SECTION 1.5 DIVING TABLES

1.5.1 GENERAL

The tables and procedures outlined herein have been developed to provide safety from the hazards of decompression sickness and oxygen toxicity described in section 1.3. At the same time, the tables have been made as efficient as possible in order that they will be the least possible hindrance to diving operations.

1.5.2 AIR DECOMPRESSION TABLES

General

(1) The air decompression tables are comprised of—

(*a*) Decompression Procedures (table 1–9).

(*b*) U.S. Navy Standard Air Decompression Table (table 1–10).

(*c*) No-Decompression Limits and Repetitive Groups (table 1–11).

(*d*) Surface Interval Credit Table (table 1–12).

(*e*) Repetitive Dive Timetable (table 1–13).

(*f*) Standard Air Decompression Table for Exceptional Exposures (table 1–14).

(2) For all dives where air is the breathing medium, regardless of the type of diving apparatus, use these tables as prescribed.

(3) Use these tables in conjunction with the Equivalent Air Tables (table 1–15) for dives where a nitrogen-oxygen mixture is the breathing medium.

(FORMERLY TABLE 1–4, 1963 DIVING MANUAL)

TABLE 1–9.—*Decompression procedures*

GENERAL INSTRUCTIONS FOR AIR DIVING

Need for Decompression

A quantity of nitrogen is taken up by the body during every dive. The amount absorbed depends upon the depth of the dive and the exposure (bottom) time. If the quantity of nitrogen dissolved in the body tissues exceeds a certain critical amount, the ascent must be delayed to allow the body tissue to remove the excess nitrogen. Decompression sickness results from failure to delay the ascent and to allow this process of gradual desaturation. A specified time at a specific depth for purposes of desaturation is called a decompression stop.

No-Decompression Schedules

Dives that are not long or deep enough to require decompression stops are no-decompression dives. Dives to 33 feet or less do not require decompression stops. As the depth increases, the allowable bottom time for no-decompression dives decreases. Five minutes at 190 feet is the deepest no-decompression schedule. These dives are all listed in the *No-Decompression Limits and Repetitive Group Designation Table for No-Decompression Dives* (No-Decompression Table (table 1–11)), and only require compliance with the 60-feet-per-minute rate of ascent.

Schedules That Require Decompression Stops

All dives beyond the limits of the *No-Decompression Table* require decompression stops. These dives are listed in the *Navy Standard Air Decompression Table* (table 1–10). Comply exactly with instructions except as modified by surface decompression procedures.

Variations in Rate of Ascent

Ascend from all dives at the rate of 60 feet per minute.

In the event you are unable to maintain the 60-feet-per-minute rate of ascent:

(*a*) If the delay was at a depth greater than 50 feet: increase the bottom time by the difference between the time used in ascent and the time that should have been used at a rate of 60 feet per minute. Decompress according to the requirements of the new total bottom time.

(*b*) If the delay was at a depth less than 50 feet: increase the first stop by the difference between the time used in ascent and the time that should have been used at the rate of 60 feet per minute.

Repetitive Dive Procedure

A dive performed within 12 hours of surfacing from a previous dive is a repetitive dive. The period between dives is the surface interval. Excess nitrogen requires 12 hours to be effectively lost from the body. These tables are designed to protect the diver from the effects of this residual nitrogen. Allow a minimum surface interval of 10 minutes between all dives. For any interval under 10 minutes, add the bottom time of the previous dives to that of the repetitive dive and choose the decompression schedule for the total bottom time and the deepest dive. Specific instructions are given for the use of each table in the following order:

(1) The *No-Decompression Table* or the *Navy Standard Air Decompression Table* gives the repetitive group designation for all schedules which may precede a repetitive dive.
(2) The *Surface Interval Credit Table* gives credit for the desaturation occurring during the surface interval.
(3) The *Repetitive Dive Timetable* gives the number of minutes of residual nitrogen time to add to the actual bottom time of the repetitive dive to obtain decompression for the residual nitrogen.
(4) The *No-Decompression Table* or the *Navy Standard Air Decompression Table* gives the decompression required for the repetitive dive.

U.S. NAVY STANDARD AIR DECOMPRESSION TABLE

Instructions for Use

Time of decompression stops in the table is in minutes.

Enter the table at the exact or the next greater depth than the maximum depth attained during the dive. Select the listed bottom time that is exactly equal to or is next greater than the bottom time of the dive. Maintain the diver's chest as close as possible to each decompression depth for the number of minutes listed. The rate of ascent *between* stops is not critical for stops of 50 feet or less. Commence timing each stop on arrival at the decompression depth and resume ascent when the specified time has lapsed.

For example—a dive to 82 feet for 36 minutes. To determine the proper decompression procedure: The next greater depth listed in this table is 90 feet. The next greater bottom time listed opposite 90 feet is 40. Stop 7 minutes at 10 feet in accordance with the 90/40 schedule.

For example—a dive to 110 feet for 30 minutes. It is known that the depth did not exceed 110 feet. To determine the proper decompression schedule: The exact depth of 110 feet is listed. The exact bottom time of 30 minutes is listed opposite 110 feet. Decompress according to the 110/30 schedule unless the dive was particularly cold or arduous. In that case, go to the schedule for the next deeper and longer dive, i.e., 120/40.

(FORMERLY TABLE 1-5, 1963 DIVING MANUAL)

TABLE 1-10.—*U.S. Navy Standard Air Decompression Table*

Depth (feet)	Bottom time (min)	Time to first stop (min:sec)	Decompression stops (feet)					Total ascent (min:sec)	Repetitive group
			50	40	30	20	10		
40	200						0	0:40	(*)
	210	0:30					2	2:40	N
	230	0:30					7	7:40	N
	250	0:30					11	11:40	O
	270	0:30					15	15:40	O
	300	0:30					19	19:40	Z
50	100						0	0:50	(*)
	110	0:40					3	3:50	L
	120	0:40					5	5:50	M
	140	0:40					10	10:50	M
	160	0:40					21	21:50	N
	180	0:40					29	29:50	O
	200	0:40					35	35:50	O
	220	0:40					40	40:50	Z
	240	0:40					47	47:50	Z

TABLE 1-10.—*U.S. Navy Standard Air Decompression Table*—Continued

Depth (feet)	Bottom time (min)	Time to first stop (min:sec)	Decompression stops (feet)					Total ascent (min:sec)	Repetitive group
			50	40	30	20	10		
60	60						0	1:00	(*)
	70	0:50					2	3:00	K
	80	0:50					7	8:00	L
	100	0:50					14	15:00	M
	120	0:50					26	27:00	N
	140	0:50					39	40:00	O
	160	0:50					48	49:00	Z
	180	0:50					56	57:00	Z
	200	0:40				1	69	71:00	Z
70	50						0	1:10	(*)
	60	1:00					8	9:10	K
	70	1:00					14	15:10	L
	80	1:00					18	19:10	M
	90	1:00					23	24:10	N
	100	1:00					33	34:10	N
	110	0:50				2	41	44:10	O
	120	0:50				4	47	52:10	O
	130	0:50				6	52	59:10	O
	140	0:50				8	56	65:10	Z
	150	0:50				9	61	71:10	Z
	160	0:50				13	72	86:10	Z
	170	0:50				19	79	99:10	Z
80	40						0	1:20	(*)
	50	1:10					10	11:20	K
	60	1:10					17	18:20	L
	70	1:10					23	24:20	M
	80	1:00				2	31	34:20	N
	90	1:00				7	39	47:20	N
	100	1:00				11	46	58:20	O
	110	1:00				13	53	67:20	O
	120	1:00				17	56	74:20	Z
	130	1:00				19	63	83:20	Z
	140	1:00				26	69	96:20	Z
	150	1:00				32	77	110:20	Z
90	30						0	1:30	(*)
	40	1:20					7	8:30	J
	50	1:20					18	19:30	L
	60	1:20					25	26:30	M
	70	1:10				7	30	38:30	N
	80	1:10				13	40	54:30	N
	90	1:10				18	48	67:30	O
	100	1:10				21	54	76:30	Z
	110	1:10				24	61	86:30	Z
	120	1:10				32	68	101:30	Z
	130	1:00			5	36	74	116:30	Z
100	25						0	1:40	(*)
	30	1:30					3	4:40	I
	40	1:30					15	16:40	K
	50	1:20				2	24	27:40	L
	60	1:20				9	28	38:40	N
	70	1:20				17	39	57:40	O
	80	1:20				23	48	72:40	O
	90	1:10			3	23	57	84:40	Z

TABLE 1-10.—*U.S. Navy Standard Air Decompression Table*—Continued

Depth (feet)	Bottom time (min)	Time to first stop (min:sec)	Decompression stops (feet)					Total ascent (min:sec)	Repetitive group
			50	40	30	20	10		
100—Continued	100	1:10			7	23	66	97:40	Z
	110	1:10			10	34	72	117:40	Z
	120	1:10			12	41	78	132:40	Z
110	20						0	1:50	(*)
	25	1:40					3	• 4:50	H
	30	1:40					7	8:50	J
	40	1:30				2	21	24:50	L
	50	1:30				8	26	35:50	M
	60	1:30				18	36	55:50	N
	70	1:20			1	23	48	73:50	O
	80	1:20			7	23	57	88:50	Z
	90	1:20			12	30	64	107:50	Z
	100	1:20			15	37	72	125:50	Z
120	15						0	2:00	(*)
	20	1:50					2	4:00	H
	25	1:50					6	8:00	I
	30	1:50					14	16:00	J
	40	1:40				5	25	32:00	L
	50	1:40				15	31	48:00	N
	60	1:30			2	22	45	71:00	O
	70	1:30			9	23	55	89:00	O
	80	1:30			15	27	63	107:00	Z
	90	1:30			19	37	74	132:00	Z
	100	1:30			23	45	80	150:00	Z
130	10						0	2:10	(*)
	15	2:00					1	3:10	F
	20	2:00					4	6:10	H
	25	2:00					10	12:10	J
	30	1:50				3	18	23:10	M
	40	1:50				10	25	37:10	N
	50	1:40			3	21	37	63:10	O
	60	1:40			9	23	52	86:10	Z
	70	1:40			16	24	61	103:10	Z
	80	1:30		3	19	35	72	131:10	Z
	90	1:30		8	19	45	80	154:10	Z
140	10						0	2:20	(*)
	15	2:10					2	4:20	G
	20	2:10					6	8:20	I
	25	2:00				2	14	18:20	J
	30	2:00				5	21	28:20	K
	40	1:50			2	16	26	46:20	N
	50	1:50			6	24	44	76:20	O
	60	1:50			16	23	56	97:20	Z
	70	1:40		4	19	32	68	125:20	Z
	80	1:40		10	23	41	79	155:20	Z
150	5						0	2:30	C
	10	2:20					1	3:30	E
	15	2:20					3	5:30	G
	20	2:10				2	7	11:30	H
	25	2:10				4	17	23:30	K
	30	2:10				8	24	34:30	L
	40	2:00			5	19	33	59:30	N
	50	2:00			12	23	51	88:30	O

TABLE 1-10.—*U.S. Navy Standard Air Decompression Table*—Continued

Depth (feet)	Bottom time (min)	Time to first stop (min:sec)	Decompression stops (feet)					Total ascent (min:sec)	Repetitive group
			50	40	30	20	10		
150—Continued	60	1:50		3	19	26	62	112:30	Z
	70	1:50		11	19	39	75	146:30	Z
	80	1:40	1	17	19	50	84	173:30	Z
160	5						0	2:40	D
	10	2:30					1	3:40	F
	15	2:20				1	4	7:40	H
	20	2:20				3	11	16:40	J
	25	2:20				7	20	29:40	K
	30	2:10			2	11	25	40:40	M
	40	2:10			7	23	39	71:40	N
	50	2:00		2	16	23	55	98:40	Z
	60	2:00		9	19	33	69	132:40	Z
	70	1:50	1	17	22	44	80	166:40	Z
170	5						0	2:50	D
	10	2:40					2	4:50	F
	15	2:30				2	5	9:50	H
	20	2:30				4	15	21:50	J
	25	2:20			2	7	23	34:50	L
	30	2:20			4	13	26	45:50	M
	40	2:10		1	10	23	45	81:50	O
	50	2:10		5	18	23	61	109:50	Z
	60	2:00	2	15	22	37	74	152:50	Z
	70	2:00	8	17	19	51	86	183:50	Z
180	5						0	3:00	D
	10	2:50					3	6:00	F
	15	2:40				3	6	12:00	I
	20	2:30			1	5	17	26:00	K
	25	2:30			3	10	24	40:00	L
	30	2:30			6	17	27	53:00	N
	40	2:20		3	14	23	50	93:00	O
	50	2:10	2	9	19	30	65	128:00	Z
	60	2:10	5	16	19	44	81	168:00	Z
190	5						0	3:10	D
	10	2:50				1	3	7:10	G
	15	2:50				4	7	14:10	I
	20	2:40			2	6	20	31:10	K
	25	2:40			5	11	25	44:10	M
	30	2:30		1	8	19	32	63:10	N
	40	2:30		8	14	23	55	103:10	O
	50	2:20	4	13	22	33	72	147:10	Z
	60	2:20	10	17	19	50	84	183:10	Z

*See table 1-11 for repetitive groups in no-decompression dives.

