DCIEM
DIVING TABLES
(MULTI-LEVEL)

A: AIR DECOMPRESSION

Depth	No-Decompression Bottom Times (minutes)				Decompression Required Bottom Times			
20' 6m	30 A 60 B 90 C 120 D	150 E 180 F 240 G 300 H	360 I 420 J 480 K 600 L	720 M ∞				
30' 9m	30 A 45 B 60 C 90 D	100 E 120 F 150 G 180 H	190 I 210 J 240 K 270 L	300 M	360	400		
40' 12m	22 A 30 B 40 C	60 D 70 E 80 F	90 G 120 H 130 I	150 J	160 K 170 L	180 M 190	200	215
50' 15m	18 A 25 B	30 C 40 D	50 E 60 F	75 G	85 H 95 I	105 J 115 K	124 L	132 M
60' 18m	14 A 20 B	25 C 30 D	40 E	50 F	60 G	70 H 80 I	85 J	92 K
Decompression Stops in minutes			**at 10' 3m**		**5**	**10**	**15**	**20**
70' 21m	12 A 15 B	20 C	25 D	35 E	40 F	50 G	60 H 63 I	66 J
80' 24m	10 A 13 B	15 C	20 D	25 E	29 F	35 G	48 H	52 I
90' 27m	9 A	12 B	15 C	20 D	23 E	27 F	35 G	40 H 43 I
100' 30m	7 A	10 B	12 C	15 D	18 D	21 E	25 F 29 G	36 H
110' 33m		6 A	10 B	12 C	15 D	18 E	22 F	26 G 30 H
120' 36m		6 A	8 B	10 C	12 D	15 E	19 F	25 G
130' 39m			5 A	8 B	10 C	13 D	16 F	21 G
140' 42m			5 A	7 B	9 C	11 D	14 F	18 G
150' 45m			4 A	6 B	8 C	10 D	12 E	15 F
Decompression Stops in minutes			**at 20' 6m**		**-**	**-**	**5**	**10**
			at 10' 3m		**5**	**10**	**10**	**10**

- **ASCENT RATE** is 50' (15m) plus or minus 10' (3m) per minute
- **NO-DECOMPRESSION LIMITS** are given for first dives
- **DECOMPRESSION STOPS** are taken at mid-chest level

→ Table B for **Minimum Surface Intervals**
→ Table C for **Repetitive Dive No-Decompression Limits**
→ Table D for **Depth Corrections** required at Altitudes above 1000' (300m)

B: SURFACE INTERVALS

Rep. Group	0:15 ↘ 0:29	0:30 ↘ 0:59	1:00 ↘ 1:29	1:30 ↘ 1:59	2:00 ↘ 2:59	3:00 ↘ 3:59	4:00 ↘ 5:59	6:00 ↘ 8:59	9:00 ↘ 11:59	12:00 ↘ 14:59	15:00 ↘ 18:00
A	1.4	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0
B	1.5	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.0
C	1.6	1.4	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0
D	1.8	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0	1.0
E	1.9	1.6	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0
F	2.0	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.1	1.0
G	-	1.9	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0
H	-	-	1.9	1.7	1.6	1.5	1.4	1.3	1.1	1.1	1.1
I	-	-	2.0	1.8	1.7	1.5	1.4	1.3	1.1	1.1	1.1
J	-	-	-	1.9	1.8	1.6	1.5	1.3	1.2	1.1	1.1
K	-	-	-	2.0	1.9	1.7	1.5	1.3	1.2	1.1	1.1
L	-	-	-	-	2.0	1.7	1.6	1.4	1.2	1.1	1.1
M	-	-	-	-	-	1.8	1.6	1.4	1.2	1.1	1.1

Repetitive Factors (RF) given for Surface Intervals (hr:min)

C: REPETITIVE DIVING

Depth	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
30' 9m	272	250	230	214	200	187	176	166	157	150
40' 12m	136	125	115	107	100	93	88	83	78	75
50' 15m	60	55	50	45	41	38	36	34	32	31
60' 18m	40	35	31	29	27	26	24	23	22	21
70' 21m	30	25	21	19	18	17	16	15	14	13
80' 24m	20	18	16	15	14	13	12	12	11	11
90' 27m	16	14	12	11	11	10	9	9	8	8
100' 30m	13	11	10	9	9	8	8	7	7	7
110' 33m	10	9	8	8	7	7	6	6	6	6
120' 36m	8	7	7	6	6	6	5	5	5	5
130' 39m	7	6	6	5	5	5	4	4	4	4
140' 42m	6	5	5	5	4	4	4	3	3	3
150' 45m	5	5	4	4	4	3	3	3	3	3

