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DECOMPRESSION PROCEDURES FOR THE SAFE ASCENT OF  
AEROSPACE PERSONNEL FROM GROUND LEVEL TO ALTITUDE

Contract NAS 9-6978

Supplement B  
To Final Report

To:

National Aeronautics and Space Administration  
Manned Spacecraft Center  
Houston, Texas

**CASE FILE  
COPY**

Submitted by

Union Carbide Corporation  
Linde Division  
Technical Center  
Tarrytown, New York 10591

28 February 1970

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## I. INTRODUCTION AND SUMMARY

Under an extension of Contract NAS 9-6978, a single repetitive diving/flying decompression table was evolved to enable astronauts to determine the surface intervals required, breathing either air or oxygen, before making a safe ascent to cabin pressure altitudes of 6, 8, 10, 12, 16, 20, or 24 thousand feet. The table considers hyperbaric exposures to air at depth increments of 0-12, 12-24, 24-36, and 36-47 feet of sea water (fsw)\* for durations of up to 40, 80, and 120 minutes having a frequency of up to 2 exposures per day which are separated by surface intervals of at least 120, 180, or 240 minutes. It is assumed that these exposures may take place on every one of up to 5 successive days with an assumed surface interval of at least 16 hours between consecutive dives conducted on successive days. The diving/flying decompression table which was developed under Contract NAS 9-6978 states the required minimum preflight surface intervals in minutes breathing either air or 100% oxygen (administered by mask - a 2% N<sub>2</sub> mask leakage is assumed) after any number of repetitive hyperbaric exposures as delineated above.

The ascent-criteria (M-values) upon which this table is based were developed during a previous extension of this Contract. This work is described in Supplement A to our Final Report on Contract NAS 9-6978 (to be referred to as "Final Report" throughout this narrative).

Using our mathematical Tonawanda II Model of decompression (cf Final Report, p. 2) and the analyzed decompression experiences gained in 1553 manned altitude flights in its construction, we expected our repetitive diving/flying decompression table to be capable of predicting the outcome of experimental diving/flying exposures. Still we were impressed by the excellent agreement between safe preflight surface intervals predicted by our work and the safe surface intervals calculated on a theoretical basis

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\* A unit of pressure rigorously defined in the context of this study as being equal to  $\frac{760}{33}$  Torr.

by Mr. P. O. Edel of the J and J Marine Diving Company, Inc. under Contract Number T-77650 with the National Aeronautics and Space Administration. This agreement serves to validate our modeling approach to decompression from depth as well as to altitude.

## II. DESCRIPTION OF EFFORT

Using the computer program and decompression tables generated under the existing research effort, we constructed decompression tables which will predict safe surface intervals of crewmen who are subjected to diving exposure and then must fly.

In the preparation of the decompression tables, we took into consideration the following independent variables:

The hyperbaric exposures are made to depths ranging from 0-47 FSW. Calculations considered depth increments of 0-12 FSW, 12-24 FSW, 24-36 FSW and 36-47 FSW.

Duration of exposure varies from 20 min. to 2 hours. Calculations were based on exposures lasting 40, 80, and 120 minutes.

The frequency of exposures is to be a maximum of 2 exposures per day for up to 5 successive days. Two exposures during the day are to be separated by a period of surface pressure and varied from 2-4 hours. A surface interval of 16 hours is assumed to exist between pressure exposures on successive days. For calculation purposes, 2, 3, and 4 hour surface intervals were considered between exposures.

Air is the breathing mixture used during the dives and during the intervals on the surface between successive dives.

Both air and 100% oxygen (administered by mask) was considered as the breathing atmosphere to be used during the interval between the last dive and the flight.

The cabin pressure altitudes to be considered during the flight following the last dive are 6,000, 8,000, 12,000, 16,000, 20,000 and 24,000 feet. For all cabin pressures above 10,000 feet, it was assumed that 100% oxygen is breathed during the flight.

On the basis of the above independent variables, a table was constructed which will permit the astronaut or other involved personnel to determine (1) the duration of the surface interval, (2) the breathing mixture to be used, and (3) the maximum allowable cabin altitude that would be safe for a flight of 2 hours duration.

### III. RESULTS AND DISCUSSION

Using the Gas Transport Equation (cf. Final Report, p. 11) and assuming instantaneous changes in the level of ambient pressure, a set of  $\pi_{N_2}^{15}$  values at the end of the first day's second hyperbaric exposure and the corresponding  $\pi_{N_2}^{15}$  values 16 hours later for each of the combinations of first exposure depths (12, 24, 36 and 47 FSW) and times (40, 80 and 120 min.), surface interval times (2, 3 and 4 hours) and second exposure depths and times was calculated.

An additional exposure depth of 0 FSW was included to allow for the possibility of a subject missing one or both of the two hyperbaric exposures on any of the five successive days. A unique five digit index was generated for each of the aforementioned combinations for purposes of identification only. The resulting  $(4 + 1) \times 3 \times 3 \times (4 + 1) \times 3 = 675$  records were then arranged in ascending order based on the computed  $\pi_{N_2}^{15}$  values prevailing 16 hours after the end of the second dive, and printed out. These values ranged from 25.11 FSW to a maximum of about 36.5 FSW. Each of these 675 values would become a starting  $\pi_{N_2}^{0 15}$  value for the first dive on the following day and would in turn generate another 675 values for a total number of  $(675)^5$  for a five day period of hyperbaric exposures at Huntsville.

Many of the various combinations of dive profiles and surface intervals were found to result in the same or nearly the same end-of-second-dive value of  $\pi_{N_2}^{15}$ . All of these values would fall between the starting value for the first dive and some maximum value. This maximum value was obtained by assuming repetitive dives to 47 FSW for 120 minutes each separated by a minimum rest period of 2 hours each day, and a minimum overnight surface interval of 16 hours.

<u>DAY</u>	<u>INITIAL</u> <u><math>\pi_{N_2}^{15}</math> VALUE</u>	<u>FINAL <math>\pi_{N_2}^{15}</math></u> <u>VALUE</u>	$P_0$ (ground level) = 25.115 $P_0$ (47 FSW) = 62.715
1	25.115	36.495	
2	27.414	37.757	
3	27.669	37.897	
4	27.698	37.913	
5	27.701	37.914	

The initial values of  $\pi_{N_2}^{15}$  are those obtained following the 16 hour rest period while the final values are those computed at the end of the second exposure of the day. Hence, all  $\pi_{N_2}^{15}$  values that could be encountered in this situation will fall between 25.115 and 37.914 FSW. Since there is no significant change in the final value of  $\pi_{N_2}^{15}$  after the fourth day of maximum intensity diving, the mathematical development which follows is applicable to any number of successive diving days.

To classify each dive depth and time combination as a single activity, the following dive type numbers 1 through 15 have been assigned:

		DIVE TYPE NUMBERS		
MAXIMUM DIVE DEPTH IN FSW	0	1	2	3
	12	4	5	6
	24	7	8	9
	36	10	11	12
	47	13	14	15
MAXIMUM DIVE TIME IN MINUTES		40	80	120

Thus, for example, any dive to a depth greater than 24 FSW but equal to or less than 36 FSW for not more than 80 and not less than 41 minutes is classified as a dive type 11.

A table was constructed based on a single activity occurrence, since any one activity (dive or surface interval) consists of determining a new final  $\pi_{N_2}^{15}$  value from the previous final  $\pi_{N_2}^{15}$  value calculated. This table is presented as page i of Appendix I. It consists of final  $\pi_{N_2}^{15}$  values resulting from the activity described by the column titles (denitrogenation of tissues for dive types 1, 2, and 3 and rest periods of 2, 3, 4 and 16 hours and nitrogen uptake for dive type 4 through 15).

The left most column of the table contains table line numbers. Immediately to the right of the line numbers are the initial  $\pi_{N_2}^{15}$  values for the



current activity. These values were generated by stating initial  $\pi_{N_2}^{15}$  values in increments of 0.15 FSW, so that the maximum spread of initial  $\pi_{N_2}^{15}$  values possible could still be displayed by photo reduction on an 8 1/2 x 11 in. page. The first line entry of the table is the initial  $\pi_{N_2}^{15}$  value of 25.115 FSW for the first exposure of the series to be conducted.