(FORMERLY TABLE 1-6, 1963 DIVING MANUAL)

TABLE 1-11.—*No-decompression limits and repetitive group designation table for no-decompression air dives*

Depth (feet)	No-decompression limits (min)	Repetitive groups (air dives)														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
10	----------	60	120	210	300	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
15	----------	35	70	110	160	225	350	-----	-----	-----	-----	-----	-----	-----	-----	-----
20	----------	25	50	75	100	135	180	240	325	-----	-----	-----	-----	-----	-----	-----
25	----------	20	35	55	75	100	125	160	195	245	315	-----	-----	-----	-----	-----
30	----------	15	30	45	60	75	95	120	145	170	205	250	310	-----	-----	-----
35	310	5	15	25	40	50	60	80	100	120	140	160	190	220	270	310
40	200	5	15	25	30	40	50	70	80	100	110	130	150	170	200	-----
50	100	----	10	15	25	30	40	50	60	70	80	90	100	-----	-----	-----
60	60	----	10	15	20	25	30	40	50	55	60	-----	-----	-----	-----	-----
70	50	----	5	10	15	20	30	35	40	45	50	-----	-----	-----	-----	-----
80	40	----	5	10	15	20	25	30	35	40	-----	-----	-----	-----	-----	-----
90	30	----	5	10	12	15	20	25	30	-----	-----	-----	-----	-----	-----	-----
100	25	----	5	7	10	15	20	22	25	-----	-----	-----	-----	-----	-----	-----
110	20	----	-----	5	10	13	15	20	-----	-----	-----	-----	-----	-----	-----	-----
120	15	----	-----	5	10	12	15	-----	-----	-----	-----	-----	-----	-----	-----	-----
130	10	----	-----	5	8	10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
140	10	----	-----	5	7	10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
150	5	----	-----	5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
160	5	----	-----	-----	5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
170	5	----	-----	-----	5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
180	5	----	-----	-----	5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
190	5	----	-----	-----	5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Instructions for Use

I. No-decompression limits:

This column shows at various depths greater than 30 feet the allowable diving times (in minutes) which permit surfacing directly at 60 feet a minute with no decompression stops. Longer exposure times require the use of the Standard Air Decompression Table (table 1-10).

II. Repetitive group designation table:

The tabulated exposure times (or bottom times) are in minutes. The times at the various depths in each vertical column are the maximum exposures during which a diver will remain within the group listed at the head of the column.

To find the repetitive group designation at surfacing for dives involving exposures up to and including the no-decompression limits: Enter the table on the *exact or next greater depth* than that to which exposed and select the listed exposure time *exact or next greater* than the actual exposure time. The repetitive group designation is indicated by the letter at the head of the vertical column where the selected exposure time is listed.

For example: A dive was to 32 feet for 45 minutes. Enter the table along the 35-foot-depth line since it is next greater than 32 feet. The table shows that since group D is left after 40 minutes' exposure and group E after 50 minutes, group E (at the head of the column where the 50-minute exposure is listed) is the proper selection.

Exposure times for depths less than 40 feet are listed only up to approximately 5 hours since this is considered to be beyond field requirements for this table.

(FORMERLY TABLE 1-7, 1963 DIVING MANUAL)

TABLE 1-12.—*Surface Interval Credit Table for air decompression dives*

[Repetitive group at the end of the surface interval (air dive)]

Z	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A
0:10	0:23	0:35	0:49	1:03	1:19	1:37	1:56	2:18	2:43	3:11	3:46	4:30	5:28	6:57	10:00
0:22	0:34	0:48	1:02	1:18	1:36	1:55	2:17	2:42	3:10	3:45	4:29	5:27	6:56	10:05	12:00*
O	0:10	0:24	0:37	0:52	1:08	1:25	1:44	2:05	2:30	3:00	3:34	4:18	5:17	6:45	9:55
	0:23	0:36	0:51	1:07	1:24	1:43	2:04	2:29	2:59	3:33	4:17	5:16	6:44	9:54	12:00*
	N	0:10	0:25	0:40	0:55	1:12	1:31	1:54	2:19	2:48	3:23	4:05	5:04	6:33	9:44
		0:24	0:39	0:54	1:11	1:30	1:53	2:18	2:47	3:22	4:04	5:03	6:32	9:43	12:00*
		M	0:10	0:26	0:43	1:00	1:19	1:40	2:06	2:35	3:09	3:53	4:50	6:19	9:29
			0:25	0:42	0:59	1:18	1:39	2:05	2:34	3:08	3:52	4:49	6:18	9:28	12:00*
			L	0:10	0:27	0:46	1:05	1:26	1:50	2:20	2:54	3:37	4:36	6:03	9:13
				0:26	0:45	1:04	1:25	1:49	2:19	2:53	3:36	4:35	6:02	9:12	12:00*
				K	0:10	0:29	0:50	1:12	1:36	2:04	2:39	3:22	4:20	5:49	8:59
					0:28	0:49	1:11	1:35	2:03	2:38	3:21	4:19	5:48	8:58	12:00*
					J	0:10	0:32	0:55	1:20	1:48	2:21	3:05	4:03	5:41	8:41
						0:31	0:54	1:19	1:47	2:20	3:04	4:02	5:40	8:40	12:00*
						I	0:10	0:34	1:00	1:30	2:03	2:45	3:44	5:13	8:22
							0:33	0:59	1:29	2:02	2:44	3:43	5:12	8:21	12:00*
							H	0:10	0:37	1:07	1:42	2:24	3:21	4:50	8:00
								0:36	1:06	1:41	2:23	3:20	4:49	7:59	12:00*
								G	0:10	0:41	1:16	2:00	2:59	4:26	7:36
									0:40	1:15	1:59	2:58	4:25	7:35	12:00*
									F	0:10	0:46	1:30	2:29	3:58	7:06
										0:45	1:29	2:28	3:57	7:05	12:00*
										E	0:10	0:55	1:58	3:23	6:33
											0:54	1:57	3:22	6:32	12:00*
											D	0:10	1:10	2:39	5:49
												1:09	2:38	5:48	12:00*
												C	0:10	1:40	2:50
													1:39	2:49	12:00*
													B	0:10	2:11
														2:10	12:00*
														A	0:10
															12:00*

Repetitive group at the beginning of the surface interval from previous dive

Instructions for Use

Surface interval time in the table is in *hours* and *minutes* (7:59 means 7 hours and 59 minutes). The surface interval must be at least 10 minutes.

Find the *repetitive group designation letter* (from the previous dive schedule) on the diagonal slope. Enter the table horizontally to select the surface interval time that is exactly between the actual surface interval times shown. The repetitive group designation for the *end* of the surface interval is at the head of the vertical column where the selected surface interval time is listed. For example, a previous dive was to 110 feet for 30 minutes. The diver remains on the surface 1 hour and 30 minutes and wishes to find the new repetitive group designation: The repetitive group from the last column of the 110/30 schedule in the Standard Air Decompression Tables is "J." Enter the surface interval credit table along the horizontal line labeled "J." The 1-hour-and-30-minute surface interval lies between the times 1:20 and 1:47. Therefore, the diver has lost sufficient inert gas to place him in group "G" (at the head of the vertical column selected).

*NOTE.—Dives following surface intervals of *more* than 12 hours are not considered repetitive dives. *Actual* bottom times in the Standard Air Decompression Tables may be used in computing decompression for such dives.

(FORMERLY TABLE 1-8, 1963 DIVING MANUAL)

TABLE 1-13.—*Repetitive dive timetable for air dives*

Repetitive groups	Repetitive dive depth (ft) (air dives)															
	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190
A	7	6	5	4	4	3	3	3	3	3	2	2	2	2	2	
B	17	13	11	9	8	7	7	6	6	6	5	5	4	4	4	
C	25	21	17	15	13	11	10	10	9	8	7	7	6	6	6	
D	37	29	24	20	18	16	14	13	12	11	10	9	9	8	8	
E	49	38	30	26	23	20	18	16	15	13	12	12	11	10	10	1
F	61	47	36	31	28	24	22	20	18	16	15	14	13	13	12	1
G	73	56	44	37	32	29	26	24	21	19	18	17	16	15	14	1
H	87	66	52	43	38	33	30	27	25	22	20	19	18	17	16	1
I	101	76	61	50	43	38	34	31	28	25	23	22	20	19	18	1
J	116	87	70	57	48	43	38	34	32	28	26	24	23	22	20	1
K	138	99	79	64	54	47	43	38	35	31	29	27	26	24	22	2
L	161	111	88	72	61	53	48	42	39	35	32	30	28	26	25	2
M	187	124	97	80	68	58	52	47	43	38	35	32	31	29	27	2
N	213	142	107	87	73	64	57	51	46	40	38	35	33	31	29	2
O	241	160	117	96	80	70	62	55	50	44	40	38	36	34	31	3
Z	257	169	122	100	84	73	64	57	52	46	42	40	37	35	32	3

Instructions for Use

The bottom times listed in this table are called "residual nitrogen times" and are the times a diver is to consider he has *already* spent on bottom when he *starts* a repetitive dive to a specific depth. They are in minutes.

Enter the table horizontally with the repetitive group designation from the Surface Interval Credit Table. The time in each vertical column is the number of minutes that would be required (at the depth listed at the head of the column) to saturate to the particular group.

For example: The final group designation from the Surface Interval Credit Table, on the basis of a previous dive and surface interval, is "H." To plan a dive to 110 feet, determine the residual nitrogen time for this depth required by the repetitive group designation: Enter this table along the horizontal line labeled "H." The table shows that one must *start* a dive to 110 feet as though he had already been on the bottom for 27 minutes. This information can then be applied to the Standard Air Decompression Table or No-Decompression Table in a number of ways:

(1) Assuming a diver is going to finish a job and take whatever decompression is required, he must add 27 minutes to his actual bottom time and be prepared to take decompression according to the 110-foot schedules for the sum or equivalent single dive time.

