

DCA21FA174

OPERATIONAL FACTORS/HUMAN PERFORMANCE

Attachment 13

Rhoades Aviation, Inc. Aircraft Quick Reference Handbook [Excerpts]

May 4, 2022

1.0 Introduction

The Rhoades Aviation, INC (RAI) Boeing 737-200C (B737) Quick Reference Handbook (QRH) is derived from the Boeing document-D6-27370-200A-TBC, as revised. The RAI QRH provides the trained flight crew the information, in abbreviated form, required to cope with non-normal situations. Additionally, commonly referred material used during the normal operation of the aircraft is included in the publication.

The QRH is composed of the following chapters:

- Introduction – QRH Introduction
- NNC – Non-Normal Checklists
- PI – Performance Inflight
- Evacuation

1.1 Non-Normal Checklists

This chapter of the B737 QRH contains Non-Normal Checklists for the use of the flight crews in the event abnormal or emergency situations are encountered during aircraft operation.

The Non-Normal Checklists are grouped into sections according to aircraft systems. The checklist in each section is organized in order of importance: Checklist including Memory items being listed first, followed by checklist containing Reference items only.

All checklists have condition statements. The condition statement briefly describes the situation that caused the light, alert or other indication. Non-annunciated checklists also have condition statements to help in understanding the reason for the checklist.

Some checklists have objective statements. The objective statement briefly describes the expected result of doing the checklist or briefly describes the reason for steps in the checklist.

Checklists can have both Memory and Reference items. Memory items (boxed items) are critical steps that must be done before

reading the checklist. Reference items are actions to be done while reading the checklist.

Some checklists have additional information at the end of the checklist. The additional information provides data the crew may wish to consider. The additional information does not need to be read.

Checklist titles in upper case (such as AUTO BRAKE DISARM) are annunciated by a light, alert, or other indication. Checklist titles in upper and lower case (such as Window Damage) are not annunciated.

Non-normal checklists start with steps to correct the situation. If needed, information for planning the rest of the flight is included. When special items are needed to configure the airplane for landing, the items are included in the Deferred Items section of the checklist. Flight patterns for some non-normal situations are located in the AOM V1 and show the sequence of configuration changes.

While every attempt is made to supply needed non-normal checklists, it is not possible to develop checklists for all conceivable situations. In some smoke, fire or fumes situations, the flight crew may need to move between the Smoke, Fire or Fumes checklist and the Smoke or Fumes Removal checklist. In some multiple failure situations, the flight crew may need to combine the elements of more than one checklist. In all situations, the Captain must assess the situation and use good judgment to determine the safest course of action.

It should be noted that, in determining the safest course of action, troubleshooting, i.e., taking steps beyond published non-normal checklist steps, may cause further loss of system function or system failure. Troubleshooting should only be considered when completion of the published non-normal checklist results in an unacceptable situation.

There are some situations where the flight crew must land at the nearest suitable airport. These situations include, but are not limited to, conditions where:

- The non-normal checklist includes the item “Land at the nearest suitable airport.”
- Fire or smoke continues
- Only one AC power source remains (engine or APU generator)
- Only one hydraulic system remains (the standby system is considered a hydraulic system)
- Any other situation determined by the flight crew to have a significant adverse effect on safety if the flight is continued.

It must be stressed that for smoke that continues or a fire that cannot be positively confirmed to be completely extinguished, the earliest possible descent, landing, and evacuation must be done.

If a smoke, fire or fumes situation becomes uncontrollable, the flight crew should consider an immediate landing. Immediate landing implies immediate diversion to a runway. However, in a severe situation, the flight crew should consider an overweight landing, a tailwind landing, an off-airport landing, or a ditching.

Checklists directing an engine shutdown must be evaluated by the Captain to determine whether an actual shutdown or operation at reduced thrust is the safest course of action. Consideration must be given to the probable effects of running the engine at reduced thrust.

There are no non-normal checklists for the loss of an engine indication. Continue normal engine operation unless a limit is exceeded.