Use of the table can best be illustrated by an example. Assume the first day's schedule is to consist of a type 15 dive (47 FSW for 120 minutes), followed by a rest period of 3 hours, followed by a type 8 dive (24 FSW for 80 minutes). Starting with the initial entry of 25.11 FSW on line number 1, the tissue nitrogen tension of 31.93 FSW is extracted from the 1st line under dive type 15. This value becomes the starting tissue nitrogen tension for the surface interval of 3 hours which follows this dive. The value of 31.93 falls between the initial values of 31.86 and 32.01 FSW opposite line/ numbers 46 and 47 respectively. To err on the conservative side, the value of 32.01 FSW on line 47 is chosen as the new initial value of  $\pi_{N_2}^{15}$ . Following line 47 to the right, the value of 30.23 is taken from the 3 hour Rest Period column. This in turn becomes the initial value of  $\pi_{N_2}^{15}$  for the second hyperbaric exposure. Since 30.23 falls between 30.21 and 30.36 FSW the greater value, on line 36 is chosen. Following line 36 to the right, a final value of  $\pi_{N_2}^{15}$  of 32.11 FSW is taken from the dive type 8 column. This then is the tissue nitrogen gas tension that must be considered if ascent to altitude is to follow this dive. When followed by another day's schedule, the value of 32.11 FSW is related to line 48 and a new  $\pi_{N_2}^{15}$  value of 26.54 is obtained from the 16 hour Rest Period column. This value becomes the initial value for the next day's schedule and relates to line 11. Since any surface-level prebreathing period (delay time for tissue denitrogenation) required to effect safe ascents to altitudes of 6, 8, 12, 16, 20, and 24 thousand feet can be considered as just one additional activity, it was added to the second version of the table. Room was obtained for its inclusion by using the table line numbers as code numbers in place of the actual computed values of  $\pi_{N_2}^{15}$ . This table is presented as page ii of Appendix I.

The surface level prebreathing periods were computed by solving the Nitrogen Transport Equation (cf Final Report, Supplement A)

$$\frac{d\pi}{dt} = \frac{0.693}{416} (F_{I_{N_2}} [ B-37 ] - \pi)$$

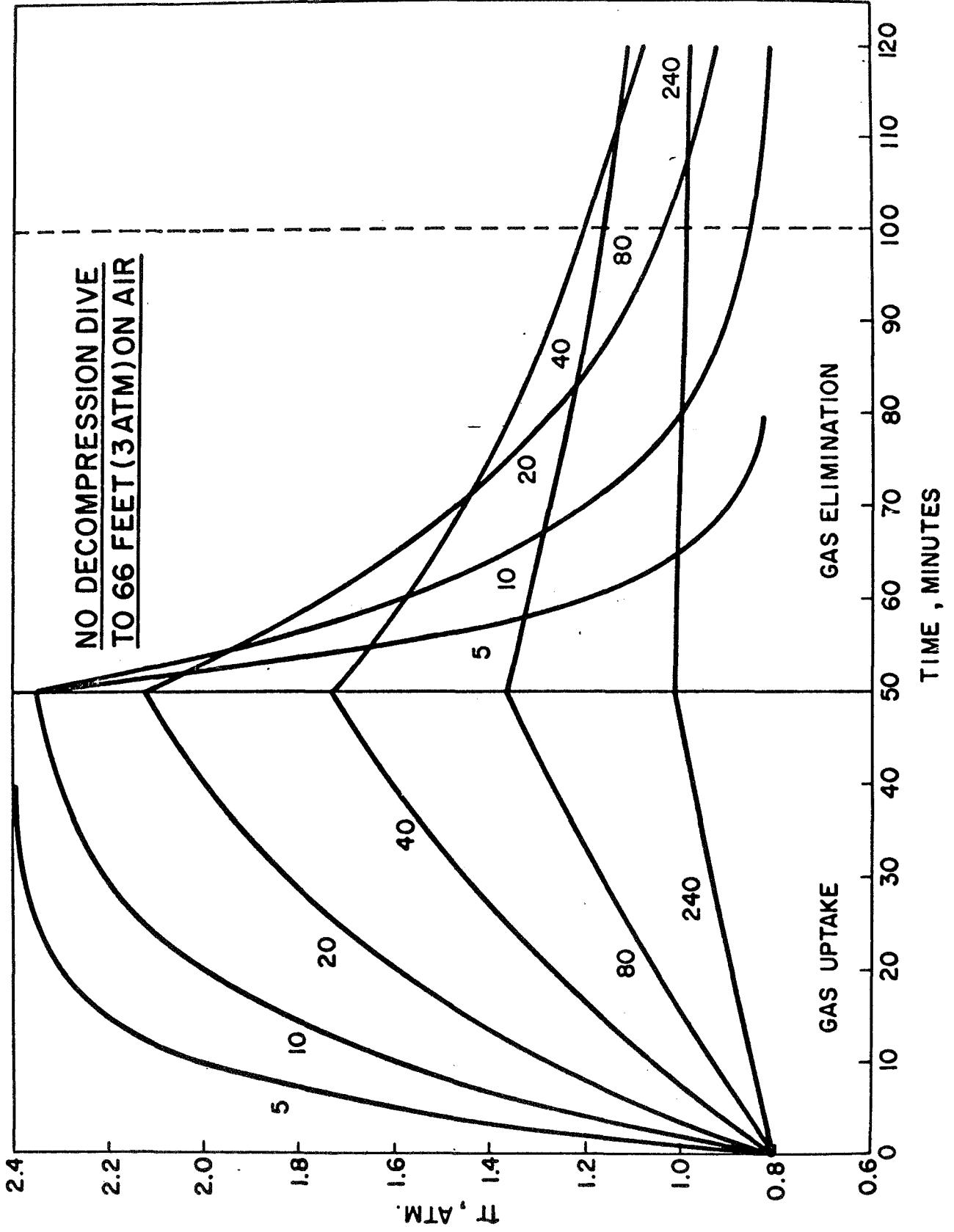
for t where  $F_{I_{N_2}} = 0.80$  for air breathing and  $0.02$  for oxygen breathing by mask (assuring an average level of nitrogen in the mask due to inboard leakage of 2 %),  $B = 760$  mm Hg,  $\pi$  the ascent-limiting value of  $\pi_{N_2}^{15}$  appropriate for a safe sojourn of 2 hours at a given target altitude (cf Final Report, Supplement A Table V) and  $\pi_0$  the value of  $\pi_{N_2}^{15}$  at the end of the last activity preceding the proposed flight as derived from page i of Appendix I.

Ascents to altitudes greater than 12,000 feet prebreathing air were not included in page ii of Appendix I since the M-value for the 15th compartment for safe ascent to 16,000 altitude is nearly equal to the inspired  $P_{N_2}$  value for surface breathing of air which produces lengthy prebreathing times, while  $M_{N_2}^{15}$  values for safe ascent to 20 and 24 thousand feet cannot be attained by the ground-level breathing of air. Therefore oxygen prebreathing must be employed where necessary to insure the safe ascent to altitudes of 16,000 ft. and above.

Examination of the resulting table, indicated no air or oxygen prebreathing requirement for ascent to 6,000 ft. and only nominal prebreathing times for ascent to 8,000 ft. Whereas the preoxygenation times required for safe ascent to altitude from ground level (cf Final Report, Supplement A, Table VII) are based on the fact that only the slowest (15th) inert gas exchange compartment controls ascent, hyperbaric exposures could result in one of the faster inert gas exchange compartments being the controlling tissue during ascent to altitude. The gas uptake-gas elimination situation for a no decompression dive to 66 feet (3 Atm.) on air, illustrated in Figure 1, clearly indicates that such can be the case.