(2) Assuming one wishes to make a quick inspec tion dive for the minimum decompression, h will decompress according to the 110/3(schedule for a dive of 3 minutes or les (27+3=30). For a dive of over 3 minutes bu less than 13, he will decompress according t the 110/40 schedule (27+13=40).

(3) Assuming that one does not want to exceed the 110/50 schedule and the amount of decom pression it requires, he will have to start ascen before 23 minutes of actual bottom tim (50−27=23).

(4) Assuming that a diver has air for approxi mately 45 minutes bottom time and decom pression stops, the possible dives can b computed: A dive of 13 minutes will requir 23 minutes of decompression (110/40 schedule) for a total submerged time of 36 minutes A dive of 13 to 23 minutes will require 3 minutes of decompression (110/50 schedule) for a total submerged time of 47 to 57 minutes Therefore, to be safe, the diver will have t start ascent before 13 minutes or a standby air source will have to be provided.

(FORMERLY TABLE 1-9, 1963 DIVING MANUAL)

TABLE 1-14.—*U.S. Navy Standard Air Decompression Table for exceptional exposures*

Depth (ft)	Bottom time (min)	Time to first stop (min:sec)	Decompression stops (feet)													Total ascent time (min:sec)
			130	120	110	100	90	80	70	60	50	40	30	20	10	
40	360	0:30													23	23:40
	480	0:30													41	41:40
	720	0:30													69	69:40
60	240	0:40												2	79	82:00
	360	0:40												20	119	140:00
	480	0:40												44	148	193:00
	720	0:40												78	187	266:00
80	180	1:00												35	85	121:20
	240	0:50											6	52	120	179:20
	360	0:50											29	90	160	280:20
	480	0:50											59	107	187	354:20
	720	0:40										17	108	142	187	455:20
100	180	1:00										1	29	53	118	202:40
	240	1:00										14	42	84	142	283:40
	360	0:50									2	42	73	111	187	416:40
	480	0:50									21	61	91	142	187	503:40
	720	0:50									55	106	122	142	187	613:40
120	120	1:20										10	19	47	98	176:00
	180	1:10									5	27	37	76	137	284:00
	240	1:10									23	35	60	97	179	396:00
	360	1:00								18	45	64	93	142	187	551:00
	480	0:50							3	41	64	93	122	142	187	654:00
	720	0:50							32	74	100	114	122	142	187	773:00
140	90	1:30									2	14	18	42	88	166:20
	120	1:30									12	14	36	56	120	240:20
	180	1:20								10	26	32	54	94	168	386:20
	240	1:10							8	28	34	50	78	124	187	511:20
	360	1:00						9	32	42	64	84	122	142	187	684:20
	480	1:00						31	44	59	100	114	122	142	187	801:20
	720	0:50					16	56	88	97	100	114	122	142	187	924:20
170	90	1:50								12	12	14	34	52	120	246:50
	120	1:30						2	10	12	18	32	42	82	156	356:50
	180	1:20					4	10	22	28	34	50	78	120	187	535:50
	240	1:20					18	24	30	42	50	70	116	142	187	681:50
	360	1:10				22	34	40	52	60	98	114	122	142	187	873:50
	480	1:00			14	40	42	56	91	97	100	114	122	142	187	1007:50
200	5	3:10													1	4:20
	10	3:00												1	4	8:20
	15	2:50											1	4	10	18:20
	20	2:50											3	7	27	40:20
	25	2:50											7	14	25	49:20
	30	2:40										2	9	22	37	73:20
	40	2:30									2	8	17	23	59	112:20
	50	2:30									6	16	22	39	75	161:20
	60	2:20								2	13	17	24	51	89	199:20
	90	1:50					1	10	10	12	12	30	38	74	134	324:20
	120	1:40				6	10	10	10	24	28	40	64	98	180	473:20
	180	1:20		1	10	10	18	24	24	42	48	70	106	142	187	685:20
	240	1:20		6	20	24	24	36	42	54	68	114	122	142	187	842:20
	360	1:10	12	22	36	40	44	56	82	98	100	114	122	142	187	1058:20

TABLE 1–14.—*U.S. Navy Standard Air Decompression Table for exceptional exposures*—Continued

Depth (ft)	Bottom time (min)	Time to first stop (min:sec)	Decompression stops (feet)													Total ascent time (min:sec)
			130	120	110	100	90	80	70	60	50	40	30	20	10	
210	5	3:20													1	4:3
	10	3:10												2	4	9:3
	15	3:00											1	5	13	22:3
	20	3:00											4	10	23	40:3
	25	2:50										2	7	17	27	56:3
	30	2:50										4	9	24	41	81:3
	40	2:40									4	9	19	26	63	124:3
	50	2:30								1	9	17	19	45	80	174:3
220	5	3:30													2	5:4
	10	3:20												2	5	10:4
	15	3:10											2	5	16	26:4
	20	3:00										1	3	11	24	42:4
	25	3:00										3	8	19	33	66:4
	30	2:50									1	7	10	23	47	91:4
	40	2:50									6	12	22	29	68	140:4
	50	2:40								3	12	17	18	51	86	190:4
230	5	3:40													2	5:5
	10	3:20											1	2	6	12:5
	15	3:20											3	6	18	30:5
	20	3:10										2	5	12	26	48:5
	25	3:10										4	8	22	37	74:5
	30	3:00									2	8	12	23	51	99:5
	40	2:50								1	7	15	22	34	74	156:5
	50	2:50								5	14	16	24	51	89	202:5
240	5	3:50													2	6:0
	10	3:30											1	3	6	14:0
	15	3:30											4	6	21	35:0
	20	3:20										3	6	15	25	53:0
	25	3:10									1	4	9	24	40	82:0
	30	3:10									4	8	15	22	56	109:0
	40	3:00								3	7	17	22	39	75	167:0
	50	2:50							1	8	15	16	29	51	94	218:0
250	5	3:50												1	2	7:1
	10	3:40											1	4	7	16:1
	15	3:30										1	4	7	22	38:1
	20	3:30										4	7	17	27	59:1
	25	3:20									2	7	10	24	45	92:1
	30	3:20									6	7	17	23	59	116:1
	40	3:10								5	9	17	19	45	79	178:1
	60	2:40					4	10	10	10	12	22	36	64	126	298:1
	90	2:10		8	10	10	10	10	10	28	28	44	68	98	186	514:1
260	5	4:00												1	2	7:2
	10	3:50											2	4	9	19:2
	15	3:40										2	4	10	22	42:2
	20	3:30									1	4	7	20	31	67:2
	25	3:30									3	8	11	23	50	99:2
	30	3:20								2	6	8	19	26	61	126:2
	40	3:10							1	6	11	16	19	49	84	190:2
270	5	4:10												1	3	8:3
	10	4:00											2	5	11	22:3
	15	3:50										3	4	11	24	46:3
	20	3:40									2	3	9	21	35	74:3

TABLE 1-14.—*U.S. Navy Standard Air Decompression Table for exceptional exposures*—Continued

Depth (ft)	Bottom time (min)	Time to first stop (min:sec)	Decompression stops (feet)													Total ascent time (min:sec)
			130	120	110	100	90	80	70	60	50	40	30	20	10	
270—Con.	25	3:30	----	----	----	----	----	----	----	2	3	8	13	23	53	106:30
	30	3:30	----	----	----	----	----	----	----	3	6	12	22	27	64	138:30
	40	3:20	----	----	----	----	----	----	5	6	11	17	22	51	88	204:30
280----	5	4:20	----	----	----	----	----	----	----	----	----	----	----	2	2	8:40
	10	4:00	----	----	----	----	----	----	----	----	----	1	2	5	13	25:40
	15	3:50	----	----	----	----	----	----	----	----	1	3	4	11	26	49:40
	20	3:50	----	----	----	----	----	----	----	----	3	4	8	23	39	81:40
	25	3:40	----	----	----	----	----	----	----	2	5	7	16	23	56	113:40
	30	3:30	----	----	----	----	----	----	1	3	7	13	22	30	70	150:40
	40	3:20	----	----	----	----	----	1	6	6	13	17	27	51	93	218:40
290----	5	4:30	----	----	----	----	----	----	----	----	----	----	----	2	3	9:50
	10	4:10	----	----	----	----	----	----	----	----	----	1	3	5	16	29:50
	15	4:00	----	----	----	----	----	----	----	----	1	3	6	12	26	52:50
	20	4:00	----	----	----	----	----	----	----	----	3	7	9	23	43	89:50
	25	3:50	----	----	----	----	----	----	----	3	5	8	17	23	60	120:50
	30	3:40	----	----	----	----	----	----	1	5	6	16	22	36	72	162:50
	40	3:30	----	----	----	----	----	3	5	7	15	16	32	51	95	228:50
300----	5	4:40	----	----	----	----	----	----	----	----	----	----	----	3	3	11:00
	10	4:20	----	----	----	----	----	----	----	----	----	1	3	6	17	32:00
	15	4:10	----	----	----	----	----	----	----	----	2	3	6	15	26	57:00
	20	4:00	----	----	----	----	----	----	----	2	3	7	10	23	47	97:00
	25	3:50	----	----	----	----	----	----	1	3	6	8	19	26	61	129:00
	30	3:50	----	----	----	----	----	----	2	5	7	17	22	39	75	172:00
	40	3:40	----	----	----	----	----	4	6	9	15	17	34	51	90	231:00
	60	3:00	----	4	10	10	10	10	10	14	28	32	50	90	187	460:00

TABLE 1-14.—*U.S. Navy Standard Air Decompression Table for exceptional exposures*—Continued

Extreme exposures—250 and 300 ft

Depth (ft)	Bottom time (min)	Time to first stop (min:sec)	Decompression stops (feet)																				Total ascent time (min:sec)
			200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	10	
250	120	1:50	----	----	----	----	----	----	5	10	10	10	10	16	24	24	36	48	64	94	142	187	684:10
	180	1:30	----	----	----	----	4	8	8	10	22	24	24	32	42	44	60	84	114	122	142	187	931:10
	240	1:30	----	----	----	----	9	14	21	22	22	40	40	42	56	76	98	100	114	122	142	187	1109:10
300	90	2:20	----	----	----	----	3	8	8	10	10	10	10	16	24	24	34	48	64	90	142	187	693:00
	120	2:00	----	----	4	8	8	8	8	10	14	24	24	24	34	42	58	66	102	122	142	187	890:00
	180	1:40	6	8	8	8	14	20	21	21	28	40	40	48	56	82	98	100	114	122	142	187	1168:00

Single Dives

(4) A *single dive* is the first dive of the day. It is denoted by an exposure to a specific depth in feet for a specific time in minutes. An example would be 134 feet for 14 minutes. The depth is the maximum depth attained. The time is the actual bottom time. Bottom time is the elapsed time between leaving the surface in descent and leaving the maximum depth in ascent. A combination of depth and time as listed in the decompression tables is called a dive schedule. All dives which are not separately listed are included and covered in the tables by the next deeper and next longer schedule. Do not interpolate.

Repetitive Dives

(5) Any dive performed within 12 hours of a previous dive is a *repetitive dive.* The period between dives is the *surface interval.* Decompression following a repetitive dive requires special consideration. This consideration is necessary because dissolved inert gas from the previous dive remains in the body at the *beginning* of the repetitive dive.

(6) A detailed consideration of all the factors involved in repetitive-dive decompression would be prohibitively complicated. The basic idea of this approach involves considering the previous dive, the surface interval, and the repetitive dive as a whole to yield an equivalent *single dive.* For the *depth* of the equivalent single dive, the *actual* depth of the repetitive dive is used. However, the *bottom time* is the sum of the actual time of the repetitive dive, plus an additional amount of time to account for the residual nitrogen from the previous dive and the surface interval.