Non-normal checklists also assume:

- During engine start and before takeoff, the associated non-normal checklist is done if a non-normal situation is identified. After completion of the checklist, the Dispatch Deviations Guide or operator equivalent is consulted to determine if Minimum Equipment List dispatch relief is available.
- System controls are in the normal configuration for the phase of flight before the start of the non-normal checklist.
- If the MASTER CAUTION and system annunciator lights illuminate, all related amber lights are reviewed to assist in recognizing the cause(s) of the alert.
- Aural alerts are silenced and the master caution system is reset by the flight crew as soon as the cause of the alert is recognized.
- The EMERGENCY position of the oxygen regulator is used when needed to supply positive pressure in the masks and goggles to remove contaminants. The 100% position of the oxygen regulator is used when positive pressure is not needed but contamination of the flight deck air exists. The Normal position of the oxygen regulator is used if prolonged use is needed and the situation allows. Normal boom microphone operation is restored when oxygen is no longer in use.
- Indicator lights are tested to verify suspected faults.
- Flight crew reset of a tripped fuel pump or fuel pump control circuit breaker is prohibited. In flight, reset of any other tripped circuit breaker is not recommended. However, these other tripped circuit breakers may be reset once, after a short cooling period (approximately 2 minutes), if in the judgment of the Captain, the situation resulting from the circuit breaker trip has a significant adverse effect on safety. On the ground, flight crew reset of any other tripped circuit breaker should only be done after maintenance has determined that it is safe to reset the circuit breaker.

- Flight crew cycling (pulling and resetting) of a circuit breaker to clear a non-normal condition is not recommended, unless directed by a non-normal checklist.

After engine start and before takeoff, illumination of a red warning light, an amber caution light, an alert or other indication requires completion of the associated checklist.

Non-normal checklist use starts when the airplane flight path and configuration are correctly established. Only a few situations need an immediate response (such as CABIN ALTITUDE WARNING or Rapid Depressurization). Usually, time is available to assess the situation before corrective action is started. All actions must then be coordinated under the Captain's supervision and done in a deliberate, systematic manner.

When a non-normal situation occurs, at the direction of the pilot flying, both crewmembers do all memory items in their areas of responsibility without delay.

The pilot flying calls for the checklist when:

- The flight path is under control
- The airplane is not in a critical phase of flight (such as takeoff or landing)
- All memory items are complete. The pilot monitoring reads aloud:
- The checklist title
- As much of the condition statement as needed to verify that the correct checklist has been selected
- As much of the objective statement (if applicable) as needed to understand the expected result of doing the checklist.

The pilot flying does not need to repeat this information but must acknowledge that the information was heard and understood.

For checklists with memory items, the pilot monitoring first verifies that each memory item has been done. The checklist is normally

read aloud during this verification. The pilot flying does not need to respond except for items that are not in agreement with the checklist. The item numbers do not need to be read.

Non-memory items are called reference items. The pilot monitoring reads aloud the reference items, including:

- The precaution (if any)
- The response or action
- Any amplifying information.

The pilot flying does not need to repeat this information but must acknowledge that the information was heard and understood. The item numbers do not need to be read.

The word “Confirm” is added to checklist items when both crewmembers must verbally agree before action is taken. During an inflight non-normal situation, verbal confirmation is required for:

- An engine thrust lever
- An engine start lever
- An engine, APU or cargo fire switch
- A generator drive disconnect switch
- A flight control switch.

With the airplane stationary on the ground:

- The Captain and First Officer take action based on pre-flight and post-flight areas of responsibility;
- During an evacuation, the First Officer sets the flap lever to 40.

With the airplane in flight or in motion on the ground:

- The pilot flying and the pilot monitoring take action based on each crewmember’s Areas of Responsibility.

After moving the control, the crewmember taking the action also states the checklist response.

The pilot flying may also direct reference checklists to be done by

memory if no hazard is created by such action, or if the situation does not allow reference to the checklist.

Checklists include an Inoperative Items table only when the condition of the items is needed for planning the rest of the flight. The inoperative items, including the consequences (if any), are read aloud by the pilot monitoring. The pilot flying does not need to repeat this information but must acknowledge that the information was heard and understood.

After completion of the non-normal checklist, normal procedures are used to configure the airplane for each phase of flight.

When there are no deferred items, the DESCENT and BEFORE LANDING Normal Checklists are used to verify that the configuration is correct for each phase of flight.