To overcome this weakness of our approach, a second table, included as page iii of Appendix I, was constructed assuming a "worst possible case" situation. Since maximum gas uptake takes place in the face of maximum

FIGURE 1



inspired inert gas pressure, we calculated the time (t) for a single 47 FSW exposure which would produce the value of  $\pi_{N_2}^{15}$  listed on page i, Appendix I following the last hyperbaric exposure prior to ascent, a value that we would normally find in the left hand column of the table. Using this time we calculated corresponding values of  $\pi_{N_2}$  for the remaining 14 inert gas exchange compartments of the Tonawanda II Model of decompression and then determined the length of time each compartment requires for sufficient nitrogen elimination to attain a desired  $M_{N_2}^{15}$  value. The maximum time required is then reported as the required preflight ground-level interval regardless of which compartment is controlling. Lacking appropriate M-values for the other compartments, which usually are greater in value than that for the 15th compartment, we acted conservatively by using  $M_{N_2}^{15}$  values for all 15 inert gas exchange compartments.

The tabular output (page iii, Appendix I) indicates that faster inert gas exchange compartments indeed control ascent to lower altitudes while the slowest (15th) compartment controls ascent to higher altitudes.

In tracing through this table, using dive types 15 and minimum surface intervals between daily dives of 120 minutes, we found that the tissue nitrogen tensions resulting from the 2nd exposure of the 3rd day, fell into an 88th category of  $\pi_{N_2}^{15}$  values. Hence our repetitive diving/flying decompression table was expanded to contain 90 categories and is included as page iv of Appendix I.

A version of table iii in which ground-level air prebreathing times prior to ascent to 10,000 feet were displayed (page v, Appendix I) was used for comparison with diving/flying decompression data calculated by Mr. Peter O. Edel and reported by him in "Decompression Risks In Successive Hyperbaric-Hypobaric Exposures". This document reports work performed under contract number T-77650 with the National Aeronautics and Space Administration by J. and J. Marine Diving Company, Inc. This comparison relates to repetitive dives to 47 FSW for 120 minutes separated by a 3 hour surface interval and consecutive dives on succeeding days separated by a minimum surface interval of 16 hours.

<u>DIVING DAY</u>	<u>EXPOSURE NUMBER</u>	<u>SURFACE INTERVAL (Breathing Air) IN MINUTES PRIOR TO ASCENT TO ALTITUDE</u>			
		8,000 Ft.		10,000 Ft.	
		<u>Edel</u>	<u>This Report</u>	<u>Edel</u>	<u>This Report</u>
1	1	90	95	150	148
1	2	150	168	240	253
2	1	120	125	180	199
2	2	180	186	300	291
3	1	120	127	180	203
3	2	180	188	300	296
4	1	120	127	180	203
4	2	180	188	300	296
5	1	120	127	180	203
5	2	180	188	300	296

IV. ADMINISTRATIVE INFORMATION

The work reported herein was performed by Messers. P. L. Kelley, N. Skalski and E. L. Smith, Jr. of the Niagara Frontier Regional Computer Center of Union Carbide Corporation at Tonawanda, N. Y. and by Dr. H. R. Schreiner, the Principal Investigator. Dr. Schreiner is currently Director of Research and Development of Ocean Systems, Inc., an affiliate of Union Carbide Corporation and the Singer Company. He is located at the Tarrytown Technical Center, Saw Mill River Road at Route 100C, Tarrytown, New York 10591, Telephone (914) 345-3029.