(7) Upon surfacing from a dive, the diver is cataloged by table 1–10 or 1–11 into one of 16 lettered *repetitive groups* according to the amount of inert gas left in his body. During the surface interval the diver loses inert gas and is given credit for the loss by means of table 1–12, which shows the change from one group to another for various time intervals on the surface. For every depth of dive, there is a certain time of exposure which would bring the diver to the same degree of saturation as that represented by each repetitive group. This time, based on the residual inert gas from the previous dive and the surface interval, is called the *residual nitrogen time.* In table 1–13, residual nitrogen time is expressed as a number of minutes for various depths (in 10-foot increments) and for each repetitive group designation. The bottom time of the *equivalent single dive* is then obtained by adding this residual nitrogen time to the actual bottom time of the repetitive dive. The proper decompression for ascent from the repetitive dive may then be found in the Standard Air Decompression Table (table 1–10) by using the actual depth of the repetitive dive and the equivalent single-dive bottom time. Successive repetitive dives may be handled similarly.

U.S. Navy Standard Air Decompression Table

(8) The Standard Air Decompression Table (table 1–10) covers the normal range of diving. The depth limit is 190 feet. Stay within the limits of this table for all routine air dives.

(9) Details for the use of the Standard Air Decompression Tables are—

(*a*) The time of decompression stops listed in the table is in minutes.

(*b*) Enter the tables at the listed depth that is exactly equal to, or is the next greater than, the maximum depth attained during the dive.

(*c*) Select the bottom time of those listed for the selected depth that is exactly equal to or is next greater than the bottom time of the dive.

(*d*) Use the decompression stops listed on the line for the selected bottom time.

(*e*) For any repetitive diving, use the repetitive group designation listed on the same line (or if no decompression is required, obtain the repetitive group from table 1–11).

(*f*) Insure that the diver's *chest* is maintained as close as possible to each decompression depth for the number of minutes listed.

(*g*) The rate of ascent between stops is not critical for stops that are 50 feet or shallower. Delay in ascent from stops deeper than 50 feet could result in excess gas being absorbed.

(10) Specific examples of the use of the table are—

(*a*) A single dive is made to 82 feet for 36 minutes. To determine the proper decompression procedure: The next greater depth listed in the table is 90 feet. The next greater bottom

time listed opposite 90 feet is 40 minutes. The proper decompression procedure is therefore a 7-minute stop at 10 feet in accordance with the 90/40 schedule.

(*b*) A single dive is made to 110 feet for 30 minutes. It is known that the depth did not exceed 110 feet. To determine the proper decompression procedure: The exact depth of 110 feet is listed. The exact time of 30 minutes is listed opposite 110 feet. Decompression is according to the 110/30 schedule unless the dive was particularly cold or arduous, or unless conditions prohibit accurate decompression. In any of these cases, the next deeper and longer schedule should be used, i.e., 120/40.

No-Decompression Table

(11) The No-Decompression Table is officially and more accurately titled *No-Decompression Limits and Repetitive Group Designation Table for No-Decompression Schedules.* It is a new table which is required by repetitive diving. It is no longer sufficient merely to know the limits at which decompression requirements begin. In repetitive diving one must know the amount of nitrogen remaining in the tissues from any dive, no matter how short or shallow. The repetitive group designations provide that information.

(12) Repetitive group designations are given for depths of 10 feet to 40 feet in 5-foot increments, and for depths of 40 feet to 190 feet in 10-foot increments. Opposite each depth and each repetitive group is listed the maximum bottom time which will allow the diver to remain within the group. On the assumption that it is the operational limit, the times for 10 to 25 feet end at approximately 5 hours. From 40 feet on, the times end at the no-decompression limit.

(13) The no-decompression limits listed in this table for depths of 40 feet and greater are useful in planning operations. The diver may surface directly (no-decompression dive) as long as the bottom time is less than the maximum listed for the depth. For depths not greater than 33 feet, direct surfacing is permissible regardless of the bottom time.

(14) Other than the above uses to obtain no-decompression limits, the only purpose of this table is to provide the repetitive group designation for no-decompression dives. This knowledge is necessary to make repetitive dives after no-decompression dives.

(15) Details of the table and an example of the manner in which to obtain the repetitive group designations are given directly on the table.

Surface Interval Credit Table

(16) The Surface Interval Credit Table is another requirement of the repetitive diving system. It is the real reason for the success and efficiency of the repetitive dive system.

(17) The diver continues to lose nitrogen while he is on the surface until he is completely desaturated. This desaturation requires 12 hours or more. To provide efficient decompression instructions, it is necessary to know the amount of nitrogen remaining in the tissues at the time a repetitive dive commences. This table provides that information.

(18) The repetitive groups are the measuring units. In this table, the loss of inert gas with increasing length of surface interval is reflected in the change from one group to another.

(19) Details and an example of its use are given directly in the table.

Repetitive Dive Timetable

(20) The Repetitive Dive Timetable lists the number of minutes at each depth that will build up the nitrogen partial pressure represented by each repetitive group.

(21) For the diver's known repetitive group designation, the system gives an arbitrary bottom time (the residual nitrogen time) that the diver must assume he has already completed before he starts his repetitive dive. This arbitrary bottom time and the actual bottom time of the repetitive dive are added to yield the bottom time of the equivalent single dive mentioned previously.

(22) Details and an example of its use are given directly on the table.

(23) There is one exception to the table. It occasionally occurs when the repetitive dive is to the same depth as, or to a greater depth than, the initial dives, and when the surface interval is short. Because of the necessity to account for the greatest exposure within a group, the arbitrary bottom time assigned may be greater than the sum of the actual bottom times of the pre-

vious dives. In such a case (if the repetitive dive is to the same depth as or greater depth than the previous dive or dives), add the actual bottom time of the previous dives to the actual bottom time of the repetitive dive.

Decompression for Exceptional Exposures

(24) The U.S. Navy Standard Air Decompression Table for Exceptional Exposures (table 1–14) includes only schedules of decompression for exceptional or emergency cases. Schedules are provided for 120-minute exposures up to 140 feet, and for extreme exposures up to 300 feet. Great demands are imposed upon the diver's endurance by emergencies necessitating use of the table. Therefore, complete assurance of success of the decompression schedules is impossible.

(25) Repetitive group designations are not given in the Table for Exceptional Exposures. Never follow a dive covered by that table with a repetitive dive. Make every effort to limit the equivalent single dive schedule of repetitive dives to the Standard Air Decompression Tables. The diving officer must be the one to weigh the need for any dive in the Table for Exceptional Exposures against the increased danger and demands on the diver's physical endurance.

Repetitive Dive Worksheet

(26) Figure 1–31(*a*) is a suggested worksheet for the selection of decompression schedules in repetitive diving. A systematic approach of this kind must *always* be used when the repetitive diving tables are applied.

(27) The following example demonstrates the use of the worksheet (fig. 1–31(*b*)). A diver makes a dive to 105 feet with a bottom time of 24 minutes, and decompresses properly according to the Standard Air Decompression Table. After being on the surface for 2 hours, he is required to make a second dive, this time to 145 feet. It is anticipated that 15 minutes' bottom time will be required to complete his work. The problem is to determine the proper decompression for his second or *repetitive* dive. The time and depth of his first or *previous dive* are used in worksheet part I. Table 1–10 indicates that the diver is in repetitive group H (according to the 110/25 schedule). During the surface interval of 2 hours he loses sufficient nitrogen to change from group H to group E, according to the Surface Interval Credit Table (table 1–12). His residual nitrogen time may now be determined by referring to the Repetitive Dive Timetable (table 1–13), using the depth of his second or repetitive dive and the *new* group from the end of the surface interval. This table indicates that the diver's residual nitrogen time is 12 minutes. The 15-minute actual bottom time of the repetitive dive is added to the residual nitrogen time to obtain the *equivalent single dive time*, which is 27 minutes. This time is used, as indicated in worksheet part V, to select the decompression schedule for the repetitive dive; in this example, the 150/30 schedule from table 1–10.

More Than One Repetitive Dive

(28) When one repetitive dive is to be followed by another, the procedure for selecting the proper decompression schedule for the first repetitive dive is *repeated*. The time and depth of the equivalent single dive of the *first* repetitive dive calculation becomes the time and depth of the previous dive of the *second* repetitive dive calculation. That is, the time and depth used in worksheet part V (fig. 1–31(*b*)) become the time and depth in part I of the following worksheet.

1.5.3 MIXED-GAS DECOMPRESSION TABLES

Nitrogen-Oxygen Decompression Tables

(1) The fundamental principle of decompression from nitrogen-oxygen dives is that an *equivalent air depth* is established for the actual depth of the dive. This equivalent air depth is then combined with the actual bottom time of the dive to determine a schedule to use in the Standard Air Decompression Table.

(2) No credit is allowed for the fact that high-oxygen mixtures are breathed during decompression on the stops established for air decompression.

(3) Definitions of equivalent air depth and other details of nitrogen-oxygen diving are given in section 3.6.

This latter mixture is intended mainly for use in depths of less than 50 feet because the lower flow rates required provide for longer mission times when required.

(11) The use of the apparatus to which these tables apply is described in section 3.6. When the 68 percent helium, 32 percent oxygen mixture is used, the injection flow rate as measured at the surface should be 18.5 lpm. However, using the present type of flowmeters which are calibrated for air, the reading of the flowmeter will be 12.5 lpm. When the 60 percent helium, 40 percent oxygen mixture is used, the surface flow rate should be 11 lpm, which will read 8 lpm on the air-calibrated flowmeter.

Tables

(12) The tables for *Helium-Oxygen Decompression for Mixed-Gas Scuba* are very similar in many ways to the *U.S. Navy Standard Air Decompression Tables.* Table 1-17 is self-explanatory. The rate of descent should not exceed 75 feet per minute. The rate of ascent should be 60 feet per minute from the bottom and between stops. Note that these tables allow for repetitive diving, and, therefore, there is a repetitive group designator for each schedule in the last column.

TABLE 1-17.—*Helium-oxygen decompression table for mixed-gas scuba using 68 to 32 percent helium-oxygen supply mixture*

Depth (ft)	Bottom time (min)	Time to first stop (min:sec)	Decompression stops (feet)					Total ascent time (min:sec)	Repetitive group
			50	40	30	20	10		
40	260						0	0:40	L
50	180						0	0:50	L
	200	0:40					20	20:50	L
60	130						0	1:00	L
	150	0:50					20	21:00	L
	170	0:50					35	36:00	L
70	85						0	1:10	J
	100	1:00					15	16:10	K
	115	1:00					25	26:10	L
	130	1:00					40	41:10	L
80	60						0	1:20	I
	70	1:00				5	10	16:20	J
	80	1:00				10	15	26:20	K
	90	1:00				10	25	36:20	K
	100	1:00				10	35	46:20	K
90	45						0	1:30	H
	60	1:10				5	10	16:30	J
	70	1:10				5	20	26:30	K
	85	1:10				10	30	41:30	L
100	35						0	1:40	G
	50	1:20				5	15	21:40	J
	60	1:20				10	20	31:40	K
	70	1:10			5	15	25	46:40	K
110	30						0	1:50	G
	40	1:30				5	10	16:50	H
	50	1:30				10	20	31:50	J
	65	1:20			5	15	25	46:50	L

TABLE 1–17.—*Helium-oxygen decompression table for mixed-gas scuba using 68 to 32 percent helium-oxygen supply mixture*—Continued