When there are deferred items, the non-normal checklist will include the item **“Checklist Complete Except Deferred Items.”** The pilot flying is to be made aware when there are deferred items. These items are included in the Deferred Items section of the checklist and may be delayed until the usual point during descent, approach or landing.

The deferred items are read aloud by the pilot monitoring. The pilot flying or the pilot monitoring takes action based on each crewmember's area of responsibility. After moving the control, the crewmember taking the action also states the response.

When there are deferred items, the Deferred Items section of the non-normal checklist will include the Descent and Before Landing normal checklists. These checklists should be used instead of the usual DESCENT and BEFORE LANDING Normal Checklists. If a normal checklist item is changed as a result of the non-normal situation, the changed response is printed in **bold** type. The pilot flying or the pilot monitoring responds to the deferred normal checklist items based on each crewmember's area of responsibility. However, during the deferred Landing normal checklist, the pilot

flying responds to all deferred normal checklist items.

Each checklist has a checklist complete symbol at the end. The following symbol indicates that the checklist is complete:



The checklist complete symbol can also be in the body of the checklist. This only occurs when a checklist divides into two or more paths. Each path can have a checklist complete symbol at the end. The flight crew does not need to continue reading the checklist after the checklist complete symbol.

After completion of each non-normal checklist, the pilot monitoring states "CHECKLIST COMPLETE."

Additional information at the end of the checklist is not required to be read.

The flight crew must be aware that checklists cannot be created for all conceivable situations and are not intended to replace good judgment. In some situations, at the Captain's discretion, deviation from a checklist may be needed.

1.2 Legend

1) **Checklist complete symbol** ■ ■ ■ ■

Each checklist has a checklist complete symbol at the end. The above symbol indicates that the checklist is complete. The checklist complete symbol can also be in the body of the checklist. This only occurs when a checklist divides into two or more paths. Each path can have a checklist complete symbol at the end. The flight crew does not need to continue reading the checklist after the checklist complete symbol.

2) **Redirection Symbol** ►►

The redirection symbol is used in two ways:

- In the Table of Contents of a system section, to direct the flight crew to a different system section.
- In a non-normal checklist, with the word “Go to”, to direct the flight crew to a different checklist or to a different step in the current checklist.

3) **Boxed Items**

In a non-normal checklist, a bold black outline is used to separate the memory items from the reference items.

4) **Task Divider Symbol** —————

In a non-normal checklist, a bold black outline is used to separate the memory items from the reference items.

5) **Decision Symbol** ◆◆

The decision symbol is used to identify possible choices.

6) **Precaution Symbol** ⚠

The precaution symbol is used to identify information the flight crew must consider before taking the action.

2.8.6 **Engine Failure or Shutdown**

Condition: One of these occurs:

- **An engine failure**
- **An engine flameout**
- **Another checklist directs an engine shutdown.**

1 Choose one:

◆ Airframe vibrations with abnormal engine indications exist:

▶▶ Go to ENGINE FIRE or Engine Severe Damage or Separation checklist in section 2.9.2

■ ■ ■ ■

◆ An engine has separated:

▶▶ Go to ENGINE FIRE or Engine Severe Damage or Separation checklist in section 2.9.2

■ ■ ■ ■

◆ Airframe vibrations with abnormal engine indications do not exist and an engine has not separated:

▶▶ Go to step 2

2 Do an engine shutdown only when flight conditions allow.

3 Thrust lever
(affected engine) Confirm Close

▼ Continued on next page ▼

▼ Engine Failure or Shutdown continued ▼

- 4 **When** the affected engine is at idle thrust:
 - Engine start lever
(affected engine) . . . Confirm CUTOFF
- 5 Choose one:
 - ◆ APU is **available** for start:
 - APU START
 - When** APU is running:
 - APU GEN switch
(affected side) ON
 - ▶▶ **Go to step 6**
 - ◆ APU is **not** available:
 - The galleys and one system B
hydraulic pump are not powered.
 - ▶▶ **Go to step 6**
- 6 Balance fuel as needed.
- 7 Transponder mode selector
(TCAS equipped airplanes) TA
 - This prevents climb commands which can
exceed single engine performance capability.
- 8 **If** wing anti-ice is needed:
 - PACK switch (affected side) OFF
 - ISOLATION VALVE switch AUTO

