

MODIFIED DCIEM AIR DIVING TABLES

Introduction. These tables and procedures have been developed from the Canadian Defence and Civil Institute for Environmental Medicine's 1983 decompression model. This model is the result of over 20 years of decompression research, and the tables have been extensively tested. They were chosen for inclusion in Australian Standards as they are generally more conservative than previous commonly used tables, especially in the deeper depth or longer bottom time profiles.

Application of DCIEM tables-General The DCIEM tables are applied as follows:

- (a) **Depth** (Columns 2-11 of Table A2) These columns have depth increments of 3m (10 ft), and the value to be used is the one immediately exceeding the deepest depth to which the diver descended in the dive.
- (b) **Bottom time** (Column 1 of Table A2) The bottom time of the dive is the interval, in minutes, between the diver leaving the surface at the start of the dive and leaving the bottom to commence the ascent. The value to be used is the one immediately exceeding the actual bottom time.
- (c) **Rate of ascent** The rate of ascent shall not exceed 18 m/min (60 ft/min).
- (d) **Rate of descent** The rate of descent shall not exceed 18 m/min (60 ft/min).
- (e) **Hyperbaric chamber availability (level 1 and level 2)** These shaded areas in Table A2 represent time limits for depth of dives with respect to the availability of the nearest functional hyperbaric chamber. Access time to a chamber, is the time taken to transport a diver exiting the water to compression in the chamber.
- (f) **Repetitive dive** Any dive conducted within 18 h of a previous dive or any dive that has a repetitive factor greater than 1.0.
- (g) **Repetitive dive groups (RG)** The repetitive dive group letter is directly related to the amount of residual nitrogen in a diver's body immediately on surfacing from a dive. The repetitive dive groups shown are different from and incompatible with repetitive dive groups in other tables, eg. US Navy. Where bottom times appear without repetitive groups, repetitive diving is not recommended.
- (h) **Repetitive factor (RF)** A figure determined by the repetitive dive group and the length of the surface interval after a dive and used for repetitive diving.
- (i) **Effective bottom time (EBT)** For repetitive diving, the bottom time is calculated to take into consideration the residual nitrogen from previous dives.
- (j) **Effective depth** For a dive at altitude, the depth of an equivalent dive at sea level.

Table A3-Repetitive diving Procedures relevant to Table A3a and A3(b) are as follows:

- (a) Repetitive diving is permitted only in the normal air diving range. For surface intervals of less than 15 min, the 'combined dive' procedure is used. The combined dive procedure can also be used as an alternative to the repetitive dive procedure outlined below. This will result in shorter bottom times for any second or subsequent dive and thus usually more conservative dives.
- (b) The repetitive dive group letters (A-J) shown beside each dive profile in the normal air range of the DCIEM tables are used in conjunction with the repetitive factors table. These correction factors are based on the first dive and surface interval (to determine the 'residual' nitrogen) in conjunction with any possible depth (within the normal air diving range) for the second dive. Table A3(a) is used with the repetitive group and the surface interval to find the repetitive factor and A3(b) for the maximum bottom for the next dive.
- (c) To use Tables A3(a) & A3(b)-
 - (i) take the repetitive dive group (RG) letter of the first dive and enter the repetitive factor table (Table A3(a));
 - (ii) find the repetitive factor (RF) corresponding to that letter and the applicable surface interval column;
 - (iii) enter table A3(b) using the corresponding RF column cross reference with the appropriate depth row to obtain the maximum bottom time allowed for the next dive.
 - (iv) If a subsequent dive is planned, by multiplying the planned bottom time by the RF the EBT can be obtained. This calculation can then be used to re-enter Table A2.

Important
other.

The RG for a repetitive dive must be higher than the RG of the preceding dive when they are undertaken within 6 hours of each other.

Example:

First dive 15 m (50 ft) for 60 min. RG = F (Table A2).

The surface interval is 2 h, and the repetitive dive depth is 12 m (40 ft). From Table A3(a), the RF is 1.4 and from Table A3(b) the maximum bottom time allowed is 71 min.

The actual bottom time planned is only 60 min. Therefore, the EBT = 60 x 1.4 (RF after first dive) = 84 min, with an RG of G (Table A2). SI before third dive 1 h 35 min. RF = 1.6.