Depth (ft)	Bottom time (min)	Time to first stop (min:sec)	Decompression stops (feet)					Total ascent time (min:sec)	Repetitive group
			50	40	30	20	10		
120	25						0	2:00	G
	35	1:40				5	10	17:00	I
	45	1:30			5	10	15	32:00	K
	55	1:30			10	15	20	47:00	L
130	20						0	2:10	F
	30	1:50				5	10	17:10	I
	40	1:40			5	10	15	32:10	J
	50	1:30		5	5	15	20	47;10	L
140	15						0	2:20	E
	25	2:00				5	10	17:20	G
	35	1:50			5	10	20	37:20	J
	45	1:40		5	5	15	25	52:20	K
150	15						0	2:30	E
	20	2:10				5	10	17:30	G
	30	2:00			5	10	15	32:30	J
	40	1:50		5	10	15	20	52:30	K
160	10						0	2:40	E
	20	2:10				5	5	10	22:40	G
	35	2:00		5	10	10	20	47:40	K
170	10						0	2:50	E
	20	2:20				5	5	10	22:50	H
	35	2:10		5	10	15	20	52:50	K
180	5						0	3:00	C
	10	2:40				5	10	18:00	E
	20	2:20		5	5	10	10	33:00	H
	30	2:20		5	10	15	20	53:00	K
190	10	2:50				5	10	18:10	E
	20	2:30		5	5	10	20	43:10	H
	30	2:20	5	5	10	15	25	63:10	K
200	10	3:00				5	15	23:20	F
	20	2:40		5	5	10	20	43:20	I
	30	2:30	5	5	10	15	35	73:20	K

TABLE 1–18.—*Helium-oxygen decompression table for mixed-gas scuba using 68 to 32 percent supply mixture and oxygen decompression*

Depth (ft)	Time (min)	Decompression stops					Repetitive group
		$He-O_2$			Oxygen		
		50′	40′		30′	20′	
60	170			ALLOW 2 MINUTES TO COMPLETE BAG PURGE TO OXYGEN		20	L
70	115					15	L
	130					25	L
80	80					15	K
	90					20	K
	100					25	K
90	70					15	K
	85					25	L
100	50					15	J
	60					20	K
	70				5	20	K
110	50					15	J
	65				5	20	L
120	45				5	15	K
	55				10	20	L
130	40				5	15	J
	50		5		5	20	L
140	35				5	15	J
	45		5		5	20	K
150	30				5	15	J
	40		5		10	20	K
160	20				5	10	G
	35		5		10	20	K
170	20				5	10	H
	35		5		10	20	K
180	20		5		5	10	H
	30		5		10	20	K
190	20		5		5	15	H
	30	5	5		10	20	K
200	20		5		5	20	I
	30	5	5		10	25	K

TABLE 1-19.—*No-decompression limits and repetitive group designation table for no-decompression helium-oxygen dives*

Depth (ft)	No-decompression limits (min)	Repetitive groups ($He-O_2$ dives)											
		A	B	C	D	E	F	G	H	I	J	K	L
)---------	----------	70	190	720	------	------	------	------	------	------	------	------	------
)---------	----------	25	60	95	145	215	335	720	------	------	------	------	------
)---------	----------	15	35	60	80	110	145	185	245	335	525	720	------
)---------	260	10	25	40	55	70	90	110	140	165	200	245	260
)---------	180	10	20	30	40	55	70	85	100	120	140	160	180
)---------	130	5	15	25	35	45	55	65	75	90	105	120	130
)---------	85	5	10	20	30	35	45	55	65	75	85	------	------
)---------	60	5	10	15	25	30	40	45	55	60	------	------	------
)---------	45	5	10	15	20	25	35	40	45	------	------	------	------
00--------	35	5	10	15	20	25	30	35	------	------	------	------	------
10--------	30	5	9	12	15	20	25	30	------	------	------	------	------
20--------	25	5	8	10	15	20	22	25	------	------	------	------	------
30--------	20	------	5	10	15	17	20	------	------	------	------	------	------
40--------	15	------	5	10	12	15	------	------	------	------	------	------	------
50--------	15	------	5	10	12	15	------	------	------	------	------	------	------
60--------	10	------	5	6	8	10	------	------	------	------	------	------	------
70--------	10	------	5	6	8	10	------	------	------	------	------	------	------
80--------	5	------	------	5	------	------	------	------	------	------	------	------	------
90--------	----------	------	------	------	------	------	------	------	------	------	------	------	------
00--------	----------	------	------	------	------	------	------	------	------	------	------	------	------

Instructions for Use

. No-Decompression Limits:

This column shows at various depths the allowable diving time in minutes which permits surfacing directly at 60 feet per minute with no decompression stops. Longer exposures require use of the helium-oxygen decompression table for mixed-gas scuba table 1-17.

. Repetitive Group Designation Table:

The tabulated exposure times are in minutes. The times at the various depths in each vertical column are the maximum exposures during which the diver will remain within the group listed at the head of the column.

To find the repetitive group designation upon surfacing for dives involving exposures up to and including the No-Decompression Limit: enter the table on the *exact or next greater depth* than that to which exposed and select the listed exposure time *exact or next greater* than the actual exposure time. The repetitive group designation is indicated by the letter at the head of the vertical column where the selected exposure time is listed.

For example: A dive was to 42 feet for 45 minutes, entering the 50-foot depth line. Since it is greater than 42 feet, the table shows that since group "D" is left after 40 minutes of exposure and group "E" after 55 minutes, group "E" (at the head of the column where the 55-minute exposure is listed) is the proper selection. Exposure times for depths less than 40 feet are listed up to 12 hours though this is considered to be beyond field requirements for this table.

TABLE 1-20.—*Surface interval credit table for helium-oxygen decompression dives*

[Repetitive group at the end of the surface interval ($He-O_2$ dives)]

	L	K	J	I	H	G	F	E	D	C	B	A
L	0:00 0:30	0:31 0:40	0:41 0:50	0:51 1:20	1:21 1:40	1:41 2:00	2:01 2:30	2:31 3:10	3:11 4:00	4:01 5:10	5:11 7:10	7:11 12:00*
K		0:00 0:30	0:31 0:40	0:41 1:00	1:01 1:20	1:21 1:50	1:51 2:20	2:21 3:00	3:01 3:50	3:51 5:00	5:01 7:00	7:01 12:00*
J			0:00 0:30	0:31 0:40	0:41 1:00	1:01 1:30	1:31 2:00	2:01 2:40	2:41 3:30	3:31 4:40	4:41 6:40	6:41 12:00*
I				0:00 0:30	0:31 0:50	0:51 1:20	1:21 1:50	1:51 2:20	2:21 3:10	3:11 4:20	4:21 6:20	6:21 12:00*
H					0:00 0:30	0:31 0:50	0:51 1:30	1:31 2:00	2:01 2:50	2:51 4:00	4:01 6:00	6:01 12:00*
G						0:00 0:30	0:31 1:00	1:01 1:40	1:41 2:30	2:31 3:40	3:41 5:40	5:41 12:00*
F							0:00 0:35	0:36 1:10	1:11 2:00	2:01 3:10	3:11 5:10	5:11 12:00*
E								0:00 0:40	0:41 1:30	1:31 2:40	2:41 4:40	4:41 12:00*
D									0:00 0:50	0:51 2:00	2:01 4:00	4:01 12:00*
C										0:00 1:20	1:21 3:10	3:11 12:00*
B											0:00 2:00	2:01 12:00*
A												0:00 12:00*

Repetitive group at the beginning of the surface interval from previous dive

Instructions for Use

Surface interval time in the table is in *hours* and *minutes* (1:30 means 1 hour and 30 minutes). The surface interval must be at least 30 minutes.

Find the *repetitive group designation letter* (from the previous dive schedule) on the diagonal slope. Enter the table horizontally to select the surface interval time that is exactly between the actual surface interval times shown. The repetitive group designation for the *end* of the surface interval is at the head of the vertical column where the selected surface interval time is listed. For example, a previous dive was to 110 feet for 30 minutes. The diver wishes to remain on the surface for 1 hour and 30 minutes and wants to find the new repetitive group designation. The repetitive group from the last column of the 110/30 schedule in the Helium-Oxygen Decompression Tables is "G." Enter the surface interval credit table along the horizontal line labeled "G." The 1 hour and 30 minute surface interval lies between the times 1:01 and 1:40. Therefore, the diver has lost sufficient inert gas to place him in group "E" (at the head of the vertical column selected).

*NOTE.—Dives following surface intervals of more than 12 hours are not considered repetitive dives. Actual bottom times in the Helium-Oxygen Decompression Tables may be used in computing decompression for such dives.

TABLE 1-21.—*Repetitive dive timetable for helium-oxygen dives*

Repetitive groups	Repetitive dive depth (ft) (He-O_2 dives)																
	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
	13	10	8	7	6	6	5	5	4	4	4	4	3	3	3	3	3
	26	21	17	14	13	11	10	9	8	8	7	7	6	6	6	5	5
	40	32	26	22	19	17	15	14	13	12	11	10	9	9	8	8	8
	56	44	35	30	26	23	20	19	17	15	14	13	13	12	11	11	10
	74	57	45	38	33	29	26	23	21	19	18	17	16	15	14	13	13
	93	71	56	47	40	35	31	28	26	24	22	20	19	18	17	16	15
	115	86	67	56	47	42	37	33	30	28	26	24	22	21	20	19	18
	139	102	79	66	55	48	43	39	35	32	29	28	26	24	22	21	20
	168	120	92	76	64	56	49	44	40	37	33	31	29	27	26	24	23
	203	141	105	87	72	63	55	49	45	41	37	35	32	31	28	27	25
	248	165	120	98	80	71	61	55	49	45	42	39	36	34	32	30	28
	305	191	137	111	91	79	68	61	55	50	46	43	40	37	35	33	31

Instructions for Use

The bottom times listed in this table are called "residual helium times" and are the times a diver is to consider he has *already* spent on the bottom when he *starts* a repetitive dive to a specific depth. They are in minutes.

Enter the table horizontally with the repetitive group designation from the Surface Interval Credit Table. The time in each vertical column is the number of minutes that would be required (at the depth listed at the head of the column) to saturate to the particular group.

For example: The final group designation from the Surface Interval Credit Table on the basis of a previous dive and surface interval is "H." To plan a dive to 110 feet, determine the residual helium time for this depth required by the repetitive group designation. Enter this table along the horizontal line labeled "H." The table shows that one must *start* a dive to 110 feet as though he had already been at this depth for 39 minutes. This information can then be applied to the Helium-Oxygen Decompression Table or No-Decompression Table in a number of ways:

(1) Assuming a diver is going to finish a job and take whatever decompression is required, he must add 39 minutes to his actual bottom time and be prepared to take decompression according to the 110-foot schedules for the sum or equivalent single dive time.

(2) Assuming the diver wishes to make a quick inspection dive for the minimum decompression, he will decompress according to the 110/50 schedule for a dive of 11 minutes or less (39+11=50).

(3) Assuming that a diver has sufficient mixed gas for approximately 40 minutes bottom time and decompression stops, the possible dive can be computed: A dive of 11 minutes will require 32 minutes of decompression (110/50 schedule), for a total submerged time of 43 minutes. Therefore to be safe, the diver will have to start ascent before 11 minutes or a standby mixed gas source will have to be provided.

(2) Helium-oxygen decompression tables differ from the air tables in the following major respects:

(*a*) The partial pressure of the inert gas at depth and not the depth of the dive determines the particular table to use.

(*b*) The rate of ascent from the bottom to the first stop varies, and the means to compute it are given in the particular decompression schedule used.

(*c*) Repetitive diving is not allowed with less than a 12-hour surface interval.

(3) The helium-oxygen decompression tables are comprised of:

(*a*) Partial Pressure Table (table 1–22).

(*b*) Helium-Oxygen Decompression Table (table 1–23).

(*c*) Helium-Oxygen Decompression Table for Exceptional Exposures (table 1–23*a*).