▼ Continued on next page ▼

▼ Engine Failure or Shutdown continued ▼

9 A restart may be attempted if there is N1 rotation and no abnormal airframe vibration.

10 Choose one:

◆ A restart will be **attempted**:

▶▶ **Go to the Engine In-Flight
Start checklist in section 2.8.8**



◆ A restart will **not** be attempted:

▶▶ **Go to step 11**

11 Land at the nearest suitable airport.

▶▶ **Go to the One Engine Inoperative
Landing checklist in section 2.8.13**



2.9.2 **ENGINE FIRE or Engine Severe Damage or Separation**

Condition: One or more of these occur:

- **Engine fire warning**
- **Airframe vibrations with abnormal engine indications**
- **Engine separation.**

- 1 Thrust lever
(affected engine) Confirm Close
- 2 Engine start lever
(affected engine) Confirm . . . CUTOFF
- 3 Engine fire switch
(affected engine) Confirm Pull
To manually unlock the engine fire switch, press
the override and pull.
- 4 **If** the engine fire switch or ENG OVERHEAT light
is illuminated:
Engine fire switch Rotate to the stop and
hold for 1 second
If after 30 seconds the engine fire switch or ENG
OVERHEAT light stays illuminated:
Engine fire switch. Rotate to the
other stop and
hold for 1 second

▼ Continued on next page ▼

▼ ENGINE FIRE or Engine Severe Damage or Separation continued ▼

5 Choose one:

- ◆ High airframe vibration **occurs** and **continues** after the engine is shut down:

Without delay, reduce airspeed and descend to a safe altitude which results in an acceptable vibration level.

Note: If high vibration returns and further airspeed reduction and descent are not practical, increasing airspeed may reduce the vibration.

▶▶ **Go to step 6**

- ◆ High airframe vibration does **not** occur or does **not** continue after the engine is shut down:

▶▶ **Go to step 6**

6 ISOLATION VALVE switch CLOSE

7 APU BLEED air switch OFF

▼ Continued on next page

▼ **ENGINE FIRE or Engine Severe Damage or Separation continued** ▼

8 Choose one:

◆ APU is **available** for start:

APUSTART

When APU is running:

APU GEN switch
(affected side) ON

►► **Go to step 9**

◆ APU is **not** available:

The galleys and one system B hydraulic pump are not powered.

►► **Go to step 9**

9 Balance fuel as needed.

10 Transponder mode selector

(TCAS equipped airplanes).TA

This prevents climb commands which can exceed single engine performance capability.

11 **If** wing anti-ice is needed:

PACK switch (affected side) OFF

ISOLATION VALVE switch
(after fire has been extinguished). AUTO

12 Land at the nearest suitable airport.

►► **Go to the One Engine Inoperative Landing checklist in section 2.8.13**



2.9.3 **ENGINE OVERHEAT**



Condition: An overheat is detected in the engine.

- 1 Thrust lever
(affected engine) Confirm Close
- 2 **If the ENG OVERHEAT light *stays illuminated*:**
 - ▶▶ **Go to the ENGINE FIRE or Engine Severe Damage or Separation checklist in section 2.9.2**



- 3 **If the ENG OVERHEAT light *extinguishes*:**

Run the engine at reduced thrust to keep the light extinguished.



3.3.1.2 Max Climb EPR

Based on engine bleed for packs on and anti-ice off

TAT (°C)	PRESSURE ALTITUDE (1000 FT)/SPEED (KIAS OR MACH)												
	0	1	2	3	4	5.66	10	15	20	25	30	35	37
	320	320	320	320	320	320	320	320	320	.70	.70	.70	.70
50	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64		
45	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67		
40	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70		
35	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73		
30	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76		
25	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79		
20	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82		
15	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86		
10	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90		
5	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.92	1.92
0	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.97	1.97
-5	1.98	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.02	2.02
-10	1.98	2.04	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.07	2.07
-15	1.98	2.04	2.09	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.11	2.11
-20	1.98	2.04	2.09	2.14	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.14	2.14
-25	1.98	2.04	2.09	2.14	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.17	2.17
-30	1.98	2.04	2.09	2.14	2.20	2.21	2.21	2.21	2.21	2.21	2.21	2.20	2.20
-35	1.98	2.04	2.09	2.14	2.20	2.23	2.23	2.23	2.23	2.23	2.23	2.22	2.22
-40	1.98	2.04	2.09	2.14	2.20	2.25	2.25	2.25	2.25	2.25	2.25	2.24	2.24