APPENDIX I

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DIVE TABLE

PI	VALUF	DIVE TYPE															REST PERIOD			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	2 HR.	3 HR.	4 HR.	16 HR
1	25.11	25.11	25.11	25.73	26.31	26.85	26.35	27.51	28.59	26.97	28.71	30.33	27.54	29.81	31.93	25.11	25.11	25.11	25.11	
2	25.26	25.26	25.25	25.24	25.87	26.44	26.98	26.49	27.64	28.72	27.11	28.84	30.46	27.68	29.94	32.05	25.24	25.23	25.22	25.15
3	25.41	25.40	25.38	25.36	26.01	26.58	27.10	26.63	27.77	28.84	27.25	28.97	30.58	27.82	30.07	32.17	25.36	25.34	25.32	25.18
4	25.54	25.54	25.51	25.48	26.15	26.71	27.22	26.77	27.90	28.96	27.39	29.10	30.70	27.96	30.20	32.30	25.48	25.45	25.42	25.21
5	25.71	25.68	25.64	25.61	26.29	26.84	27.35	26.91	28.04	29.08	27.53	29.23	30.82	28.10	30.33	32.42	25.61	25.56	25.52	25.24
6	25.86	25.82	25.77	25.73	26.44	26.97	27.47	27.05	28.17	29.21	27.67	29.36	30.95	28.24	30.46	32.54	25.73	25.67	25.62	25.27
7	26.01	25.96	25.90	25.85	26.58	27.10	27.59	27.19	28.30	29.33	27.81	29.50	31.07	28.38	30.59	32.66	25.85	25.78	25.72	25.30
8	26.16	26.10	26.03	25.97	26.72	27.23	27.71	27.33	28.43	29.45	27.95	29.63	31.19	28.52	30.73	32.79	25.97	25.89	25.82	25.33
9	26.31	26.24	26.16	26.10	26.86	27.36	27.84	27.47	28.56	29.58	28.09	29.76	31.32	28.66	30.86	32.91	26.10	26.00	25.92	25.36
10	26.46	26.38	26.30	26.22	27.00	27.49	27.96	27.62	28.69	29.70	28.23	29.89	31.44	28.80	30.99	33.03	26.22	26.11	26.02	25.39
11	26.61	26.52	26.43	26.34	27.14	27.63	28.08	27.76	28.82	29.82	28.37	30.02	31.56	28.94	31.12	33.16	26.34	26.23	26.12	25.42
12	26.76	26.66	26.56	26.47	27.28	27.76	28.21	27.90	28.95	29.94	28.51	30.15	31.68	29.08	31.25	33.28	26.47	26.34	26.22	25.45
13	26.91	26.80	26.69	26.59	27.42	27.89	28.33	28.04	29.09	30.07	28.66	30.28	31.81	29.22	31.38	33.40	26.59	26.45	26.32	25.48
14	27.06	26.94	26.82	26.71	27.56	28.02	28.45	28.18	29.22	30.19	28.80	30.41	31.93	29.36	31.51	33.52	26.71	26.56	26.42	25.51
15	27.21	27.08	26.95	26.83	27.70	28.15	28.57	28.32	29.35	30.31	28.94	30.55	32.05	29.50	31.64	33.65	26.83	26.67	26.52	25.54
16	27.36	27.22	27.08	26.96	27.84	28.28	28.70	28.46	29.48	30.44	29.08	30.68	32.18	29.64	31.78	33.77	26.96	26.78	26.62	25.57
17	27.51	27.36	27.22	27.08	27.98	28.41	28.82	28.60	29.61	30.56	29.22	30.81	32.30	29.78	31.91	33.89	27.08	26.89	26.72	25.60
18	27.66	27.50	27.35	27.20	28.12	28.54	28.94	28.74	29.74	30.68	29.36	30.94	32.42	29.92	32.04	34.02	27.20	27.00	26.82	25.63
19	27.81	27.64	27.48	27.33	28.26	28.68	29.06	28.88	29.87	30.80	29.50	31.07	32.54	30.06	32.17	34.14	27.33	27.12	26.92	25.66
20	27.96	27.78	27.61	27.45	28.40	28.81	29.19	29.02	30.00	30.93	29.64	31.20	32.67	30.20	32.30	34.26	27.45	27.23	27.03	25.69
21	28.11	27.92	27.74	27.57	28.54	28.94	29.31	29.16	30.14	31.05	29.78	31.33	32.79	30.35	32.43	34.38	27.57	27.34	27.13	25.72
22	28.26	28.06	27.87	27.69	28.68	29.07	29.43	29.30	30.27	31.17	29.92	31.47	32.91	30.49	32.56	34.51	27.69	27.45	27.23	25.75
23	28.41	28.20	28.00	27.82	28.82	29.20	29.56	29.44	30.40	31.30	30.06	31.60	33.04	30.63	32.69	34.63	27.82	27.56	27.33	25.78
24	28.56	28.34	28.13	27.94	28.96	29.33	29.68	29.58	30.53	31.42	30.20	31.73	33.16	30.77	32.83	34.75	27.94	27.67	27.43	25.81
25	28.71	28.48	28.27	28.06	29.10	29.46	29.80	29.72	30.66	31.54	30.34	31.86	33.28	30.91	32.96	34.88	28.06	27.78	27.53	25.84
26	28.86	28.62	28.40	28.19	29.24	29.59	29.92	29.86	30.79	31.66	30.48	31.99	33.40	31.05	33.09	35.00	28.19	27.89	27.63	25.87
27	29.01	28.76	28.53	28.31	29.38	29.73	30.05	30.00	30.92	31.79	30.62	32.12	33.53	31.19	33.22	35.12	28.31	28.00	27.73	25.90
28	29.16	28.90	28.66	28.43	29.52	29.86	30.17	30.14	31.05	31.91	30.76	32.25	33.65	31.33	33.35	35.24	28.43	28.12	27.83	25.93
29	29.31	29.04	28.79	28.55	29.66	29.99	30.29	30.28	31.19	32.03	30.90	32.38	33.77	31.47	33.48	35.37	28.55	28.23	27.93	25.96
30	29.46	29.18	28.92	28.68	29.80	30.12	30.42	30.42	31.32	32.16	31.04	32.52	33.89	31.61	33.61	35.49	28.68	28.34	28.03	25.99
31	29.61	29.32	29.05	28.80	29.94	30.25	30.54	30.56	31.45	32.28	31.18	32.65	34.02	31.75	33.74	35.61	28.80	28.45	28.13	26.02
32	29.76	29.46	29.18	28.92	30.08	30.38	30.66	30.70	31.58	32.40	31.32	32.78	34.14	31.89	33.88	35.73	28.92	28.56	28.23	26.05
33	29.91	29.61	29.32	29.04	30.22	30.51	30.78	30.84	31.71	32.52	31.46	32.91	34.26	32.03	34.01	35.86	29.04	28.67	28.33	26.08
34	30.06	29.75	29.45	29.17	30.36	30.64	30.91	30.98	31.84	32.65	31.60	33.04	34.39	32.17	34.14	35.98	29.17	28.78	28.43	26.11
35	30.21	29.89	29.58	29.29	30.50	30.78	31.03	31.12	31.97	32.77	31.74	33.17	34.51	32.31	34.27	36.10	29.29	28.89	28.53	26.15
36	30.36	30.03	29.71	29.41	30.65	30.91	31.15	31.26	32.11	32.89	31.88	33.30	34.63	32.45	34.40	36.23	29.41	29.00	28.63	26.18
37	30.51	30.17	29.84	29.54	30.79	31.04	31.28	31.40	32.24	33.02	32.02	33.43	34.75	32.59	34.53	36.35	29.54	29.12	28.74	26.21
38	30.66	30.31	29.97	29.66	30.93	31.17	31.40	31.54	32.37	33.14	32.16	33.57	34.88	32.73	34.66	36.47	29.66	29.23	28.84	26.24
39	30.81	30.45	30.10	29.78	31.07	31.30	31.52	31.68	32.50	33.26	32.30	33.70	35.00	32.87	34.79	36.59	29.78	29.34	28.94	26.27
40	30.96	30.59	30.23	29.90	31.21	31.43	31.64	31.83	32.63	33.38	32.44	33.83	35.12	33.01	34.93	36.72	29.90	29.45	29.04	26.30
41	31.11	30.73	30.37	30.03	31.35	31.56	31.77	31.97	32.76	33.51	32.58	33.96	35.25	33.15	35.06	36.84	30.03	29.56	29.14	26.33
42	31.26	30.87	30.50	30.15	31.49	31.70	31.89	32.11	32.89	33.63	32.72	34.09	35.37	33.29	35.19	36.96	30.15	29.67	29.24	26.36
43	31.41	31.01	30.63	30.27	31.63	31.83	32.01	32.25	33.02	33.75	32.87	34.22	35.49	33.43	35.32	37.09	30.27	29.78	29.34	26.39
44	31.56	31.15	30.76	30.40	31.77	31.96	32.14	32.39	33.16	33.87	33.01	34.35	35.61	33.57	35.45	37.21	30.40	29.89	29.44	26.42
45	31.71	31.29	30.89	30.52	31.91	32.09	32.26	32.53	33.29	34.00	33.15	34.48	35.74	33.71	35.58	37.33	30.52	30.00	29.54	26.45
46	31.86	31.43	31.02	30.64	32.05	32.22	32.38	32.67	33.42	34.12	33.29	34.62	35.86	33.85	35.71	37.45	30.64	30.12	29.64	26.48
47	32.01	31.57	31.15	30.76	32.19	32.35	32.50	32.81	33.55	34.24	33.43	34.75	35.98	33.99	35.85	37.58	30.76	30.23	29.74	26.51
48	32.16	31.71	31.29	30.89	32.33	32.48	32.63	32.95	33.68	34.37	33.57	34.88	36.11	34.13	35.98	37.70	30.89	30.34	29.84	26.54
49	32.31	31.85	31.42	31.01	32.47	32.61	32.75	33.09	33.81	34.49	33.71	35.01	36.23	34.27	36.11	37.82	31.01	30.45	29.94	26.57
50	32.46	31.99	31.55	31.13	32.61	32.75	32.87	33.23	33.94	34.61	33.85	35.14	36.35	34.41	36.24	37.95	31.13	30.56	30.04	26.60
51	32.61	32.13	31.68	31.26	32.75	32.88	33.00	33.37	34.07	34.73	33.99	35.27	36.47	34.55	36.37	38.07	31.26	30.67	30.14	26.63
52	32.76	32.27	31.81	31.38	32.89	33.01	33.12	33.51	34.21	34.86	34.13	35.40	36.60	34.70	36.50	38.19	31.38	30.78	30.24	26.66
53	32.91	32.41	31.94	31.50	33.03	33.14	33.24	33.65	34.34	34.98	34.27	35.53	36.72	34.84	36.63	38.31	31.50	30.89	30.34	26.69
54	33.06	32.55	32.07	31.62	33.17	33.27	33.36	33.79	34.47	35.10	34.41	35.67	36.84	34.98	36.76	38.44	31.62	31.01	30.44	26.72
55	33.21	32.69	32.20	31.75	33.31	33.40	33.49	33.93	34.60	35.23	34.55	35.80	36.97	35.12	36.90	38.56	31.75	31.12	30.55	26.75
56	33.36	32.83	32.34	31.87	33.45	33.53	33.61	34.07	34.73	35.35	34.69	35.93	37.09	35.26	37.03	38.68	31.87	31.23	30.65	26.78
57	33.51	32.97	32.47	31.99	33.59	33.66	33.73	34.21	34.86	35.47	34.83	36.06	37.21	35.40	37.16	38.81	31.99	31.34	30.75	26.81
58	33																			