(*d*) Emergency Table ($He\text{-}O_2$) (table 1–24).

(*e*) Emergency Table (Air) (table 1–25).

Oxygen Limits in Helium-Oxygen Diving

(4) Because the risk of incurring oxygen toxicity increases with the time of exposure to high oxygen pressure, the maximum safe limit for the oxygen partial pressure in helium-oxygen diving decreases as the bottom time of the dive increases. Table 1–16 gives the limits (which are related to the bottom time) for maximum oxygen partial pressure, expressed as atmospheres, in diving with helium-oxygen mixtures. The maximum allowable oxygen percentage for a gas mixture in helium-oxygen diving depends on the permissible partial pressure of oxygen. It can be determined from the following formula on pages 138 and 139.

TABLE 1-22.—*Table of helium-oxygen partial pressures—40 feet to 380 feet (enter this table—select partial pressures)*

Depth (feet)	Oxygen percent												
	15	16	17	19	21	23	25	30	35	40	45	50	55
40	64	63	63	61	60	58	57	(*)	(*)	(*)	(*)	(*)	(*)
50	73	72	71	69	68	66	64	60	56	(*)	(*)	(*)	(*)
60	81	80	80	78	76	74	72	67	63	58	54	(*)	(*)
70	90	89	88	86	84	82	80	75	70	64	59	54	(*)
80	99	98	97	94	92	90	88	82	76	71	65	59	54
90	108	106	105	103	100	98	95	89	83	77	71	64	
100	116	115	114	111	108	106	103	96	90	83	76		
110	125	123	122	119	116	113	111	103	96	89	82		
120	134	132	131	127	124	121	118	111	103	95			
130	142	141	139	136	133	129	126	118	110	102			
140	151	149	148	144	141	137	134	125	116				
150	160	158	156	152	149	145	141	132	123				
160	168	166	165	161	157	155	149	139					
170	177	175	173	169	165	161	157	147					
180	186	184	182	177	173	169	165	154					
190	195	192	190	186	181	177	172						
200	203	201	199	194	189	185	180						
210	212	209	207	202	197	192	188						
220	221	218	216	210	205	200	195						
230	229	227	224	219	214	203	203						
240	238	235	233	227	222	216							
250	247	244	241	235	230	224							
260	255	252	250	244	238								
270	264	261	258	252	246								
280	273	270	267	260	254								
290	282	278	275	269									
300	290	287	284	277									
310	299	295	292	285									
320	308	304	301										
330	316	313	309										
340	325	321	318										
350	334	330	326										
360	342	338											
370	351	347											
380	360	356											

The heavy line indicates the maximum depth on each oxygen percent mixture for a 30-min exposure at 1.6 atmospheres PO_2. Partial pressures above the heavy line are applicable to table 1–23 (He-O_2 decompression table). Partial pressures below the heavy line are applicable only to table 1–23*a* (He-O_2 decompression table for exceptional exposures).

*No-decompression to 100 percent oxygen

$$\text{Cutoff depth for oxygen} = \frac{52.8}{\text{Oxygen percent}} - 33$$

$$\frac{52.8}{D+33} \times 100 = \text{maximum oxygen percent}$$

$$\frac{(D+33) \times \text{oxygen percent}}{33} = \text{Effective atmospheres of oxygen}$$

$$PP = (D+33) \times 1.00 - (\text{Oxygen percent} - 0.02)$$

16 percent is considered the minimum oxygen percentage for surface breathing. The Partial Pressure Tables are not designed for shifting to lower percentages of oxygen during the dive. Therefore, those Partial Pressure Tables requiring a lower percent of oxygen are for emergency use only.

(FORMERLY TABLE 1–13, 1963 DIVING MANUAL)

TABLE 1–23.—*Helium-oxygen decompression table*

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (60)																	
	4															0	4
	4															0	4
	4															0	4
	4															0	4
	4															0	4
	2															6	8
	2															7	9
	2															9	11
	2															13	15
PARTIAL PRESSURE (70)																	
	3															6	9
	3															7	10
	3															9	12
	3															10	13
	3															15	18
	3															17	20
	3															22	25
	3															25	28
	3															27	30
	3															29	32
	3															31	34
	3															31	34
	3															33	36
	3															33	36
PARTIAL PRESSURE (80)																	
	3															6	9
	3															10	13
	3															13	16
	3															17	20
	3															24	27
	3															32	35
	3															40	43
	3															42	45
	3															45	48
	3															47	50
	3															48	51
	3															48	51
	3															48	51
	3															50	53

TABLE 1-23.—*Helium-oxygen decompression table*—Continued

Time of dive	Time to first stop	Feet and minutes														Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (90)																	
10	3															8	11
20	3															15	18
30	3															18	21
40	3															23	26
60	3															35	38
80	3															45	48
100	3															50	53
120	3															55	58
140	3															58	61
160	3															60	63
180	3															60	63
200	3															62	65
220	3															62	65
240	3															63	66
PARTIAL PRESSURE (100)																	
10	3															10	13
20	3															17	20
30	3															24	27
40	3															31	34
60	3															47	50
80	3															56	59
100	3															63	66
120	3															67	70
140	3															70	73
160	3															72	75
180	3															73	76
200	3															73	76
220	3															73	76
240	3															75	78
PARTIAL PRESSURE (110)																	
10	3															12	15
20	3															21	24
30	3															31	34
40	3															39	42
60	3															56	59
80	3															67	70
100	3															75	78
120	3															78	81
140	3															81	84
160	3															83	86
180	3															84	87
200	3															84	87
220	3															85	88
240	3															86	89

TABLE 1-23.—*Helium oxygen decompression table*—Continued

Time of dive	Time to first stop	Feet and minutes														Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (120)																	
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14	17
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25	28
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36	39
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47	50
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	66	69
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	77	80
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	84	87
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	87	90
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	90	93
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	92	95
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	93	96
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	93	96
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	95	98
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	97	100
PARTIAL PRESSURE (130)																	
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	16	19
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	29	32
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	42	45
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	53	56
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	73	76
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	86	89
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	92	95
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	96	99
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	99	102
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	92	105
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	93	106
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	94	107
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	95	108
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	96	109
PARTIAL PRESSURE (140)																	
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	19	22
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	34	37
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	49	52
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	62	65
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	82	85
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	94	97
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	99	102
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	97	110
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	98	111
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	99	112
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12	99	114
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13	99	115
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14	99	116
.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15	99	117

TABLE 1–23.—*Helium-oxygen decompression table*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (150)																	
10	3													0	10	11	24
20	3													0	10	28	41
30	3													0	10	45	58
40	3													7	10	59	79
60	3													7	10	78	98
80	3													7	10	90	110
100	3													7	10	96	116
120	3													7	11	98	119
140	3													7	13	99	122
160	3													8	15	99	125
180	3													9	15	99	126
200	3													10	16	99	128
220	3													11	16	99	129
240	3													12	16	99	130
PARTIAL PRESSURE (160)																	
10	3												0	0	10	12	25
20	3												0	7	10	33	53
30	3												0	7	10	50	70
40	3												0	7	10	65	85
60	3												0	7	10	84	104
80	3												0	7	10	96	116
100	3												0	7	13	99	122
120	3												0	9	16	99	127
140	3												0	15	16	99	133
160	3												0	18	16	99	136
180	3												0	20	16	99	138
200	3												0	22	16	99	140
220	3												0	23	16	99	141
240	3												7	19	16	99	144
PARTIAL PRESSURE (170)																	
10	3												0	7	10	15	35
20	3												0	7	10	36	56
30	3												0	7	10	55	75
40	3												0	7	10	70	90
60	3												7	6	10	83	109
80	3												7	9	10	98	127
100	3												7	13	14	98	135
120	3												7	17	16	99	142
140	3												8	21	16	99	147
160	3												11	22	16	99	151
180	3												11	23	16	99	152
200	3												12	23	16	99	153
220	3												14	23	16	99	155
240	3												16	23	16	99	157

TABLE 1-23.—*Helium-oxygen decompression table*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (180)																	
	3											0	7	0	10	17	37
	3											0	7	0	10	41	61
	3											0	7	1	10	62	83
	3											0	7	4	10	77	101
	3											0	7	10	10	92	122
	3											0	9	14	13	98	137
	3											7	5	18	15	99	147
	3											7	9	21	16	99	155
	3											7	11	22	16	99	158
	3											7	15	23	16	99	163
	3											7	17	23	16	99	165
	3											7	19	23	16	99	167
	3											7	21	23	16	99	169
	3											7	23	23	16	99	171
PARTIAL PRESSURE (190)																	
	4											0	7	0	10	20	41
	4											0	7	0	10	44	65
	4											0	7	4	10	67	92
	4											7	0	8	10	81	110
	4											7	5	11	10	96	133
	4											7	9	15	15	99	149
	4											7	13	19	16	99	158
	4											7	17	23	16	99	166
PARTIAL PRESSURE (200)																	
	4											0	0	7	0	10	22	43
	4											0	7	0	2	10	50	73
	4											0	7	0	7	10	69	97
	4											0	7	4	9	10	84	118
	4											0	7	9	13	12	93	138
	4											7	3	13	18	15	99	159
	4											7	6	16	21	16	99	169
	4											7	8	20	23	16	99	177

TABLE 1-23.—*Helium-oxygen decompression table*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (210)																	
10	4										0	7	0	0	10	25	46
20	4										0	7	0	4	10	53	78
30	4										7	0	3	7	10	74	105
40	4										7	0	7	10	10	86	124
60	4										7	4	10	14	13	98	150
80	4										7	8	14	18	16	99	166
100																	
120																	
140																	
160																	
180																	
200																	
240																	
PARTIAL PRESSURE (220)																	
10	4									0	0	7	0	0	10	28	49
20	4									0	7	0	1	6	10	57	85
30	4									0	7	0	6	7	10	79	113
40	4									0	7	3	9	10	10	90	133
60	4									7	0	9	11	17	13	98	159
80	4									7	3	11	15	20	13	99	172
100																	
120																	
140																	
160																	
180																	
200																	
240																	
PARTIAL PRESSURE (230)																	
10	4									0	0	7	0	2	10	30	53
20	4									0	7	0	3	7	10	61	92
30	4									0	7	2	6	9	10	81	119
40	4									7	0	6	9	11	10	93	140
60	4									7	4	9	12	18	14	99	167
80																	
100																	
120																	
140																	
160																	
180																	
200																	
240																	

TABLE 1-23.—*Helium-oxygen decompression table*—Continued

Time of dive	Time to first stop	Feet and minutes														Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (240)																	
	4								0	0	7	0	0	3	10	33	57
	4								0	7	0	1	4	7	10	65	98
	4								0	7	0	5	7	10	10	85	128
	4								7	0	3	7	9	13	11	95	149
	4								7	0	8	10	14	18	15	99	175
PARTIAL PRESSURE (250)																	
	4								0	7	0	0	2	4	10	35	62
	4								0	7	0	2	5	7	10	68	103
	4								7	0	2	6	7	10	10	87	133
	4								7	0	5	8	9	14	12	96	155
PARTIAL PRESSURE (260)																	
	4								0	7	0	0	2	4	10	37	64
	4								7	0	0	3	7	7	10	70	108
	4								7	0	4	6	8	10	10	89	138
	4								7	2	5	9	9	14	13	96	159