Repetitive Dive No-D Limits given in minutes according to Depth and RF

D: DEPTH CORRECTIONS

Actual Depth ↓ ↓	1000' ↳ 1999 *300m ↳ 599*	2000' ↳ 2999 *600m ↳ 899*	3000' ↳ 3999 *900m ↳ 1199*	4000' ↳ 4999 *1200m ↳ 1499*	5000' ↳ 5999 *1500m ↳ 1799*	6000' ↳ 6999 *1800m ↳ 2099*	7000' ↳ 7999 *2100m ↳ 2399*	8000' ↳10000 *2400m ↳ 3000*
30' 9m	10 3	10 3	10 3	10 3	10 3	10 3	20 6	20 6
40' 12m	10 3	10 3	10 3	10 3	10 3	20 6	20 6	20 6
50' 15m	10 3	10 3	10 3	10 3	20 6	20 6	20 6	20 6
60' 18m	10 3	10 3	10 3	20 6	20 6	20 6	20 6	30 9
70' 21m	10 3	10 3	10 3	20 6	20 6	20 6	30 9	30 9
80' 24m	10 3	10 3	20 6	20 6	20 6	30 9	30 9	40 12
90' 27m	10 3	10 3	20 6	20 6	20 6	30 9	30 9	40 12
100' 30m	10 3	10 3	20 6	20 6	30 9	30 9	30 9	40 12
110' 33m	10 3	20 6	20 6	20 6	30 9	30 9	40 12	
120' 36m	10 3	20 6	20 6	30 9	30 9	30 9		
130' 39m	10 3	20 6	20 6					
140' 42m	10 3							

Add Depth Correction to Actual Depth of Altitude Dive

10' 3m	10	3.0	10	3.0	9	3.0	9	3.0	9	3.0	8	2.5	8	2.5	8	2.5
20' 6m	20	6.0	19	6.0	18	5.5	18	5.5	17	5.0	16	5.0	16	5.0	15	4.5

Actual Decompression Stop Depths (feet/*metres*) at Altitude

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RECREATIONAL DIVING PROCEDURES

The DCIEM Diving Tables were developed at the **Defence and Civil Institute of Environmental Medicine**, a research facility within the Department of National Defence. The DCIEM Tables and Procedures include the following information: No-Decompression Limits, Air Decompression Stops, Minimum Surface Intervals, Depth Corrections for Altitude Dives, Multi-Level Diving Procedures, and Guidelines for Flying after Diving.

TABLE A: FIRST DIVE NO-D LIMITS

Table A provides first dive No-D Limits as well as Decompression Stops for dives which exceed the No-D Limits. A **No-D Limit** is the maximum bottom time that can be spent at a given depth without having to conduct a Decompression Stop. (**Bottom time** includes both the time it takes to descend and the actual time spent at depth before the final ascent).

1. To find a No-D Limit for a given depth, select the depth and follow the numbers across to the bold vertical lines. The largest number to the left of the bold lines is the No-D Limit. *Example: first dive No-D Limit for 60' (18m) is 50 minutes.*

2. If your exact bottom time is not listed, use the next greater bottom time. **Repetitive group (RG) letters** appear beside the bottom times in Table A. If no RG letter appears beside your bottom time, cease diving for 24 hours. *Example: 40' (12m) for 190 minutes.*

3. The **Ascent Rate** is 50' (15m) plus or minus 10' (3m) per minute. This variable rate allows you to gradually reduce your rate of ascent as you reach shallower depths. *For example, the proper ascent rate at depths below 90' (27m) is 50' to 60' (15m to 18m) per minute. Above 90', the ascent rate should be reduced to 40' to 50' (12m to 15m) per minute. For dives deeper than 40', a 3 minute Safety Stop at 15' (4.5m) is recommended.*

4. The section to the right of the bold vertical lines is used for **Decompression Dives** - dives that exceed the No-D Limits. Decompression Stops must be conducted before surfacing from such dives. Stop times are given in minutes. *Example: 70' (21m) for 50 minutes, Group letter is 'G', Decompression Stop is 10 minutes at 10' (3m).*

TABLE B: SURFACE INTERVALS

The time elapsed between surfacing from a dive and beginning the descent on the following dive is called a **Surface Interval**. Surface Intervals are expressed in hours and/or minutes. The maximum Surface Interval is 18 hours.