DIVE TABLE

REST PERIOD

DELAY TIMES

CN

DIVE TYPE

IN HOURS

FOR CABIN P. ALT. IN K FT. BREATHING OXYGEN

CN	DIVE TYPE															REST PERIOD					DELAY TIMES							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	2	3	4	16	6	8	12	6	8	12	16	20	24
1	1	1	1	6	9	13	10	17	25	14	25	36	18	33	47	1	1	1	1	0	0	0	0	0	0	0	113	241
2	2	2	2	7	10	14	11	18	26	15	26	37	19	34	48	2	2	2	2	0	0	0	0	0	0	0	117	244
3	3	3	3	7	11	15	12	19	26	16	27	38	20	35	49	3	3	3	3	0	0	0	0	0	0	2	121	248
4	4	4	4	8	12	16	13	20	27	17	28	39	20	35	49	4	4	4	2	0	0	0	0	0	0	6	124	251
5	5	5	5	9	13	16	13	21	28	18	29	40	21	36	50	5	4	4	2	0	0	0	0	0	0	9	128	255
6	6	6	6	10	14	17	14	22	29	19	30	40	22	37	51	6	5	5	3	0	0	0	0	0	0	13	131	259
7	7	7	7	11	15	18	15	23	30	19	31	41	23	38	52	6	6	6	3	0	0	0	0	0	0	16	135	262
8	8	8	8	12	16	19	16	24	30	20	32	42	24	39	53	7	7	6	3	0	0	0	0	0	0	20	139	266
9	9	9	9	13	16	20	17	24	31	21	32	43	25	40	53	8	7	7	3	0	0	0	0	0	0	23	142	269
10	10	9	9	14	17	20	18	25	32	22	33	44	26	41	54	9	8	8	3	0	0	0	0	0	0	27	146	273
11	11	10	10	15	18	21	19	26	33	23	34	44	27	42	55	10	9	8	4	0	0	0	0	0	0	30	149	276
12	12	11	11	16	19	22	20	27	34	24	35	45	28	42	56	11	10	9	4	0	0	0	0	0	0	34	153	280
13	13	12	11	17	20	23	21	28	35	25	36	46	29	43	57	11	10	10	4	0	0	0	0	0	0	37	156	283
14	14	13	12	18	21	24	22	29	35	26	37	47	30	44	58	12	11	10	4	0	0	0	0	0	0	41	159	287
15	15	14	13	19	22	25	23	30	36	27	38	48	31	45	58	13	12	11	4	0	0	0	0	0	0	44	163	290
16	16	15	14	20	23	25	24	31	37	28	39	49	32	46	59	14	13	12	5	0	0	0	0	0	0	47	166	293
17	16	16	15	21	23	26	25	31	38	29	39	49	33	47	60	15	13	12	5	0	0	0	0	0	0	51	170	297
18	17	16	15	22	24	27	26	32	39	30	40	50	34	48	61	15	14	13	5	0	0	0	0	0	0	54	173	300
19	18	17	16	22	25	28	27	33	39	31	41	51	34	49	62	16	15	14	5	0	0	0	0	0	0	57	176	303
20	19	18	17	23	26	29	28	34	40	32	42	52	35	49	62	17	16	14	5	0	0	0	0	0	0	61	179	307
21	20	19	18	24	27	29	28	35	41	33	43	53	36	50	63	18	16	15	6	0	0	0	0	0	0	64	183	310
22	21	20	19	25	28	30	29	36	42	34	44	53	37	51	64	19	17	16	6	0	0	0	0	0	0	67	186	313
23	22	21	20	26	29	31	30	37	43	34	45	54	38	52	65	20	18	16	6	0	0	0	0	0	0	71	189	316
24	23	22	20	27	30	32	31	38	44	35	46	55	39	53	66	20	19	17	6	0	0	0	0	0	0	74	193	320
25	24	23	21	28	30	33	32	38	44	36	46	56	40	54	67	21	19	18	6	0	0	0	0	0	0	77	196	323
26	25	23	22	29	31	34	33	39	45	37	47	57	41	55	67	22	20	18	7	0	0	0	0	0	0	80	199	326
27	26	24	23	30	32	34	34	40	46	38	48	58	42	56	68	23	21	19	7	0	0	0	0	0	0	83	202	329
28	27	25	24	31	33	35	35	41	47	39	49	58	43	56	69	24	22	20	7	0	0	0	0	0	0	87	205	332
29	28	26	24	32	34	36	36	42	48	40	50	59	44	57	70	24	22	20	7	0	0	0	0	0	0	90	209	336
30	29	27	25	33	35	37	37	43	48	41	51	60	45	58	71	25	23	21	7	0	0	0	0	0	0	93	212	339
31	30	28	26	34	36	38	38	44	49	42	52	61	46	59	72	26	24	22	8	0	0	0	0	0	0	96	215	342
32	31	29	27	35	37	38	39	45	50	43	53	62	47	60	72	27	24	22	8	0	0	0	0	0	0	99	218	345
33	31	30	28	36	37	39	40	45	51	44	53	62	48	61	73	28	25	23	8	0	0	0	0	0	0	102	221	348
34	32	30	29	36	38	40	41	46	52	45	54	63	49	62	74	29	26	24	8	0	0	0	0	0	0	105	224	351
35	33	31	29	37	39	41	42	47	53	46	55	64	49	63	75	29	27	24	8	0	0	0	0	0	0	108	227	354
36	34	32	30	38	40	42	42	48	53	47	56	65	50	63	76	30	27	25	9	0	0	0	0	0	0	111	230	357
37	35	33	31	39	41	43	43	49	54	48	57	66	51	64	76	31	28	26	9	0	0	12	0	0	3	114	233	360
38	36	34	32	40	42	43	44	50	55	48	58	67	52	65	77	32	29	26	9	0	0	28	0	0	6	117	236	363
39	37	35	33	41	43	44	45	51	56	49	59	67	53	66	78	33	30	27	9	0	0	44	0	0	9	120	239	366
40	38	36	33	42	44	45	46	52	57	50	60	68	54	67	79	33	30	28	9	0	0	60	0	0	11	123	242	369
41	39	37	34	43	44	46	47	52	57	51	60	69	55	68	80	34	31	28	10	0	0	75	0	0	14	126	245	372
42	40	37	35	44	45	47	48	53	58	52	61	70	56	69	80	35	32	29	10	0	0	90	0	0	17	129	248	375
43	41	38	36	45	46	47	49	54	59	53	62	71	57	70	81	36	33	30	10	0	0	104	0	0	20	132	251	378
44	42	39	37	46	47	48	50	55	60	54	63	71	58	70	82	37	33	30	10	0	0	118	0	0	23	135	254	381
45	43	40	38	47	48	49	51	56	61	55	64	72	59	71	83	38	34	31	10	0	0	132	0	0	26	138	257	384
46	44	41	38	48	49	50	52	57	62	56	65	73	60	72	84	38	35	32	11	0	0	146	0	0	29	141	260	387
47	45	42	39	49	50	51	53	58	62	57	66	74	61	73	85	39	36	32	11	0	0	159	0	0	32	144	262	390
48	45	43	40	50	51	52	54	59	63	58	67	75	62	74	85	40	36	33	11	0	0	172	0	0	35	147	265	392
49	46	44	41	51	51	52	55	59	64	59	67	76	63	75	86	41	37	34	11	0	0	184	0	0	38	149	268	395
50	47	44	42	51	52	53	56	60	65	60	68	76	63	76	87	42	38	34	11	0	0	197	0	0	40	152	271	398
51	48	45	42	52	53	54	57	61	66	61	69	77	64	77	88	42	39	35	12	0	0	209	0	0	43	155	274	401
52	49	46	43	53	54	55	57	62	66	62	70	78	65	77	89	43	39	36	12	0	0	221	0	0	46	158	277	404
53	50	47	44	54	55	56	58	63	67	63	71	79	66	78	89	44	40	36	12	0	0	232	0	0	49	161	279	407
54	51	48	45	55	56	57	59	64	68	63	72	80	67	79	90	45	41	37	12	0	0	244	0	0	52	163	282	409
55	52	49	46	56	57	58	60	65	69	64	73	81	68	80	91	46	42	38	12	0	0	255	0	0	54	166	285	412
56	53	50	47	57	58	59	61	66	70	65	74	81	69	81	92	47	42	38	13	0	0	266	0	0	57	169	288	415
57	54	51	47	58	59	60	62	66	71	66	74	82	70	82	93	47	43	39	13	0	0	277	0	0	60	172	290	418
58	55	51	48	59	60	61	63	67	71	67	75	83	71	83	94	48	44	40	13	0	0	288	0	0	63	174	293	420</