TABLE 1–23.—*Helium-oxygen decompression table*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (270)																	
10	4							0	7	0	0	0	4	4	10	40	69
20	4							0	7	0	2	4	6	7	10	74	114
30	4							7	0	2	5	6	9	10	10	92	145
40	4							7	0	3	8	9	10	15	14	96	166
60																	
80																	
100																	
120																	
140																	
160																	
180																	
200																	
240																	
PARTIAL PRESSURE (280)																	
10	4							0	7	0	0	2	3	4	10	42	72
20	4							7	0	0	2	6	6	8	10	78	121
30	4							7	0	3	6	6	9	13	10	93	151
40																	
60																	
80																	
100																	
120																	
140																	
160																	
180																	
200																	
240																	
PARTIAL PRESSURE (290)																	
10	4						0	0	7	0	0	3	3	4	10	46	77
20	4						0	7	0	0	4	6	7	7	10	81	126
30	4						7	0	1	5	5	9	9	12	10	96	158
40																	
60																	
80																	
100																	
120																	
140																	
160																	
180																	
200																	
240																	

(FORMERLY TABLE 1-13, 1963 DIVING MANUAL)

TABLE 1-23*a*.—*Helium-oxygen decompression table for exceptional exposures*

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (190)																	
	4											9	19	23	16	99	170
	4											11	20	23	16	99	173
	4											13	21	23	16	99	176
	4											14	22	23	16	99	178
	4											15	23	23	16	99	180
	4											17	23	23	16	99	182
PARTIAL PRESSURE (200)																	
	4										7	11	21	23	16	99	181
	4										7	15	23	23	16	99	187
	4										7	17	23	23	16	99	189
	4										7	18	23	23	16	99	190
	4										7	20	23	23	16	99	192
	4										8	20	23	23	16	99	193
PARTIAL PRESSURE (210)																	
	4										7	12	17	23	16	99	178
	4										8	15	21	23	16	99	186
	4										10	17	21	23	16	99	190
	4										12	17	22	23	16	99	193
	4										14	18	22	23	16	99	196
	4										16	18	23	23	16	99	199
	4										17	19	23	23	16	99	201
	4										18	20	23	23	16	99	203

TABLE 1-23a.—*Helium-oxygen decompression table for exceptional exposures*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (220)																	
10																	
20																	
30																	
40																	
60																	
80																	
100	4									7	6	14	19	23	16	99	188
120	4									7	8	18	23	23	16	99	198
140	4									7	11	18	23	23	16	99	201
160	4									7	14	19	23	23	16	99	205
180	4									7	15	20	23	23	16	99	207
200	4									7	16	20	23	23	16	99	208
220	4									8	17	20	23	23	16	99	210
240	4									9	19	20	23	23	16	99	213
PARTIAL PRESSURE (230)																	
10																	
20																	
30																	
40																	
60																	
80	4									0	7	8	12	17	21	16	99	184
100	4									0	7	12	15	20	23	16	99	196
120	4									0	8	14	19	23	23	16	99	206
140	4									0	10	16	20	23	23	16	99	211
160	4									7	6	18	20	23	23	16	99	216
180	4									7	7	19	20	23	23	16	99	218
200	4									7	9	19	20	23	23	16	99	220
220	4									7	11	19	20	23	23	16	99	222
240	4									7	13	19	20	23	23	16	99	224
PARTIAL PRESSURE (240)																	
10																	
20																	
30																	
40																	
60																	
80	4									7	3	10	14	18	23	16	99	194
100	4									7	6	12	17	23	23	16	99	207
120	4									7	7	16	19	23	23	16	99	214
140	4									7	11	16	20	23	23	16	99	219
160	4									7	13	19	20	23	23	16	99	224
180	4									8	15	19	20	23	23	16	99	227
200	4									8	17	19	20	23	23	16	99	229
220	4									9	17	19	20	23	23	16	99	230
240	4									11	17	19	20	23	23	16	99	232

TABLE 1-23a.—*Helium-oxygen decompression table for exceptional exposures*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (250)																	
	4							0	7	4	8	11	14	19	16	99	182
	4							0	7	7	11	16	18	23	16	99	201
	4							0	7	10	14	19	23	23	16	99	215
	4							7	3	12	17	19	23	23	16	99	223
	4							7	4	15	18	19	23	23	16	99	228
	4							7	7	16	19	19	23	23	16	99	233
	4							7	9	17	19	20	23	23	16	99	237
	4							7	11	17	19	20	23	23	16	99	239
	4							7	12	17	19	20	23	23	16	99	240
	4							7	13	17	19	20	23	23	16	99	241
PARTIAL PRESSURE (260)																	
	4							7	0	7	9	12	16	21	16	99	191
	4							7	3	9	13	15	21	23	16	99	210
	4							7	6	11	14	19	23	23	16	99	222
	4							7	8	13	19	20	23	23	16	99	232
	4							7	11	15	19	20	23	23	16	99	237
	4							8	13	17	19	20	23	23	16	99	242
	4							9	14	17	19	20	23	23	16	99	244
	4							10	16	17	19	20	23	23	16	99	247
	4							11	16	17	19	20	23	23	16	99	248
	4							13	16	17	19	20	23	23	16	99	250
PARTIAL PRESSURE (270)																	
	4							0	7	3	7	10	14	16	21	16	99	197
	4							0	7	6	10	13	17	23	23	16	99	218
	4							7	2	9	13	16	20	23	23	16	99	232
	4							7	4	11	14	19	20	23	23	16	99	240
	4							7	5	14	15	19	20	23	23	16	99	245
	4							7	7	15	17	19	20	23	23	16	99	250
	4							7	9	16	17	19	20	23	23	16	99	253
	4							7	11	16	17	19	20	23	23	16	99	255
	4							7	13	16	17	19	20	23	23	16	99	257
	4							7	15	16	17	19	20	23	23	16	99	259

TABLE 1–23*a*.—*Helium-oxygen decompression table for exceptional exposures*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (280)																	
10																	
20																	
30																	
40	4						7	0	2	5	8	8	12	16	13	98	173
60	4						7	0	6	8	10	14	19	23	16	99	206
80	4						7	3	8	11	14	17	23	23	16	99	225
100	4						7	5	11	13	16	20	23	23	16	99	237
120	4						7	8	12	16	19	20	23	23	16	99	247
140	4						7	10	16	17	19	20	23	23	16	99	254
160	4						8	13	16	17	19	20	23	23	16	99	258
180	4						9	14	16	17	19	20	23	23	16	99	260
200	4						10	15	16	17	19	20	23	23	16	99	262
220	4						12	15	16	17	19	20	23	23	16	99	264
240	4						14	15	16	17	19	20	23	23	16	99	266
PARTIAL PRESSURE (290)																	
10																	
20																	
30																	
40	4						0	7	0	4	6	8	9	12	17	15	98	180
60	4						0	7	4	6	8	12	15	18	23	16	99	212
80	4						7	0	7	9	11	15	17	23	23	16	99	231
100	4						7	2	9	11	15	17	20	23	23	16	99	246
120	4						7	4	11	13	16	19	20	23	23	16	99	255
140	4						7	5	13	16	17	19	20	23	23	16	99	262
160	4						7	8	14	16	17	19	20	23	23	16	99	266
180	4						7	10	15	16	17	19	20	23	23	16	99	269
200	4						7	12	15	16	17	19	20	23	23	16	99	271
220	4						7	13	15	16	17	19	20	23	23	16	99	272
240	4						7	14	15	16	17	19	20	23	23	16	99	273
PARTIAL PRESSURE (300)																	
10	5					0	0	0	7	0	0	0	4	3	4	10	49	82
20	5					0	0	7	0	0	2	6	6	6	9	10	83	134
30	5					0	0	7	0	2	5	5	9	9	14	12	94	162
40	5					0	0	7	0	5	7	8	11	13	17	15	98	186
60	5					0	7	0	6	7	9	12	15	20	23	16	99	219
80	5					0	7	2	8	10	12	16	19	23	23	16	99	240
100	5					0	7	5	10	12	15	19	20	23	23	16	99	254
120	5					0	7	8	11	16	17	19	20	23	23	16	99	264
140	5					0	8	9	14	16	17	19	20	23	23	16	99	269
160	5					0	8	13	15	16	17	19	20	23	23	16	99	274
180	5					7	3	13	15	16	17	19	20	23	23	16	99	276
200	5					7	5	14	15	16	17	19	20	23	23	16	99	279
220	5					7	6	14	15	16	17	19	20	23	23	16	99	280
240	5					7	9	14	15	16	17	19	20	23	23	16	99	283

TABLE 1-23a.—*Helium-oxygen decompression table for exceptional exposures*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (250)																	
	4							0	7	4	8	11	14	19	16	99	182
	4							0	7	7	11	16	18	23	16	99	201
	4							0	7	10	14	19	23	23	16	99	215
	4							7	3	12	17	19	23	23	16	99	223
	4							7	4	15	18	19	23	23	16	99	228
	4							7	7	16	19	19	23	23	16	99	233
	4							7	9	17	19	20	23	23	16	99	237
	4							7	11	17	19	20	23	23	16	99	239
	4							7	12	17	19	20	23	23	16	99	240
	4							7	13	17	19	20	23	23	16	99	241
PARTIAL PRESSURE (260)																	
	4							7	0	7	9	12	16	21	16	99	191
	4							7	3	9	13	15	21	23	16	99	210
	4							7	6	11	14	19	23	23	16	99	222
	4							7	8	13	19	20	23	23	16	99	232
	4							7	11	15	19	20	23	23	16	99	237
	4							8	13	17	19	20	23	23	16	99	242
	4							9	14	17	19	20	23	23	16	99	244
	4							10	16	17	19	20	23	23	16	99	247
	4							11	16	17	19	20	23	23	16	99	248
	4							13	16	17	19	20	23	23	16	99	250
PARTIAL PRESSURE (270)																	
	4							0	7	3	7	10	14	16	21	16	99	197
	4							0	7	6	10	13	17	23	23	16	99	218
	4							7	2	9	13	16	20	23	23	16	99	232
	4							7	4	11	14	19	20	23	23	16	99	240
	4							7	5	14	15	19	20	23	23	16	99	245
	4							7	7	15	17	19	20	23	23	16	99	250
	4							7	9	16	17	19	20	23	23	16	99	253
	4							7	11	16	17	19	20	23	23	16	99	255
	4							7	13	16	17	19	20	23	23	16	99	257
	4							7	15	16	17	19	20	23	23	16	99	259

TABLE 1–23*a*.—*Helium-oxygen decompression table for exceptional exposures*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (280)																	
10																	
20																	
30																	
40	4						7	0	2	5	8	8	12	16	13	98	173
60	4						7	0	6	8	10	14	19	23	16	99	206
80	4						7	3	8	11	14	17	23	23	16	99	225
100	4						7	5	11	13	16	20	23	23	16	99	237
120	4						7	8	12	16	19	20	23	23	16	99	247
140	4						7	10	16	17	19	20	23	23	16	99	254
160	4						8	13	16	17	19	20	23	23	16	99	258
180	4						9	14	16	17	19	20	23	23	16	99	260
200	4						10	15	16	17	19	20	23	23	16	99	262
220	4						12	15	16	17	19	20	23	23	16	99	264
240	4						14	15	16	17	19	20	23	23	16	99	266
PARTIAL PRESSURE (290)																	
10																	
20																	
30																	
40	4					0	7	0	4	6	8	9	12	17	15	98	180
60	4					0	7	4	6	8	12	15	18	23	16	99	212
80	4					7	0	7	9	11	15	17	23	23	16	99	231
100	4					7	2	9	11	15	17	20	23	23	16	99	246
120	4					7	4	11	13	16	19	20	23	23	16	99	255
140	4					7	5	13	16	17	19	20	23	23	16	99	262
160	4					7	8	14	16	17	19	20	23	23	16	99	266
180	4					7	10	15	16	17	19	20	23	23	16	99	269
200	4					7	12	15	16	17	19	20	23	23	16	99	271
220	4					7	13	15	16	17	19	20	23	23	16	99	272
240	4					7	14	15	16	17	19	20	23	23	16	99	273
PARTIAL PRESSURE (300)																	
10	5				0	0	0	7	0	0	0	4	3	4	10	49	82
20	5				0	0	7	0	0	2	6	6	6	9	10	83	134
30	5				0	0	7	0	2	5	5	9	9	14	12	94	162
40	5				0	0	7	0	5	7	8	11	13	17	15	98	186
60	5				0	7	0	6	7	9	12	15	20	23	16	99	219
80	5				0	7	2	8	10	12	16	19	23	23	16	99	240
100	5				0	7	5	10	12	15	19	20	23	23	16	99	254
120	5				0	7	8	11	16	17	19	20	23	23	16	99	264
140	5				0	8	9	14	16	17	19	20	23	23	16	99	269
160	5				0	8	13	15	16	17	19	20	23	23	16	99	274
180	5				7	3	13	15	16	17	19	20	23	23	16	99	276
200	5				7	5	14	15	16	17	19	20	23	23	16	99	279
220	5				7	6	14	15	16	17	19	20	23	23	16	99	280
240	5				7	9	14	15	16	17	19	20	23	23	16	99	283

