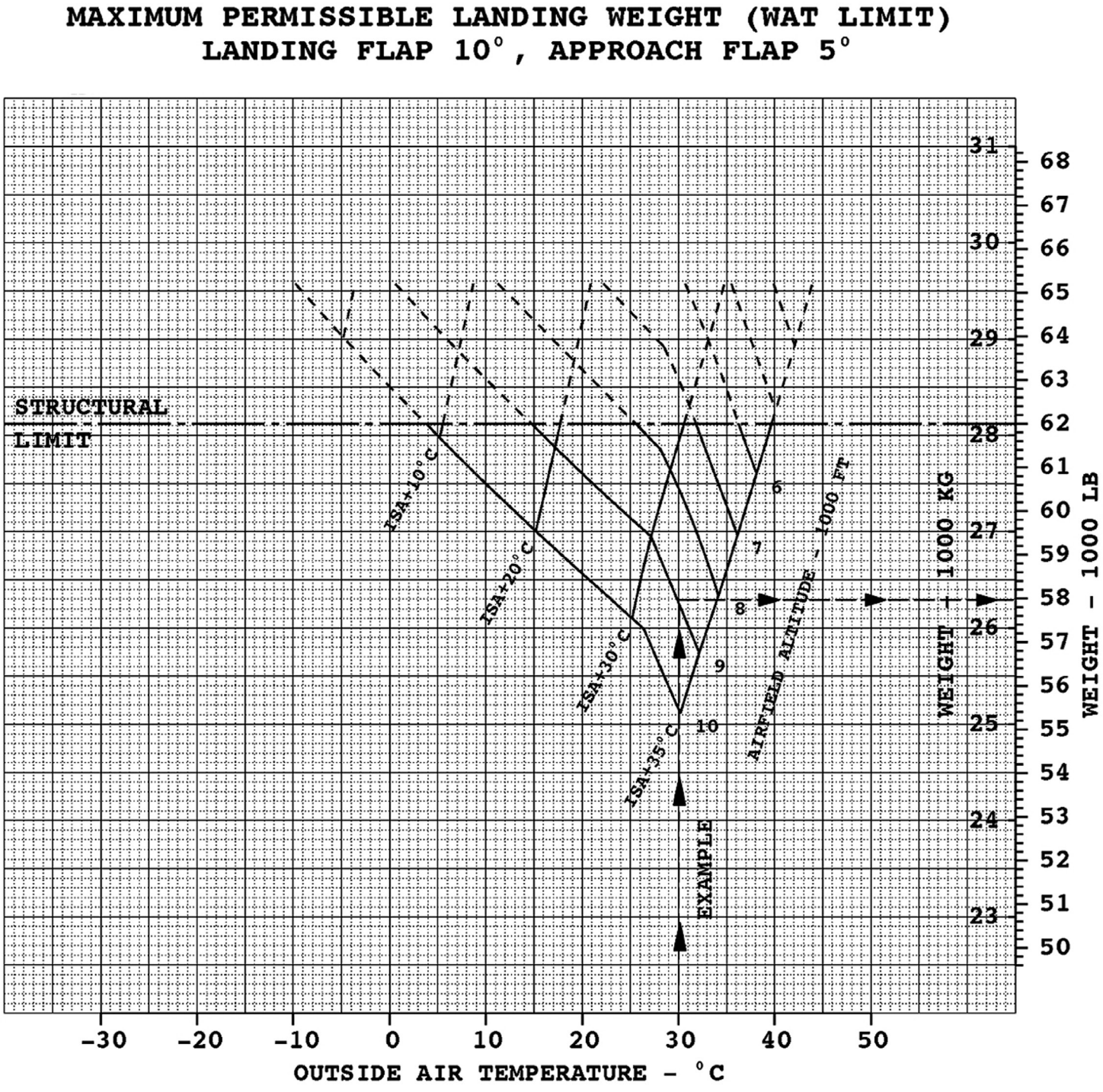

Figure 484

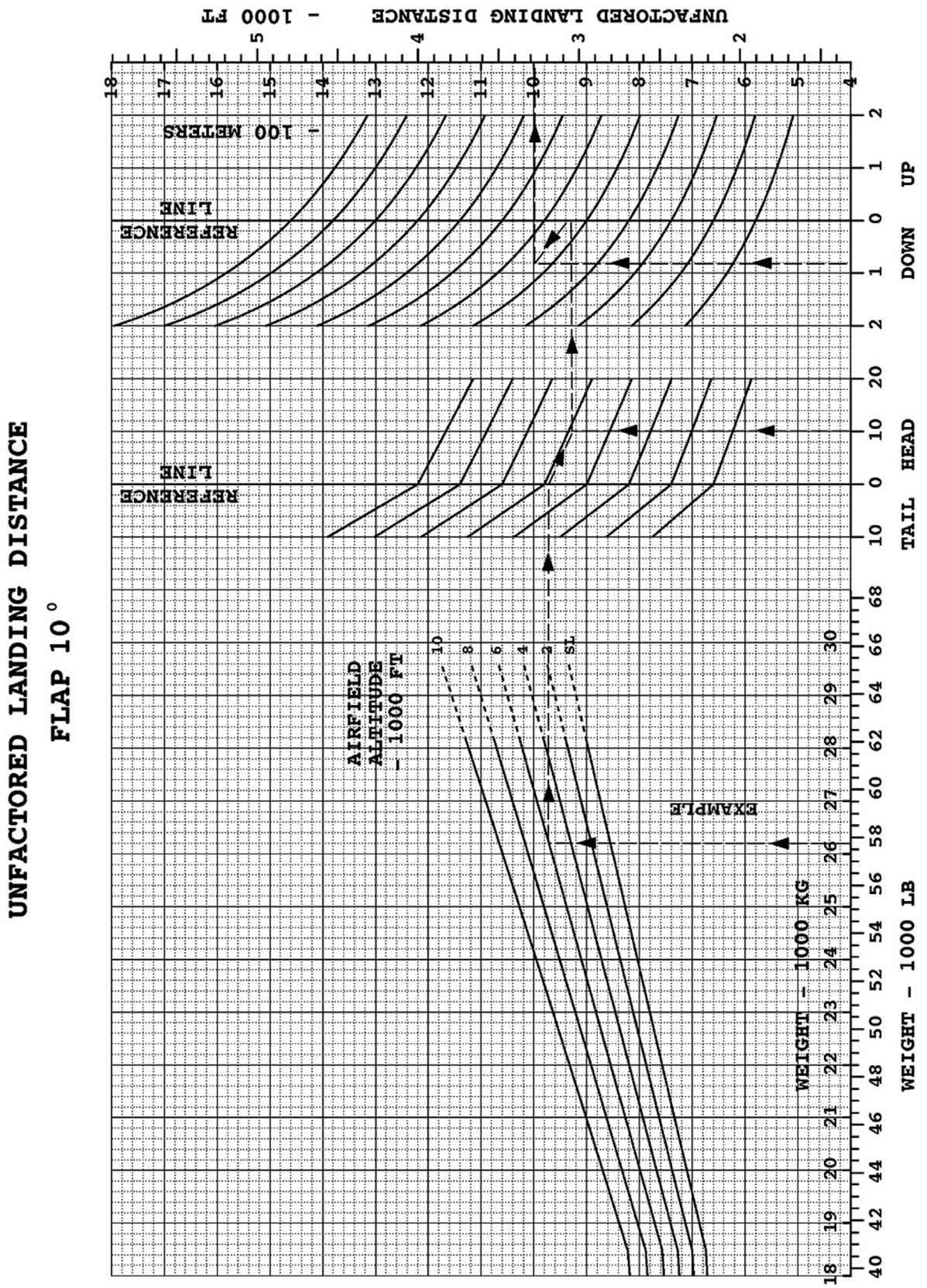

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Figure 485

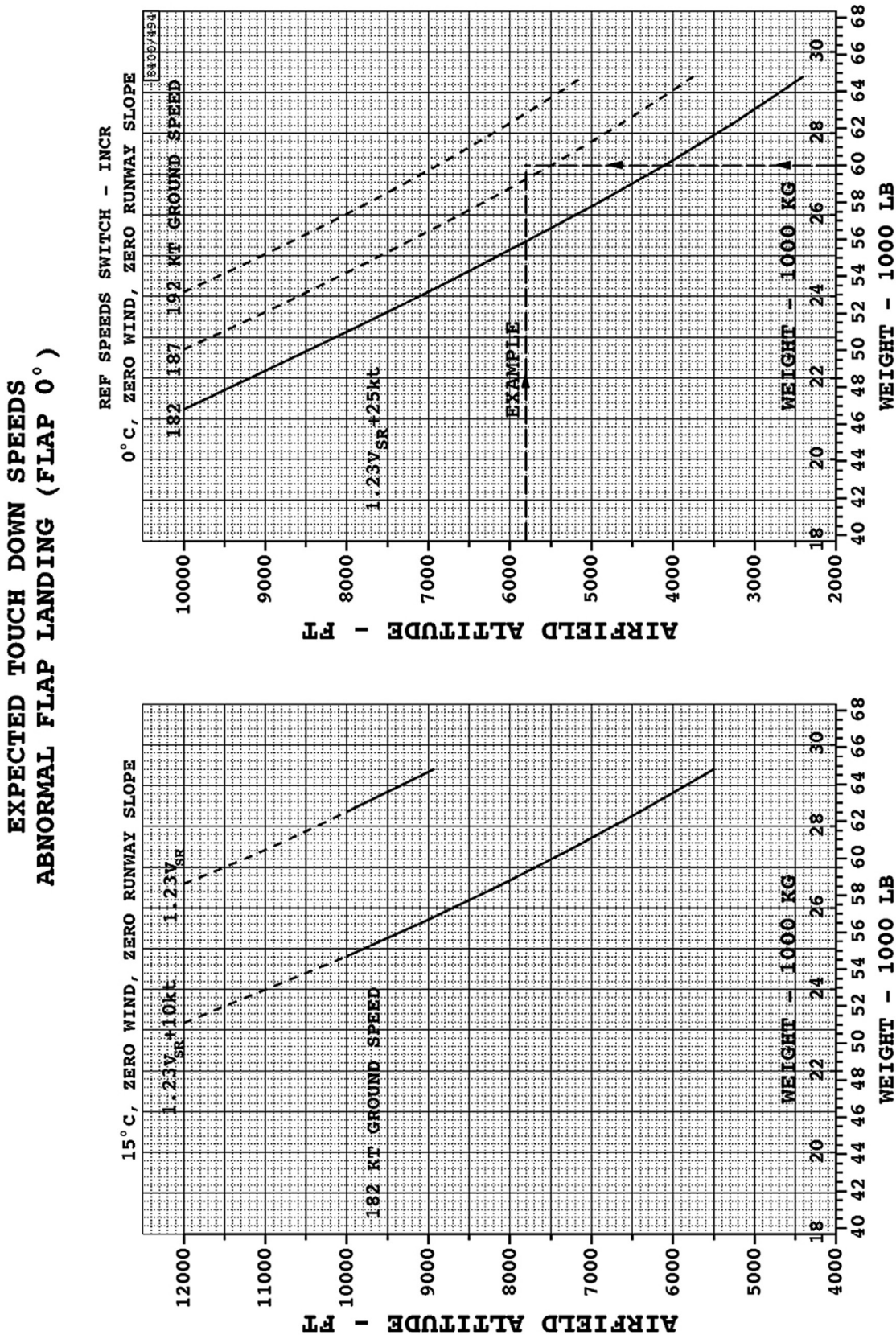

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Figure 486

MINIMUM TURN-AROUND TIME

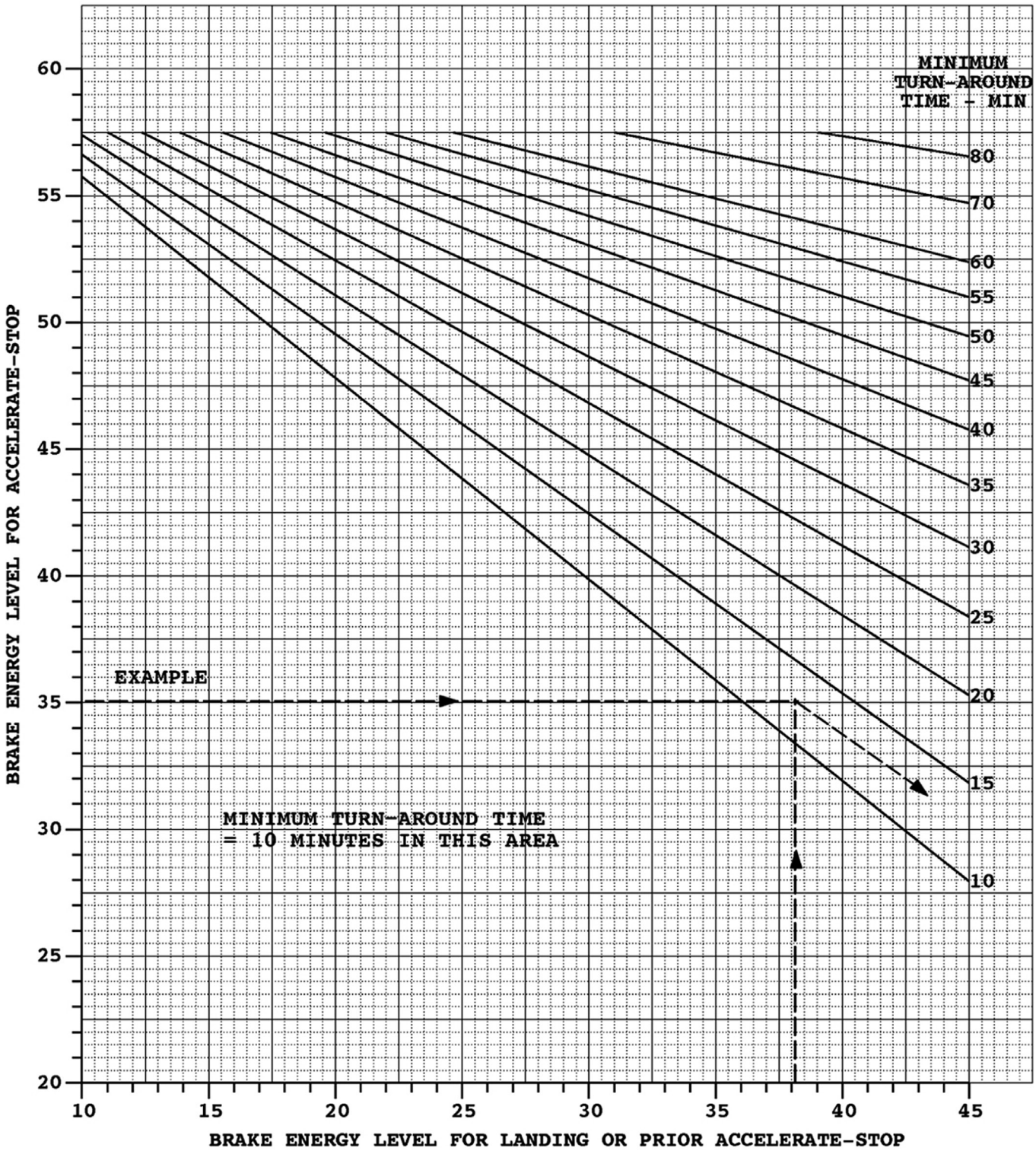

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Figure 487