CN	DIVE TABLE I															BEST PERIOD					DELAY TIMES							
	DIVE TYPE															IN HOURS					FOR CABIN P. ALT. IN K. FT.				BREATHING OXYGEN			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	2	3	4	5	6	3	12	6	8	12	16	20	24
1	1	1	1	6	9	13	10	17	25	14	25	36	18	33	47	1	1	1	1	0	0	0	0	0	0	113	241	
2	2	2	2	7	10	14	11	18	26	15	26	37	19	34	48	2	2	2	2	0	0	6	0	0	2	4	117	244
3	3	3	3	7	11	15	12	19	26	16	27	38	20	35	49	3	3	3	2	2	4	11	1	2	3	7	121	248
4	4	4	4	8	13	17	16	23	27	17	28	39	20	35	49	4	4	4	2	4	6	16	2	3	5	10	124	251
5	5	5	5	8	13	17	16	23	27	18	29	40	21	36	50	5	4	4	2	5	8	21	3	3	6	13	128	255
6	6	6	6	10	14	17	14	22	29	19	30	40	22	37	51	6	5	5	3	7	10	26	3	4	7	16	131	259
7	7	7	7	11	15	18	15	23	30	19	31	41	23	38	52	6	6	6	3	8	12	31	4	5	8	19	135	262
8	8	8	7	12	16	19	16	24	30	20	32	42	24	39	53	7	7	6	3	9	14	36	4	6	10	22	139	266
9	9	9	9	13	16	20	17	24	31	21	32	43	25	40	53	8	7	7	3	11	16	42	5	6	11	25	142	269
10	10	9	9	14	17	20	18	25	32	22	33	44	26	41	54	9	8	8	3	12	17	47	5	7	13	28	146	273
11	11	10	10	15	18	21	19	26	33	23	34	44	27	42	55	10	9	8	4	13	20	51	6	8	14	32	149	276
12	12	11	11	16	19	22	20	27	34	24	35	45	28	42	56	11	10	9	4	14	22	58	7	9	15	35	153	280
13	13	12	11	17	20	23	21	28	35	25	36	46	29	43	57	11	10	10	4	15	24	63	7	9	17	38	156	283
14	14	13	12	18	21	24	22	29	35	26	37	47	30	44	58	12	11	10	4	17	26	68	8	10	18	41	159	287
15	15	14	13	19	22	25	23	30	36	27	38	48	31	45	58	13	12	11	4	18	27	73	8	11	19	44	163	290
16	16	15	14	20	23	25	24	31	37	28	39	49	32	46	59	14	13	12	5	20	29	77	9	12	21	48	166	293
17	17	16	15	21	24	26	25	31	38	29	39	49	33	47	60	15	13	12	5	21	32	84	9	13	22	51	170	297
18	18	17	16	22	24	27	26	32	39	30	40	50	34	48	61	15	14	13	5	22	34	90	10	13	24	54	173	300
19	19	18	17	22	25	28	27	33	39	31	41	51	34	49	62	16	15	14	5	24	35	96	11	14	25	57	176	303
20	20	19	18	23	26	29	28	34	40	32	42	52	35	49	62	17	16	14	5	25	37	101	11	15	26	61	179	307
21	20	19	18	24	27	29	28	35	41	33	43	53	36	50	63	18	16	15	6	26	39	107	12	16	28	64	183	310
22	21	20	19	25	28	30	29	36	42	34	44	53	37	51	64	19	17	16	6	28	41	112	12	17	29	67	186	313
23	22	21	20	26	29	31	30	37	43	34	45	54	38	52	65	20	18	16	6	29	43	117	13	17	31	71	189	316
24	23	22	20	27	30	32	31	38	44	35	46	55	39	53	66	20	19	17	6	30	46	122	14	18	32	74	193	320
25	24	23	21	28	30	33	32	38	44	36	46	56	40	54	67	21	19	18	6	31	48	128	14	19	34	77	196	323
26	25	23	22	29	31	34	33	39	45	37	47	57	41	55	67	22	20	18	7	33	50	134	15	20	35	80	199	326
27	26	24	23	30	32	34	34	40	46	38	48	58	42	56	68	23	21	19	7	34	52	140	15	21	37	83	202	329
28	27	25	24	31	33	35	35	41	47	39	49	58	43	56	69	24	22	20	7	35	54	146	16	21	38	87	205	332
29	28	26	24	32	34	36	36	42	48	40	50	59	44	57	70	24	22	20	7	37	56	151	16	22	40	90	208	336
30	29	27	25	33	35	37	37	43	48	41	51	60	45	58	71	25	23	21	7	38	57	156	17	23	41	93	212	339
31	30	28	26	34	36	38	38	44	49	42	52	61	46	59	71	26	24	22	8	40	59	161	17	24	43	96	215	342
32	31	29	27	35	37	39	39	45	50	43	53	62	47	60	72	27	24	22	8	41	61	166	18	25	44	99	218	345
33	31	30	29	36	37	39	40	45	51	44	53	62	48	61	73	28	25	23	8	43	64	170	19	25	46	102	221	348
34	32	30	29	36	38	40	41	46	52	45	54	63	49	62	74	29	26	24	8	44	66	177	20	26	47	105	224	351
35	33	31	29	37	39	41	42	47	53	46	55	64	49	63	75	29	27	24	8	46	69	184	20	27	49	108	227	354
36	34	32	30	38	40	42	42	48	53	47	56	65	50	63	76	30	27	25	9	47	71	191	21	27	51	111	230	357
37	35	33	31	39	41	43	43	49	54	48	57	66	51	64	76	31	28	26	9	48	74	197	22	28	52	114	233	360
38	36	34	32	40	42	44	44	50	55	48	58	67	52	65	77	32	29	26	9	49	76	204	22	29	54	117	236	363
39	37	35	33	41	43	44	45	51	56	49	59	67	53	66	78	33	30	27	9	50	78	210	23	30	55	120	239	366
40	38	36	34	42	44	45	46	52	57	50	60	68	54	67	79	33	30	28	9	51	80	216	23	31	56	123	242	369
41	39	37	34	43	44	46	47	52	57	51	60	69	55	68	80	34	31	28	10	53	82	222	24	32	58	126	245	372
42	40	37	35	44	45	47	48	53	58	52	61	70	56	69	80	35	32	29	10	55	85	228	24	33	59	129	248	375
43	41	38	36	45	46	48	49	54	59	53	62	71	57	70	81	36	33	30	10	57	87	234	25	34	61	132	251	378
44	42	39	37	46	47	48	50	55	60	54	63	71	58	70	82	37	33	30	10	58	89	239	25	35	62	135	254	381
45	43	40	38	47	48	49	51	56	61	55	64	72	59	71	83	38	34	31	10	60	91	244	26	36	64	138	257	384
46	44	41	38	48	49	50	52	57	62	56	65	73	60	72	84	38	35	32	11	62	93	250	27	37	66	141	260	387
47	45	42	39	49	50	51	53	58	63	57	66	74	61	73	85	39	36	32	11	63	95	255	28	38	67	144	263	390
48	46	43	40	50	51	52	54	59	63	58	67	75	62	74	85	40	36	33	11	65	97	259	28	39	69	147	265	392
49	46	44	41	51	52	55	56	61	66	59	68	76	63	75	86	41	37	34	11	66	100	264	29	40	71	149	268	395
50	47	44	42	51	52	53	56	60	65	60	68	76	63	76	87	42	38	34	11	68	103	269	30	40	73	152	271	398
51	48	45	42	52	53	54	57	61	66	61	69	77	64	77	88	42	39	35	12	69	105	274	31	41	74	155	274	401
52	49	46	43	53	54	55	57	62	66	62	70	78	65	77	89	43	39	36	12	71	108	278	31	42	76	158	277	404
53	50	47	44	54	55	56	58	63	67	63	71	79	66	78	89	44	40	36	12	73	110	286	32	43	78	161	279	407
54	51	48	45	55	56	57	59	64	68	64	72	80	67	79	90	45	41	37	12	74	112	295	33	44	79	163	282	409
55	52	49	46	56	57	57	60	65	69	64	73	81	68	80	91	46	42	38	12	76	115	303	33	45	81	166	285	412
56	53	50	47	57	58	58	61	66	70	65	74	81	69	81	92	47	42	38	13	77	117	311	34	46	83	169	288	415
57	54	51	47	58	59	59	62	66	71	66	74	82	70	82	93	47	43	39	13	78	119	319	35	47	84	172	290	418
58	55	51	48	59	60	60	63	67	71	67	75	83	71	83	94	48	44											