EPR Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (FT)	
	0	37000
PACKS OFF	0.04	0.04
ENGINE ANTI-ICE ON	-0.08	-0.08
ENGINE AND WING ANTI-ICE ON*	-0.04	-0.04
ENGINE AND WING ANTI-ICE ON**	-0.06	-0.06

***Dual Bleed Source**

****Single Bleed Source**

MAX CONTINUOUS EPR ENGINE INOP

**Driftdown Speed/ Level Off Altitude
100ft/ min residual rate of climb**

WEIGHT (1000 LB)		OPTIMUM DRIFTDOWN SPEED (KIAS)	LEVEL OFF ALTITUDE (FT)		
START DRIFT DOWN	LEVEL OFF		ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
130	122	231	10300	8700	6700
120	113	222	13100	11800	10300
110	104	213	16000	14900	13600
100	95	203	18900	18000	17000
90	84	193	20500	19900	20000
80	75	182	24300	23200	21800
70	66	170	28200	27400	26400
60	57	158	32300	31600	30900

**Driftdown/LRC Cruise Range Capability
Ground to Air Miles Conversion**

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
302	274	251	231	214	200	187	176	166	157	150
602	547	501	462	429	400	375	353	333	315	300
893	813	747	691	642	600	563	530	501	475	452
1179	1077	991	918	855	800	752	709	671	636	605
1463	1339	1234	1145	1068	1000	940	888	840	798	760
1747	1601	1477	1372	1280	1200	1129	1066	1010	960	914
2034	1865	1722	1599	1493	1400	1318	1245	1179	1121	1067
2326	2133	1969	1828	1707	1600	1506	1422	1348	1280	1219
2627	2406	2219	2059	1921	1800	1693	1599	1514	1438	1369

Driftdown/Cruise Fuel and Time

AIR DIST (NM)	FUEL REQUIRED (1000 LB)							TIME (HR:MIN)
	WEIGHT AT START OF DRIFTDOWN (1000 LB)							
	70	80	90	100	110	120	130	
200	2.1	2.3	2.4	2.7	2.9	3.1	3.4	0:41
400	4.5	5.1	5.6	5.9	6.7	7.3	7.9	1:20
600	6.7	7.5	8.4	9.0	10.1	11.0	11.9	1:58
800	8.8	9.9	11.1	12.0	13.3	14.6	15.8	2:34
1000	10.8	12.3	13.7	14.9	16.5	18.1	19.6	3:10
1200	12.8	14.5	16.3	17.7	19.6	21.5	23.3	3:45
1400	14.7	16.8	18.8	20.4	22.6	24.8	26.9	4:22
1600	16.6	18.9	21.2	23.1	25.6	28.0	30.5	4:60
1800	18.5	21.0	23.6	25.8	28.5	31.2	33.9	5:40

Includes APU fuel burn.

Driftdown at optimum driftdown speed and cruise at LRC speed.

MAX CONTINUOUS EPR ENGINE INOP

Long Range Cruise Altitude Capability
100 ft/min residual rate of climb

WEIGHT (1000 LB)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
120	5700	2300	
110	10300	7600	4200
100	14000	12200	9900
90	17800	16400	14700
80	20000	20000	19600
70	23900	22200	20000
60	29000	27800	26400