Table A to Part 117—Maximum Flight Time Limits for Unaugmented Operations Table

Time of report (acclimated)	Maximum flight time (hours)
0000-0459	8
0500-1959	9
2000-2359	8

Table B to Part 117—Flight Duty Period: Unaugmented Operations

Scheduled time of start (acclimated time)	Maximum flight duty period (hours) for lineholders based on number of flight segments.						
	1	2	3	4	5	6	7+
0000-0359	9	9	9	9	9	9	9
0400-0459	10	10	10	10	9	9	9
0500-0559	12	12	12	12	11.5	11	10.5
0600-0659	13	13	12	12	11.5	11	10.5
0700-1159	14	14	13	13	12.5	12	11.5
1200-1259	13	13	13	13	12.5	12	11.5
1300-1659	12	12	12	12	11.5	11	10.5
1700-2159	12	12	11	11	10	9	9
2200-2259	11	11	10	10	9	9	9
2300-2359	10	10	10	9	9	9	9

Table C to Part 117—Flight Duty Period: Augmented Operations

Scheduled time of start (acclimated time)	Maximum flight duty period (hours) for lineholders based on number of pilots.					
	Class 1 rest facility		Class 2 rest facility		Class 3 rest facility	
	3 pilots	4 pilots	3 pilots	4 pilots	3 pilots	4 pilots
0000-0559	15	17	14	15.5	13	13.5
0600-0659	16	18.5	15	16.5	14	14.5
0700-1259	17	19	16.5	18	15	15.5
1300-1659	16	18.5	15	16.5	14	14.5
1700-2359	15	17	14	15.5	13	13.5

Figure 488