CN	DIVE TABLE															BEST PERIOD					DELAY TIMES								
	DIVE TYPE															IN HOURS					FOR CABIN P.		ALT.		IN K FT.		BREATHING OXYGEN		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	2	3	4	16	6	AIR	12	6	8	12	16	20	24	
1	1	1	1	6	9	13	10	17	25	14	25	36	18	33	47	1	1	1	1	0	0	0	0	0	0	0	113	241	
2	2	2	2	7	10	14	11	18	26	15	26	37	19	34	48	2	2	2	2	0	0	0	0	0	0	2	4	117	244
3	3	3	3	8	11	15	12	19	26	16	27	38	20	35	49	3	3	3	3	2	4	11	1	2	3	7	121	248	
4	4	4	4	9	12	16	13	20	27	17	28	39	20	35	49	4	4	4	4	2	6	16	2	3	5	10	124	251	
5	5	5	5	10	13	16	13	21	28	18	29	40	21	36	50	5	5	5	5	2	8	21	3	3	6	13	128	255	
6	6	6	6	10	14	17	14	22	29	19	30	40	22	37	51	6	6	6	6	7	10	26	3	4	7	16	131	259	
7	7	7	7	11	15	18	15	23	30	19	31	41	23	38	52	6	6	6	6	8	12	31	4	5	8	19	135	262	
8	8	8	8	12	16	19	16	24	30	20	32	42	24	39	53	7	7	7	7	9	14	36	4	6	10	22	139	266	
9	9	9	9	13	16	20	17	24	31	21	32	43	25	40	53	8	7	7	7	11	16	42	5	6	11	25	142	269	
10	10	9	9	14	17	20	18	25	32	22	33	44	26	41	54	9	8	8	8	12	17	47	5	7	13	28	146	273	
11	11	10	10	15	18	21	19	26	33	23	34	44	27	42	55	10	9	8	4	13	20	51	6	8	14	32	149	276	
12	12	11	11	16	19	22	20	27	34	24	35	45	28	42	56	11	10	9	4	14	22	58	7	9	15	35	153	280	
13	13	12	11	17	20	23	21	28	35	25	36	46	29	43	57	11	10	10	4	15	24	63	7	9	17	38	156	283	
14	14	13	12	18	21	24	22	29	35	26	37	47	30	44	58	12	11	10	4	17	26	68	8	10	18	41	159	287	
15	15	14	13	19	22	25	23	30	36	27	38	48	31	45	58	13	12	11	4	18	27	73	8	11	19	44	163	290	
16	16	15	14	20	23	25	24	31	37	28	39	49	32	46	59	14	13	12	5	20	29	77	9	12	21	48	166	293	
17	16	16	15	21	23	26	25	31	38	29	39	49	33	47	60	15	13	12	5	21	32	84	9	13	22	51	170	297	
18	17	16	15	22	24	27	26	32	39	30	40	50	34	48	61	15	14	13	5	22	34	90	10	13	24	54	173	300	
19	18	17	16	22	25	28	27	33	39	31	41	51	34	49	62	16	15	14	5	24	35	96	11	14	25	57	176	303	
20	19	18	17	23	26	29	28	34	40	32	42	52	35	49	62	17	16	14	5	25	37	101	11	15	26	61	179	307	
21	20	19	18	24	27	29	28	35	41	33	43	53	36	50	63	18	16	15	6	26	39	107	12	16	28	64	183	310	
22	21	20	19	25	28	30	29	36	42	34	44	53	37	51	64	19	17	16	6	28	41	112	12	17	29	67	186	313	
23	22	21	20	26	29	31	30	37	43	34	45	54	38	52	65	20	18	16	6	29	43	117	13	17	31	71	189	316	
24	23	22	20	27	30	32	31	38	44	35	46	55	39	53	66	20	19	17	6	30	46	122	14	18	32	74	193	320	
25	24	23	21	28	30	33	32	38	44	36	46	56	40	54	67	21	19	18	6	31	48	128	14	19	34	77	196	323	
26	25	23	22	29	31	34	33	39	45	37	47	57	41	55	67	22	20	18	7	33	50	134	15	20	35	80	199	326	
27	26	24	23	30	32	34	34	40	46	38	48	58	42	56	68	23	21	19	7	34	52	140	15	21	37	83	202	329	
28	27	25	24	31	33	35	35	41	47	39	49	59	43	56	69	24	22	20	7	35	54	146	16	21	38	87	205	332	
29	28	26	24	32	34	36	36	42	48	40	50	59	44	57	70	24	22	20	7	37	56	151	16	22	40	90	208	336	
30	29	27	25	33	35	37	37	43	48	41	51	60	45	58	71	25	23	21	7	38	57	156	17	23	41	93	212	339	
31	30	28	26	34	36	38	38	44	49	42	52	61	46	59	71	26	24	22	8	40	59	161	17	24	43	96	215	342	
32	31	29	27	35	37	38	39	45	50	43	53	62	47	60	72	27	24	22	8	41	61	166	18	25	44	99	216	345	
33	31	30	28	36	37	39	40	45	51	44	53	62	48	61	73	28	25	23	8	43	64	170	19	25	46	102	221	348	
34	32	30	29	36	38	40	41	46	52	45	54	63	49	62	74	29	26	24	8	44	66	177	20	26	47	105	224	351	
35	33	31	29	37	39	41	42	47	53	46	55	64	49	63	75	29	27	24	8	46	69	184	20	27	49	108	227	354	
36	34	32	30	38	40	42	42	48	53	47	56	65	50	63	76	30	27	25	9	47	71	191	21	27	51	111	230	357	
37	35	33	31	39	41	43	43	49	54	48	57	66	51	64	76	31	28	26	9	48	74	197	22	28	52	114	233	360	
38	36	34	32	40	42	43	44	50	55	48	58	67	52	65	77	32	29	26	9	49	76	204	22	29	54	117	236	363	
39	37	35	33	41	43	44	45	51	56	49	59	67	53	66	78	33	30	27	9	50	78	210	23	30	55	120	239	366	
40	38	36	33	42	44	45	46	52	57	50	60	68	54	67	79	33	30	28	9	51	80	216	23	31	56	123	242	369	
41	39	37	34	43	44	46	47	52	57	51	60	69	55	68	80	34	31	28	10	53	82	222	24	32	58	126	245	372	
42	40	37	35	44	45	47	48	53	58	52	61	70	56	69	80	35	32	29	10	55	85	228	24	33	59	129	248	375	
43	41	38	36	45	46	47	49	54	59	53	62	71	57	70	81	36	33	30	10	57	87	234	25	34	61	132	251	378	
44	42	39	37	46	47	48	50	55	60	54	63	71	58	70	82	37	33	30	10	58	89	239	25	35	62	135	254	381	
45	43	40	38	47	48	49	51	56	61	55	64	72	59	71	83	38	34	31	10	60	91	244	26	36	64	138	257	384	
46	44	41	38	48	49	50	52	57	62	56	65	73	60	72	84	38	35	32	11	62	93	250	27	37	66	141	260	387	
47	45	42	39	49	50	51	53	58	62	57	66	74	61	73	85	39	36	32	11	63	95	255	28	38	67	144	262	390	
48	45	43	40	50	51	52	54	59	63	58	67	75	62	74	85	40	36	33	11	65	97	259	28	39	69	147	265	392	
49	46	44	41	51	51	52	55	59	64	59	67	76	63	75	86	41	37	34	11	66	100	264	29	40	71	149	268	395	
50	47	44	42	51	52	53	56	60	65	60	68	76	63	76	87	42	38	34	11	68	103	269	30	40	73	152	271	398	
51	48	45	42	52	53	54	57	61	66	61	69	77	64	77	88	42	39	35	12	69	105	274	31	41	74	155	274	401	
52	49	46	43	53	54	55	57	62	66	62	70	78	65	77	89	43	39	36	12	71	108	278	31	42	76	158	277	404	
53	50	47	44	54	55	56	58	63	67	63	71	79	66	78	89	44	40	36	12	73	110	286	32	43	78	161	279	407	
54	51	48	45	55	56	56	59	64	68	63	72	80	67	79	90	45	41	37	12	74	112	295	33	44	79	163	282	409	
55	52	49	46	56	57	57	60	65	69	64	73	81	68	80	91	46	42	38	12	76	115	303	33	45	81	166	285	412	
56	53	50	47	57	58	58	61	66	70	65	74	81	69	81	92	47	42	38	13	77	117	311	34	46	83	169	288	415	
57	54	51	47	58	58	59	62	66	71	66	74	82	70	82	93	47	43	39	13	78	119	319	35	47	84	172	290	418	
58	55	51	48	59	59	60	63	67	71	67	75	83	71																