Long Range Cruise Control

WEIGHT (1000 LB)		PRESSURE ALTITUDE (1000 FT)										
		10	13	15	17	19	21	23	25	27	29	31
120	EPR	1.97										
	MACH	.521										
	KIAS	289										
	FF/ENG	6538										
110	EPR	1.89	2.00									
	MACH	.502	.529									
	KIAS	278	277									
	FF/ENG	5898	5982									
100	EPR	1.81	1.91	1.99	2.07							
	MACH	.482	.507	.525	.545							
	KIAS	266	265	265	265							
	FF/ENG	5294	5332	5383	5454							
90	EPR	1.73	1.82	1.89	1.96	2.04						
	MACH	.461	.484	.501	.519	.539						
	KIAS	255	253	252	252	251						
	FF/ENG	4727	4728	4746	4780	4844						
80	EPR	1.64	1.73	1.79	1.86	1.93	2.01	2.10				
	MACH	.440	.461	.476	.493	.511	.531	.553				
	KIAS	243	241	240	239	238	238	238				
	FF/ENG	4202	4169	4162	4166	4191	4253	4339				
70	EPR	1.57	1.63	1.69	1.75	1.81	1.88	1.96	2.05	2.14		
	MACH	.418	.437	.451	.466	.483	.500	.519	.540	.564		
	KIAS	231	228	227	225	224	223	223	223	223		
	FF/ENG	3719	3656	3628	3610	3606	3631	3678	3736	3805		
60	EPR	1.49	1.55	1.59	1.64	1.69	1.76	1.83	1.91	1.99	2.09	2.18
	MACH	.395	.412	.425	.438	.453	.471	.491	.511	.532	.555	.579
	KIAS	218	215	213	211	210	210	210	210	210	210	210
	FF/ENG	3271	3184	3137	3101	3078	3094	3129	3167	3203	3252	3319

MAX CONTINUOUS EPR ENGINE INOP

**Long Range Cruise Diversion Fuel and Time
Ground to Air Miles Conversion**

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
306	277	252	232	215	200	190	181	173	166	159
620	561	509	467	431	400	380	362	345	330	316
938	846	766	701	647	600	570	542	516	493	473
1258	1133	1025	937	864	800	759	722	687	656	629
1581	1423	1285	1174	1081	1000	949	901	858	820	785
1908	1715	1547	1412	1299	1200	1138	1081	1029	982	940
2238	2008	1810	1649	1517	1400	1327	1259	1198	1143	1094
2572	2305	2074	1888	1735	1600	1516	1438	1368	1304	1248
2910	2604	2339	2128	1953	1800	1704	1616	1536	1464	1401

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)									
	10		14		18		22		26	
	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)
200	3.3	0:44	3.0	0:42	2.7	0:40	2.6	0:39	2.4	0:37
400	6.6	1:26	6.1	1:22	5.7	1:18	5.4	1:14	5.2	1:09
600	9.8	2:08	9.1	2:02	8.6	1:56	8.2	1:50	7.9	1:43
800	13.0	2:51	12.1	2:43	11.4	2:34	11.0	2:25	10.6	2:16
1000	16.1	3:35	15.0	3:24	14.2	3:13	13.6	3:02	13.2	2:51
1200	19.2	4:19	17.9	4:06	16.9	3:53	16.2	3:39	15.8	3:25
1400	22.2	5:04	20.7	4:49	19.5	4:33	18.8	4:17	18.2	4:01
1600	25.1	5:50	23.5	5:32	22.1	5:14	21.2	4:56	20.6	4:37
1800	28.0	6:36	26.2	6:16	24.6	5:56	23.7	5:35	23.0	5:13

Fuel Required Adjustment (1000 LB)

REFERENCE FUEL REQUIRED (1000 LB)	WEIGHT AT CHECK POINT (1000 LB)						
	60	70	80	90	100	110	120
5	-0.7	-0.4	-0.2	0.0	0.2	1.0	2.3
10	-1.4	-1.0	-0.5	0.0	0.7	2.1	4.2
15	-2.1	-1.5	-0.7	0.0	1.2	3.1	5.9
20	-2.8	-2.0	-1.0	0.0	1.7	4.1	7.3
25	-3.4	-2.4	-1.2	0.0	2.1	5.0	8.5
30	-4.1	-2.9	-1.5	0.0	2.6	5.7	9.4