1. Match your RG letter with the Surface Interval to find your repetitive factor - a residual nitrogen indicator for the following dive. 2.0 is the highest repetitive factor (RF).

2. As the Surface Interval increases, the repetitive factor decreases. Any dive conducted when the RF is greater than 1.0 is a **Repetitive Dive**. If your RF is 1.0, use the first dive No-D Limits. If your RF is greater than 1.0, use the repetitive dive No-D Limits (Table C).

3. Before conducting a repetitive dive, allow enough Surface Interval time to elapse for a repetitive factor (RF) to appear in Table B. If an emergency forces you to dive before a RF appears, apply the following guidelines:

   a. For dives to the SAME DEPTH: add the bottom times together and use the total time to determine your RG letter and decompression status.

   b. For dives to DIFFERENT DEPTHS: take the RG letter from your 1st dive and find the same group letter at the second depth. Begin the 2nd dive as if you had already spent the bottom time listed beside that Group letter. *Example: RG 'F', 2nd dive to 50' (15m). Bottom time given for 'F' at 50' is 60 minutes.*

TABLE C: REPETITIVE DIVE NO-D LIMITS

The No-D Limits for repetitive dives are given in Table C. The maximum depth of a repetitive dive must not exceed that of the preceding dive. *A maximum depth of 90' (27m) is recommended for a second dive. For a third dive, a maximum depth of 50' (15m) is recommended.*

1. To find the No-D Limit, match your RF with the depth of the repetitive dive. *Example: RF 1.4 at 50' (15m), No-D Limit is 45 minutes.*

2. On a repetitive dive, actual bottom time is added to residual nitrogen time. Find the residual nitrogen time (RNT) by subtracting the repetitive dive No-D Limit from the first dive No-D Limit for the same depth.

   Example: *50' (15m) Depth with RF 1.4*
   First Dive No-D Limit = *75 minutes*
   -Rep. Dive No-D Limit = *45 minutes*
   Residual Nitrogen Time = *30 minutes*

3. Add the actual bottom time to the RNT. The total of actual bottom time plus RNT is the Effective Bottom Time (EBT). In this example, adding 40 minutes of actual bottom time to the RNT results in an EBT of 70 minutes at 50' (15m) and RG 'G'.

Example cont'd: *Residual Nitrogen Time* = *30 minutes*
+ Actual Bottom Time = *40 minutes*
Effective Bottom Time = *70 minutes*

4. If the actual bottom time exceeds the No-D Limit, a Decompression Stop will be required. Stop times are given in Table A according to the depth and EBT.

Minimum Surface Intervals

Use Tables B and C to find the minimum Surface Interval for a No-D repetitive dive.

1. In Table C, select the depth and find a No-D Limit that meets or exceeds the actual bottom time. The RF required to conduct the dive is given at the top of the column.

2. In Table B, match this RF with the RG letter from the preceding dive. The minimum Surface Interval is given at the top of the column.

   Example: *1st Dive was 80' (24m) for 25 minutes, RG 'E',*
   Repetitive Dive will be 50' (15m) for 40 minutes,
   RF 1.5 allows a No-D Limit of 41 minutes (Table C)
   Group 'E' becomes RF 1.5 after a Surface Interval of 1 hr (Table B).

Repetitive Dives and Multi-day Diving

1. The RG letter for each repetitive dive must be greater than that of the preceding dive. Otherwise, add one letter to the RG taken from the preceding dive and use the higher letter. *Example: 1st dive 'C', 2nd dive 'D', 3rd dive 'D', 3rd dive RG becomes 'E'.*

2. After three days of repetitive diving, a day off from using scuba is recommended.

TABLE D: DEPTH CORRECTIONS FOR ALTITUDE DIVES

Any dive conducted at an altitude greater than 999 feet above sea level is an **Altitude Dive. Depth Corrections** are necessary when diving at altitude because the reduced atmospheric pressure makes the altitude dive equivalent to a much deeper dive at sea level. Table D is used to convert the actual depth at altitude to an Effective Depth which corresponds with the depth figures intended for use at sea level.