Third dive depth is 9 m (30 ft). Maximum bottom time Table A3(b) = 81 min

If the actual bottom time of the third dive was 40 min then EBT = 40 min x 1.6 (RF) = 64min. re-enter Table A2 to find RG = C ?? The surface interval is not greater than 6 hours and this RG is not greater than the preceding RG therefore the correct answer is RG = H.

NOTE: For repetitive bottom times just exceeding the allowable no-decompression limits, a minimum 5 min decompression stop at 3 m (10 ft) is mandatory.

CARE MUST BE EXERCISED WHEN PLANNING MULTIPLE DIVES NOT TO EXCEED HYPERBARIC CHAMBER AVAILABILITY LIMITS.

- (d) The repetitive factors have been cut off arbitrarily, at 2.0. It is felt that after a strenuous first dive, the surface interval should be sufficient in length to reduce the 'residual' nitrogen level of the diver to that degree. (This, in effect, defined the limits of the printed tables.)
NOTE: If a second dive is required before 30 min or before the surface interval reduces the repetitive factor to 2.0, add the two bottom times to obtain the effective bottom time and use the deeper depth of the two dives and the EBT for determining the decompression schedule (combined dive procedure). Alternatively, if the repetitive dive is to a different depth, enter the tables for the depth of the repetitive dive. Using the RG from the first dive, read back to the bottom time noted for that group. Add that bottom time to the intended bottom time to obtain the EBT for the repetitive dive.

TABLE A2

MODIFIED DCIEM NO-DECOMPRESSION LIMITS AND REPETITIVE DIVE GROUPS

Time	Depth (ft)									
	6m (20)	9m (30)	12m (40)	15m (50)	18m (60)	21m (70)	24m (80)	27m (90)	30m (100)	
5	A	A	A	A	A	A	A	A	A	A
8	A	A	A	A	A	A	A	A	A	B
10	A	A	A	A	A	A	A	A	A	B
15	A	A	A	A	B	C	C	C	D	D
20	A	A	A	A	B	C	D	D	E	
25	A	A	B	C	D	D	E	E		
30	A	A	B	C	D	D	E			
35	B	C	D	D	E	E				
40	B	C	D	D	E					
50	B	C	D	E	F					
60	B	C	D	F						
70	C	D	G	G						
75	C	D	G	G						
90	C	D	G							
100	D	F	G							
110	D	F	H							
120	D	F	H							
130	E	G	I							
150	E	G	J							
175	F	H								
180	F	H								
240	G	K								
240	G	K								
300	H									
Level 1	For dives not exceeding level 1, hyperbaric chamber access shall not exceed 6 hrs									
Level 2	Hyperbaric chamber access shall not exceed 2 hrs for dives equivalent to level 1 or between levels 1 and 2									

TABLE A3a

REPETITIVE FACTORS

R.G.	S.I. in h:min									
	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	12:00-18:00
A	1.4	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1	1
B	1.5	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1
C	1.6	1.4	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1
D	1.8	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1
E	1.9	1.6	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.1
F	2	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.1
G		1.9	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1
H			1.9	1.7	1.6	1.5	1.4	1.3	1.1	1.1
I			2	1.8	1.7	1.5	1.4	1.3	1.1	1.1
J				1.9	1.8	1.6	1.5	1.3	1.2	1.1

TABLE A3b

LIMITS FOR REPETITIVE DIVES

Maximum allowable bottom time in minutes - (Level 1 access to chamber)

Depth (ft)	R.F.									
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2
6m (20)	215	200	184	171	160	150	141	133	126	120
9m (30)	115	105	100	92	86	81	76	72	68	65
12m (40)	60	55	52	50	46	43	41	38	36	35
15m (50)	54	50	46	42	40	37	35	33	31	30
18m (60)	35	30	30	28	26	24	23	22	21	20
21m (70)	20	20	19	17	16	15	14	13	13	12
24m (80)	13	12	11	10	10	9	8	8	7	7
27m (90)	10	9	8	7	7	6	6	5	5	5
30m (100)	7	6	6	5	5	5	4	4	4	4

Note: To find the new RG after repetitive dive, multiply BT x RF to get Effective Bottom Time and re-enter Table A2 using EBT and depth. The RG for a repetitive dive must be greater than the RG of the preceding dive if the surface interval between the dives is less than 6 hours.