MAX CONTINUOUS EPR ENGINE INOP
**Holding
Flaps Up**

WEIGHT (1000 LB)		PRESSURE ALTITUDE (FT)						
		1500	5000	10000	15000	20000	25000	30000
130	EPR	1.67	1.78	1.96				
	KIAS	243	246	246				
	FF/ENG	6160	6220	6370				
120	EPR	1.61	1.71	1.88	2.09			
	KIAS	232	236	236	237			
	FF/ENG	5620	5670	5760	6010			
110	EPR	1.55	1.64	1.80	1.99			
	KIAS	220	223	227	227			
	FF/ENG	5110	5130	5180	5360			
100	EPR	1.50	1.57	1.71	1.90	2.11		
	KIAS	210	211	216	216	217		
	FF/ENG	4630	4610	4640	4750	4970		
90	EPR	1.44	1.51	1.64	1.80	2.00		
	KIAS	210	210	210	210	210		
	FF/ENG	4250	4200	4170	4220	4350		
80	EPR	1.40	1.46	1.57	1.71	1.89	2.11	
	KIAS	210	210	210	210	210	210	
	FF/ENG	3920	3870	3820	3820	3890	4100	
70	EPR	1.36	1.41	1.51	1.64	1.80	2.00	
	KIAS	210	210	210	210	210	210	
	FF/ENG	3650	3590	3530	3500	3530	3670	
60	EPR	1.33	1.38	1.47	1.58	1.73	1.91	2.13
	KIAS	210	210	210	210	210	210	210
	FF/ENG	3420	3360	3290	3240	3240	3330	3450

This table includes 5% additional fuel for holding in a racetrack pattern.

MAX CONTINUOUS EPR ENGINE INOP
**Holding
Flaps Up**

WEIGHT (1000 LB)		PRESSURE ALTITUDE (FT)						
		1500	5000	10000	15000	20000	25000	30000
130	EPR	1.67	1.78	1.96				
	KIAS	243	246	246				
	FF/ENG	6160	6220	6370				
120	EPR	1.61	1.71	1.88	2.09			
	KIAS	232	236	236	237			
	FF/ENG	5620	5670	5760	6010			
110	EPR	1.55	1.64	1.80	1.99			
	KIAS	220	223	227	227			
	FF/ENG	5110	5130	5180	5360			
100	EPR	1.50	1.57	1.71	1.90	2.11		
	KIAS	210	211	216	216	217		
	FF/ENG	4630	4610	4640	4750	4970		
90	EPR	1.44	1.51	1.64	1.80	2.00		
	KIAS	210	210	210	210	210		
	FF/ENG	4250	4200	4170	4220	4350		
80	EPR	1.40	1.46	1.57	1.71	1.89	2.11	
	KIAS	210	210	210	210	210	210	
	FF/ENG	3920	3870	3820	3820	3890	4100	
70	EPR	1.36	1.41	1.51	1.64	1.80	2.00	
	KIAS	210	210	210	210	210	210	
	FF/ENG	3650	3590	3530	3500	3530	3670	
60	EPR	1.33	1.38	1.47	1.58	1.73	1.91	2.13
	KIAS	210	210	210	210	210	210	210
	FF/ENG	3420	3360	3290	3240	3240	3330	3450

This table includes 5% additional fuel for holding in a racetrack pattern.

▼ Emergency Descent continued ▼

- 8 Don oxygen masks and set regulators. . . . Normal
Flight crew must use oxygen when cabin altitude is above 10,000 feet. To conserve oxygen, move the regulator to Normal.
- 9 ENGINE START switches (both) As needed
- 10 The new course of action is based on weather, oxygen, fuel remaining and available airports. Use of long range cruise may be needed.



2.1.2 ***Ditching***

Condition: Airplane ditching and evacuation are needed.

- 1 Send distress signals. Determine position, course, speed, altitude, situation, intention, time and position of intended touchdown and transmit mayday. Report type of aircraft and request intercept.
- 2 Burn off fuel to reduce touchdown speed and increase buoyancy.
- 3 Plan to touch down on the windward side and parallel to waves and swells.
- 4 Plan a flaps 40 landing unless another configuration is needed.

▼ Continued on next page ▼

▼ Ditching

continued ▼

- 5 Set VREF 40.
- 6 Do **not** arm the auto brake.
- 7 Do **not** accomplish the normal before landing checklist.

8 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Pressurization. CAB ALT ____, LAND ALT ____
Recall Checked
Auto Brake **OFF**
Altimeters. ____ & X-Checked
Landing data **VREF 40** ____
Approach briefing Completed

Below 5000 feet

LANDING GEAR AURAL WARN
circuit breaker (P6) Pull

This prevents the warning horn with gear retracted and landing flaps selected.

The flight deck chime for an incoming call from the cabin crew is unavailable.