1. Apply the following procedures only after you have acclimatized at the altitude of the dive site for at least 12 hours:

   a. Establish the actual depth and the altitude;

   b. Find the depth correction by matching the actual depth with the altitude;

   c. Add the depth correction to the actual depth to determine the **Effective Depth** - the equivalent sea level depth for an Altitude Dive. Apply the Effective Depth to Table A (or to Table C for repetitive dives);

   d. If the dive exceeds the No-D Limit, decompress at the **Actual Decompression Stop Depth** given in Table D.

   Example: *Altitude is 6,000' (1,800m)* *Bottom Time is 35 minutes*
   Actual Depth = *60' (18m)*
   + Depth Correction = *20' (6m)* *Stop Time is 10 minutes at 10' (Table A)*
   Effective Depth = *80' (24m)* *Actual Dec. Stop Depth is 8' (2.5m)*

2. If you must dive before 12 hours have elapsed, begin with the NEXT GREATER DEPTH instead of the actual depth. In the example given above, begin the procedure as if the actual depth was 70'. The Effective Depth would be 90' (27m).

Flying after Diving

1. **12 hours** is the minimum time required before flying after a No-D first dive. However, your RF must be 1.0 before you fly. *Example: Group 'E' requires 15 hours (Table B).*

2. Allow at least **24 hours** to elapse before flying after any dive other than a No-D first dive.

The following procedures for multi-level diving are designed for advanced divers.

Multi-level STEP SYSTEM for the DCIEM Tables

A **Multi-level dive** is a dive during which bottom time is accumulated at two or more depths.

1. Conduct the DEEPEST PART of the dive FIRST. Ascend to progressively shallower depths.

   Between each of the Steps in the dive profile, the minimum range of ascent is 20' (6m). For example, if the maximum depth is 85', Step 1 is rounded to 90' (27m). Step 2 would have to be at 70' (21m) or less. From depths exceeding 100' (30m), the minimum range of ascent is 30' (9m). No more than 4 Steps should be included in the dive profile.

2. STAY WITHIN the NO-DECOMPRESSION LIMITS.

   If a No-D limit is exceeded at any Step, terminate the dive and proceed to the Decompression Stop(s) specified in Table A.

3. FINISH in SHALLOW water. Immediately before surfacing, spend at least 5 minutes in the depth range between 20' (6m) and 10' (3m). Add this time to the total bottom time (EBT).

4. Allow for a Surface Interval of at least one hour before the following dive.

First Dive Procedures

In Table A, find the RG letter for the first Step according to the depth and actual bottom time.

Example - Step 1: 90' (27m) for 15 minutes, Rep. Group for Step 1 is 'C'

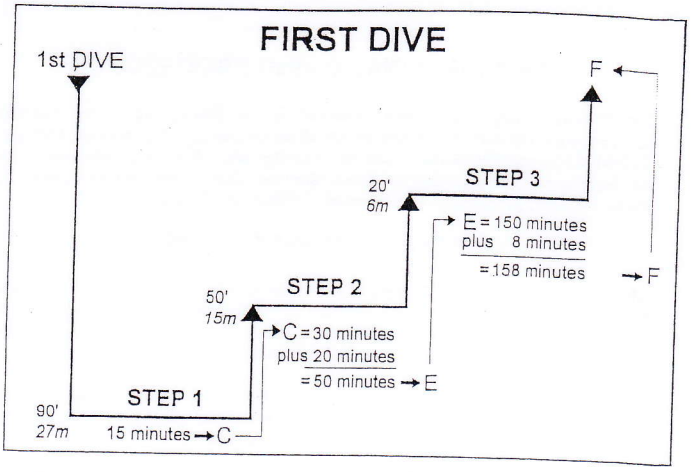
After 15 minutes at 90' (27m), the divers are in Group 'C'.

The equivalent time for 'C' at the 2nd depth (50') is 30 minutes. The actual bottom time is added to the equivalent time. The Effective Bottom Time must not exceed the No-D Limit.

Step 2: 50' (15m) for 20 minutes, (No-D Limit is 75 minutes)

Equivalent time for 'C'	*= 30 minutes*	
+Actual bottom time	*= 20 minutes*	
Effective Bottom Time	*= 50 minutes*	*RG 'E'*

At Step 2, the EBT must not exceed the 50' (15m) No-D Limit of 75 minutes. The divers spend 20 minutes at 50' (15m). Adding the actual bottom time to the equivalent time results in an Effective Bottom Time of 50 minutes at 50' and Rep. Group 'E'.