DIVE TABLE

REST PERIOD

DELAY TIMES

CN	DIVE TYPE															IN HOURS				FOR CARIN AIP		P. ALT.		IN K FT. BREATHING OXYGEN					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	2	3	4	16	6	8	10	16	20	24				
1	1	1	1	6	9	13	10	17	25	14	25	36	18	33	47	1	1	1	1	0	0	0	0	0	0	113	241		
2	2	2	2	7	10	14	11	18	26	15	26	37	19	34	48	2	2	2	2	0	0	0	0	1	4	117	244		
3	3	3	3	8	11	15	12	19	26	16	27	38	20	35	49	3	3	3	3	2	4	6	1	2	7	121	248		
4	4	4	4	9	12	16	13	20	27	17	28	39	20	35	49	4	4	4	4	2	6	9	2	3	3	10	124	251	
5	5	5	5	10	13	16	13	21	28	18	29	40	21	36	50	5	5	5	5	2	7	10	3	4	13	128	255		
6	6	6	6	10	14	17	14	22	29	19	30	40	22	37	51	6	6	6	6	3	8	12	3	4	16	131	259		
7	7	7	7	11	15	18	15	23	30	19	31	41	23	38	52	6	6	6	6	3	8	12	3	4	16	131	259		
8	8	8	8	11	15	18	15	23	30	19	31	41	23	38	52	7	7	7	7	3	9	14	4	5	6	19	135	262	
9	9	9	9	12	16	19	16	24	30	20	32	42	24	39	53	7	7	7	7	3	9	14	4	6	7	22	139	266	
10	10	10	10	13	16	20	17	24	31	21	32	43	25	40	53	8	7	7	7	3	11	16	5	6	8	25	142	269	
11	11	11	11	14	17	20	18	25	32	22	33	44	26	41	54	9	8	8	8	3	12	17	28	5	7	9	28	146	273
12	12	12	12	15	18	21	19	26	33	23	34	44	27	42	55	10	9	9	9	4	13	20	31	6	8	11	32	149	276
13	13	13	13	16	19	22	20	27	34	24	35	45	28	42	56	11	10	10	10	4	14	22	34	7	9	12	35	153	280
14	14	14	14	17	20	23	21	28	35	25	36	46	29	43	57	11	10	10	10	4	15	24	37	7	9	13	38	156	283
15	15	15	15	18	21	24	22	29	35	26	37	47	30	44	58	12	11	11	11	4	17	26	40	8	10	14	41	159	287
16	16	16	16	19	22	25	23	30	36	27	38	48	31	45	58	13	12	12	12	4	18	27	43	8	11	15	44	163	290
17	17	17	17	20	23	26	24	31	37	28	39	49	32	46	59	14	13	13	13	5	20	29	45	9	12	16	48	166	293
18	18	18	18	21	24	27	25	32	38	29	39	49	33	47	60	15	13	13	13	5	21	32	49	9	13	17	51	170	297
19	19	19	19	22	25	28	26	33	39	30	40	50	34	48	61	15	14	14	14	5	22	34	52	10	13	18	54	173	300
20	20	20	20	23	26	29	27	34	39	31	41	51	34	49	62	16	15	15	15	5	24	35	56	11	14	19	57	176	303
21	21	21	21	24	27	30	28	35	40	32	42	52	35	49	62	17	16	16	16	5	25	37	59	11	15	20	61	179	307
22	22	22	22	25	28	31	29	36	41	33	43	53	36	50	63	18	16	16	16	6	26	39	62	12	16	21	64	183	310
23	23	23	23	26	29	32	30	37	42	34	44	54	37	51	64	19	17	17	17	6	28	41	64	12	17	22	67	186	313
24	24	24	24	27	30	33	31	38	43	35	45	55	38	52	65	20	18	18	18	6	29	43	67	13	17	23	71	189	316
25	25	25	25	28	31	34	32	39	44	36	46	56	39	53	66	20	19	19	19	6	30	46	70	14	18	24	74	193	320
26	26	26	26	29	32	35	33	40	45	37	47	57	40	54	67	21	19	19	19	6	31	48	74	14	19	25	77	196	323
27	27	27	27	30	33	36	34	41	46	38	48	58	42	56	69	22	20	20	20	7	33	50	78	15	20	26	80	199	326
28	28	28	28	31	34	37	35	42	47	39	49	59	43	56	69	23	21	21	21	7	34	52	82	15	21	27	83	202	329
29	29	29	29	32	35	38	36	43	48	40	50	60	44	57	70	24	22	22	22	7	35	54	85	16	21	28	87	205	332
30	30	30	30	33	36	39	37	44	49	41	51	61	45	58	71	24	22	22	22	7	37	56	88	16	22	29	90	208	336
31	31	31	31	34	37	40	38	45	50	42	52	62	46	59	72	25	23	23	23	7	38	57	92	17	23	30	93	212	339
32	32	32	32	35	38	41	39	46	51	43	53	63	47	60	73	26	24	24	24	8	40	59	95	17	24	32	96	215	342
33	33	33	33	36	39	42	40	47	52	44	54	64	48	61	74	27	24	24	24	8	41	61	98	18	25	33	99	218	345
34	34	34	34	37	40	43	41	48	53	45	55	65	49	62	75	28	25	25	25	8	43	64	101	19	25	34	102	221	348
35	35	35	35	38	41	44	42	49	54	46	56	66	50	63	76	29	26	26	26	8	44	66	104	20	26	35	105	224	351
36	36	36	36	39	42	45	43	50	55	47	57	67	51	64	77	29	27	27	27	8	46	69	107	20	27	36	108	227	354
37	37	37	37	40	43	46	44	51	56	48	58	68	52	65	78	30	27	27	27	9	47	71	111	21	27	38	111	230	357
38	38	38	38	41	44	47	45	52	57	49	59	69	53	66	79	31	28	28	28	9	48	74	115	22	28	39	114	233	360
39	39	39	39	42	45	48	46	53	58	50	60	70	54	67	80	32	29	29	29	9	49	76	119	22	29	40	117	236	363
40	40	40	40	43	46	49	47	54	59	51	61	71	55	68	81	33	30	30	30	9	50	78	122	23	30	41	120	239	366
41	41	41	41	44	47	50	48	55	60	52	62	72	56	69	82	33	30	30	30	9	51	80	126	23	31	42	123	242	369
42	42	42	42	45	48	51	49	56	61	53	63	73	57	70	83	34	31	31	31	10	53	82	129	24	32	43	126	245	372
43	43	43	43	46	49	52	50	57	62	54	64	74	58	71	84	35	32	32	32	10	55	85	133	24	33	44	129	248	375
44	44	44	44	47	50	53	51	58	63	55	65	75	59	72	85	36	33	33	33	10	57	87	136	25	34	45	132	251	378
45	45	45	45	48	51	54	52	59	64	56	66	76	60	73	86	37	33	33	33	10	58	89	139	25	35	47	135	254	381
46	46	46	46	49	52	55	53	60	65	57	67	77	61	74	87	38	34	34	34	10	60	91	142	26	36	48	138	257	384
47	47	47	47	50	53	56	54	61	66	58	68	78	62	75	88	38	35	35	35	11	62	93	145	27	37	49	141	260	387
48	48	48	48	51	54	57	55	62	67	59	69	79	63	76	89	39	36	36	36	11	63	95	148	28	38	51	144	262	390
49	49	49	49	52	55	58	56	63	68	60	70	80	64	77	90	40	36	36	36	11	65	97	151	28	39	52	147	265	392
50	50	50	50	53	56	59	57	64	69	61	71	81	65	78	91	41	37	37	37	11	66	100	153	29	40	53	149	268	395
51	51	51	51	54	57	60	58	65	70	62	72	82	66	79	92	42	38	38	38	11	68	103	158	30	40	54	152	271	398
52	52	52	52	55	58	61	59	66	71	63	73	83	67	80	93	42	39	39	39	12	69	105	163	31	41	55	155	274	401
53	53	53	53	56	59	62	60	67	72	64	74	84	68	81	94	43	39	39	39	12	71	108	167	31	42	56	158	277	404
54	54	54	54	57	60	63	61	68	73	65	75	85	69	82	95	44	40	40	40	12	73	110	171	32	43	57	161	279	407
55	55	55	55	58	61	64	62	69	74	66	76	86	70	83	96	45	41	41	41	12	74	112	176	33	44	59	163	282	409
56	56	56	56	59	62	65	63	70	75	67	77	87	71	84	97	46	42	42	42	12	76	115	180	33	45	60	166	285	412
57	57	57																											