▼ Continued on next page ▼

▼ Ditching continued ▼

Engine BLEED air switches (both) OFF

This allows the airplane to be depressurized with the outflow valve closed.

Pressurization mode selector MAN DC

Outflow Valve Switch Hold in CLOSE
until the outflow VALVE
indication shows fully closed

This prevents water from entering the airplane.

APU switch OFF

GROUND PROXIMITY FLAP/GEAR

INHIBIT switch FLAP/GEAR INHIBIT

*Note: N737CS & N809TA have separate
FLAP & GEAR switches.*

Life vests, shoulder harnesses and seat belts . . . On

**Warning! Do not open aft entry or service
doors as they may be partially
submerged.**

Transmit all pertinent information regarding final ditching position.

▼ Continued on next page ▼

▼ Ditching continued ▼

After Impact Procedure Review

Set both engine start levers to CUTOFF. This closes fuel shutoff valves to prevent discharge of fuel from ruptured fuel lines.

Start the evacuation.

Proceed to L1 or R1, as appropriate, and launch rafts and evacuate the airplane as soon as practicable.

The airplane may stay afloat indefinitely if fuel load is minimal and no serious damage was sustained during landing.

Ditching Final

LANDING GEAR lever. UP and OFF

Flaps ____ , ____ , Green Light

At **500 feet**, advise any ACM's that ditching is imminent.

At **50 feet**, advise any ACM's to brace for impact.

Maintain airspeed at VREF. Flare the airplane to achieve the minimum rate of descent at touchdown. Maintain 200-300 fpm rate of descent until the start of the flare.

At flare, rotate smoothly to a touchdown attitude of 10-12°. Maintain airspeed and rate of descent with thrust.

At touchdown, reduce thrust to idle.



2.8.2 **Engine Limit or Surge or Stall**

Condition: *One or more of these occur:*

- **Engine indications are abnormal**
- **Engine indications are rapidly approaching or exceeding limits**
- **Abnormal engine noises are heard, possibly with airframe vibration**
- **There is no response to thrust lever movement or the response is abnormal**
- **Flames in the engine inlet or exhaust are reported.**

Objective: *To attempt to recover normal engine operation or shut down the engine if recovery is not possible.*

- 1 Thrust lever
(affected engine) Confirm. . . . Retard until
Engine indications
stay within limits or
the thrust lever is closed

2 Choose one:

- ◆ Engine indications are **stabilized and** EGT is **stabilized or decreasing:**

▶▶ **Go to step 3**

- ◆ Engine indications are **abnormal or** EGT continues to **increase:**

▶▶ **Go to step 6**

Check that RPM and EGT follow thrust lever movement.

- 3  Thrust lever
(affected engine) Advance slowly

▼ Continued on next page ▼

▼ Engine Limit or Surge or Stall continued ▼

4 Run the engine normally or at a reduced thrust setting that is surge and stall free.

5 Choose one:

◆ Engine runs normally:



◆ Engine runs at reduced thrust:

Transponder mode selector
(TCAS equipped airplanes). TA

This step prevents climb commands
which can exceed reduced thrust
performance capability.



6 Engine start lever
(affected engine) . . . Confirm. CUTOFF

7 Choose one:

◆ APU is **available** for start:

APU START

When APU is running: APU GEN

switch (affected side) ON

►► **Go to step 8**

◆ APU is **not** available:

The galleys and one system B
hydraulic pump are not powered.

►► **Go to step 8**

8 Balance fuel as needed.

▼ Continued on next page ▼

▼ Engine Limit or Surge or Stall continued ▼

- 9 Transponder mode selector
(TCAS equipped airplanes).TA

This prevents climb commands which can exceed single engine performance capability.

- 10 **If** wing anti-ice is needed:

PACK switch (affected side) OFF

ISOLATION VALVE switchAUTO

- 11 A restart may be attempted if there is N1 rotation and no abnormal airframe vibration.

- 12 Choose one:

◆ Restart **will** be attempted:

▶▶ **Go to the Engine In-Flight
Start checklist in section 2.8.8**



◆ Restart will **not** be attempted:

▶▶ **Go to step 13**

- 13 Land at the nearest suitable airport.

▶▶ **Go to the One Engine
Inoperative Landing checklist in
section 2.8.13**