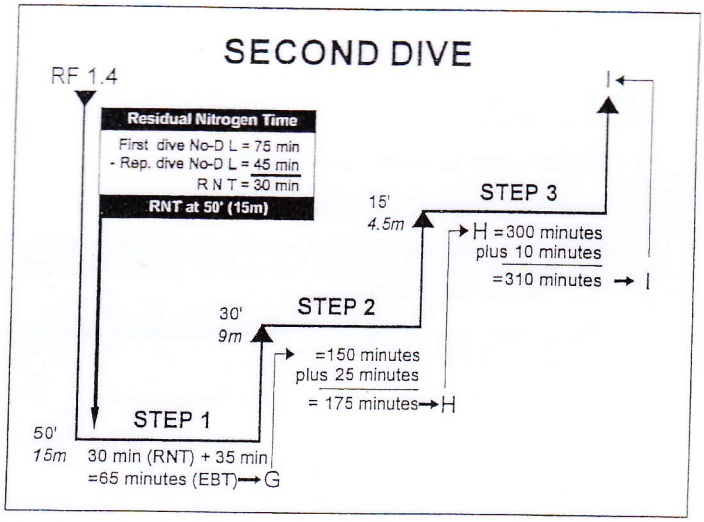
Step 3: 20' (6m) for 8 minutes, (No-D Limit does not apply at 20')

Equivalent time for 'E'	*= 150 minutes*	
+Actual Bottom Time	*= 8 minutes*	
Effective Bottom Time	*= 158 minutes*	*RG 'F'*

At Step 3, the equivalent time for Group 'E' is 150 minutes. Adding 8 minutes of actual bottom time results in an EBT of 158 minutes and a final RG letter of 'F'.

Second Dive Procedures

The Step System also allows the second dive to be a multi-level dive. The second dive should be shallower than the first dive. *A third dive may be conducted, but not as a multi-level dive.* On a 1st dive, actual bottom time is used at Step 1 because the divers are free of residual nitrogen. On a 2nd dive, the RG letter for Step 1 is based on Effective Bottom Time because of residual nitrogen remaining from the first dive.



For Step 1 of a second dive, the actual bottom time must not exceed the No-D Limit in Table C.

Example: After a 2 hour Surface Interval, Group 'F' (from 1st dive) becomes RF 1.4

Step 1: 50' (15m) for 35 minutes, (No-D Limit is 45 minutes)

The residual nitrogen time is determined by subtracting the repetitive dive No-D Limit from the first dive No-D Limit. The first dive No-D Limit for 50' (15m) is 75 minutes. Subtracting 45 minutes from 75 minutes leaves a residual nitrogen time (RNT) of 30 minutes.

Adding 35 minutes of actual bottom time to 30 minutes of RNT results in an Effective Bottom Time of 65 minutes at 50' (15m) and Rep. Group 'G'.

Residual Nitrogen Time	*= 30 minutes*	
+ Actual bottom time	*= 35 minutes*	
Effective Bottom Time	*= 65 minutes*	*RG 'G'*

The RG letter for Step 1 must be equal to or greater than the final RG from the 1st dive ('G' is greater than 'F' - the final RG from the 1st dive). Otherwise, the final RG from the 1st dive is applied to Step 1. *Example: If the RG for Step 1 was 'E', 'E' would be raised to 'F'.*

Beyond Step 1, the second dive procedures are identical to those used for a first dive. At Step 2, the divers spend 25 minutes at a depth of 30' (9m). The No-D Limit at 30' is 300 minutes. Group 'G' gives an equivalent time of 150 minutes at 30'. Adding 25 minutes of actual bottom time results in an EBT of 175 minutes and Rep. Group 'H'.

Step 2: 30' (9m) for 25 minutes, (No-D Limit is 300 minutes)

Equivalent time for 'G'	*= 150 minutes*	
+ Actual Bottom Time	*= 25 minutes*	
Effective Bottom Time	*= 175 minutes*	*RG 'H'*

At Step 3, Group 'H' gives an equivalent time of 300 minutes. Before surfacing, the divers spend 10 minutes at a depth of 15' (4.5m). Adding 10 minutes of actual bottom time results in an EBT of 310 minutes and a final RG letter of 'I'.

Step 3: 15' (4.5m) for 10 minutes, (No-D Limit does not apply)

Equivalent time for 'H'	*= 300 minutes*	
+ Actual Bottom Time	*= 10 minutes*	
Effective Bottom Time	*= 310 minutes*	*RG 'I'*

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