TABLE 1–23*a*.—*Helium-oxygen decompression table for exceptional exposures*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (310)																	
	5				0	0	0	7	0	0	2	3	3	5	10	52	87
	5				0	0	7	0	0	4	5	6	6	11	10	84	138
	5				0	7	0	0	5	5	7	8	9	14	12	96	168
	5				0	7	0	3	5	8	8	11	13	18	15	99	192
	5				0	7	3	6	7	10	12	18	22	23	16	99	228
	5				7	0	6	9	11	12	16	19	23	23	16	99	246
	5				7	1	9	10	14	17	19	20	23	23	16	99	263
	5				7	4	11	12	14	17	19	20	23	23	16	99	270
	5				7	5	12	15	16	17	19	20	23	23	16	99	277
	5				7	8	14	15	16	17	19	20	23	23	16	99	282
	5				7	10	14	15	16	17	19	20	23	23	16	99	284
	5				7	12	14	15	16	17	19	20	23	23	16	99	286
	5				8	13	14	15	16	17	19	20	23	23	16	99	288
	5				9	13	14	15	16	17	19	20	23	23	16	99	289
PARTIAL PRESSURE (320)																	
	5			0	0	0	7	0	0	0	3	3	3	7	10	54	93
	5			0	0	7	0	0	2	4	5	6	7	10	10	85	141
	5			0	0	7	0	2	4	5	7	8	11	15	13	98	175
	5			0	7	0	1	4	6	7	8	12	15	19	16	99	199
	5			0	7	0	5	6	9	11	13	17	20	23	16	99	231
	5			0	7	3	7	9	11	13	17	20	23	23	16	99	253
	5			0	7	5	9	11	13	17	19	20	23	23	16	99	267
	5			0	7	7	12	13	16	17	19	20	23	23	16	99	277
	5			7	2	9	12	15	16	17	19	20	23	23	16	99	283
	5			7	3	11	14	15	16	17	19	20	23	23	16	99	288
	5			7	5	11	14	15	16	17	19	20	23	23	16	99	290
	5			7	6	13	14	15	16	17	19	20	23	23	16	99	293
	5			7	7	13	14	15	16	17	19	20	23	23	16	99	294
	5			7	9	13	14	15	16	17	19	20	23	23	16	99	296
PARTIAL PRESSURE (330)																	
	5			0	0	0	7	0	0	0	4	3	3	7	10	56	95
	5			0	0	7	0	0	3	5	5	6	8	10	10	88	147
	5			0	7	0	0	4	4	6	7	9	11	17	13	98	181
	5			0	7	0	4	4	6	7	9	12	16	20	16	99	205
	5			7	0	2	6	8	9	11	14	17	23	23	16	99	240
	5			7	0	6	8	8	13	14	19	20	23	23	16	99	261
	5			7	2	7	10	13	16	17	19	20	23	23	16	99	277
	5			7	4	9	12	13	16	17	19	20	23	23	16	99	283
	5			7	6	11	13	15	16	17	19	20	23	23	16	99	290
	5			7	8	13	14	15	16	17	19	20	23	23	16	99	295
	5			7	10	13	14	15	16	17	19	20	23	23	16	99	297
	5			7	12	13	14	15	16	17	19	20	23	23	16	99	299
	5			9	12	13	14	15	16	17	19	20	23	23	16	99	301
	5			10	12	13	13	15	16	17	19	20	23	23	16	99	302

TABLE 1–23*a*.—*Helium-oxygen decompression table for exceptional exposures*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (340)																	
10	5	.....	0	0	0	7	0	0	0	2	3	3	4	7	10	59	100
20	5	.....	0	0	7	0	0	2	3	4	6	5	10	10	10	90	152
30	5	.....	0	0	7	0	1	4	5	6	8	8	13	17	14	98	186
40	5	.....	0	7	0	1	4	5	7	7	10	12	17	22	16	99	212
60	5	.....	0	7	0	5	6	8	9	11	15	20	23	23	16	99	247
80	5	.....	0	7	2	7	8	10	13	15	19	20	23	23	16	99	267
100	5	.....	0	7	5	9	9	13	16	17	19	20	23	23	16	99	281
120	5	.....	7	1	7	10	13	15	16	17	19	20	23	23	16	99	291
140	5	.....	7	2	9	12	14	15	16	17	19	20	23	23	16	99	297
160	5	.....	7	4	10	13	14	15	16	17	19	20	23	23	16	99	301
180	5	.....	7	5	12	13	14	15	16	17	19	20	23	23	16	99	304
200	5	.....	7	6	12	13	14	15	16	17	19	20	23	23	16	99	305
220	5	.....	7	8	12	13	14	15	16	17	19	20	23	23	16	99	307
240	5	.....	7	10	12	13	14	15	16	17	19	20	23	23	16	99	309
PARTIAL PRESSURE (350)																	
10	5	.....	0	0	0	7	0	0	0	3	3	3	4	7	10	61	103
20	5	.....	0	0	7	0	0	2	4	5	7	8	9	10	10	90	157
30	5	.....	0	7	0	0	3	5	5	6	8	9	13	18	14	98	191
40	5	.....	0	7	0	2	4	6	7	8	10	13	16	22	16	99	215
60	5	.....	7	0	3	5	6	9	10	13	16	18	21	23	16	99	251
80	5	.....	7	0	7	7	8	11	13	15	19	20	23	23	16	99	273
100	5	.....	7	2	8	8	12	13	16	17	19	20	23	23	16	99	288
120	5	.....	7	4	9	11	13	15	16	17	19	20	23	23	16	99	297
140	5	.....	7	6	11	13	14	15	16	17	19	20	23	23	16	99	304
160	5	.....	7	9	11	13	14	15	16	17	19	20	23	23	16	99	307
180	5	.....	8	9	12	13	14	15	16	17	19	20	23	23	16	99	309
200	5	.....	8	11	12	13	14	15	16	17	19	20	23	23	16	99	311
220	5	.....	10	11	12	13	14	15	16	17	19	20	23	23	16	99	313
240	5	.....	11	11	12	13	14	15	16	17	19	20	23	23	16	99	314
PARTIAL PRESSURE (360)																	
10	5	0	0	0	7	0	0	0	2	2	3	3	5	7	10	64	108
20	5	0	0	7	0	0	0	4	4	5	5	7	9	13	10	94	163
30	5	0	0	7	0	1	4	4	5	7	8	11	13	18	14	99	196
40	5	0	7	0	1	3	5	6	7	8	11	14	17	23	16	99	222
60	5	0	7	0	5	5	8	8	11	12	16	19	23	23	16	99	257
80	5	0	7	2	7	7	10	11	13	17	19	20	23	23	16	99	279
100	5	7	0	6	8	9	11	15	16	17	19	20	23	23	16	99	294
120	5	7	1	7	9	12	14	15	16	17	19	20	23	23	16	99	303
140	5	7	3	9	11	13	14	15	16	17	19	20	23	23	16	99	310
160	5	7	4	10	12	13	14	15	16	17	19	20	23	23	16	99	313
180	5	7	5	11	12	13	14	15	16	17	19	20	23	23	16	99	315
200	5	7	7	11	12	13	14	15	16	17	19	20	23	23	16	99	317
220	5	7	9	11	12	13	14	15	16	17	19	20	23	23	16	99	319
240	5	7	11	11	12	13	14	15	16	17	19	20	23	23	16	99	321

TABLE 1–23a.—*Helium-oxygen decompression table for exceptional exposures*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (310)																	
	5				0	0	0	7	0	0	2	3	3	5	10	52	87
	5				0	0	7	0	0	4	5	6	6	11	10	84	138
	5				0	7	0	0	5	5	7	8	9	14	12	96	168
	5				0	7	0	3	5	8	8	11	13	18	15	99	192
	5				0	7	3	6	7	10	12	18	22	23	16	99	228
	5				7	0	6	9	11	12	16	19	23	23	16	99	246
	5				7	1	9	10	14	17	19	20	23	23	16	99	263
	5				7	4	11	12	14	17	19	20	23	23	16	99	270
	5				7	5	12	15	16	17	19	20	23	23	16	99	277
	5				7	8	14	15	16	17	19	20	23	23	16	99	282
	5				7	10	14	15	16	17	19	20	23	23	16	99	284
	5				7	12	14	15	16	17	19	20	23	23	16	99	286
	5				8	13	14	15	16	17	19	20	23	23	16	99	288
	5				9	13	14	15	16	17	19	20	23	23	16	99	289
PARTIAL PRESSURE (320)																	
	5			0	0	0	7	0	0	0	3	3	3	7	10	54	92
	5			0	0	7	0	0	2	4	5	6	7	10	10	85	141
	5			0	0	7	0	2	4	5	7	8	11	15	13	98	175
	5			0	7	0	1	4	6	7	8	12	15	19	16	99	199
	5			0	7	0	5	6	9	11	13	17	20	23	16	99	231
	5			0	7	3	7	9	11	13	17	20	23	23	16	99	253
	5			0	7	5	9	11	13	17	19	20	23	23	16	99	267
	5			0	7	7	12	13	16	17	19	20	23	23	16	99	277
	5			7	2	9	12	15	16	17	19	20	23	23	16	99	283
	5			7	3	11	14	15	16	17	19	20	23	23	16	99	288
	5			7	5	11	14	15	16	17	19	20	23	23	16	99	290
	5			7	6	13	14	15	16	17	19	20	23	23	16	99	293
	5			7	7	13	14	15	16	17	19	20	23	23	16	99	294
	5			7	9	13	14	15	16	17	19	20	23	23	16	99	296
PARTIAL PRESSURE (330)																	
	5			0	0	0	7	0	0	0	4	3	3	7	10	56	95
	5			0	0	7	0	0	3	5	5	6	8	10	10	88	147
	5			0	7	0	0	4	4	6	7	9	11	17	13	98	181
	5			0	7	0	4	4	6	7	9	12	16	20	16	99	205
	5			7	0	2	6	8	9	11	14	17	23	23	16	99	240
	5			7	0	6	8	8	13	14	19	20	23	23	16	99	261
	5			7	2	7	10	13	16	17	19	20	23	23	16	99	277
	5			7	4	9	12	13	16	17	19	20	23	23	16	99	283
	5			7	6	11	13	15	16	17	19	20	23	23	16	99	290
	5			7	8	13	14	15	16	17	19	20	23	23	16	99	295
	5			7	10	13	14	15	16	17	19	20	23	23	16	99	297
	5			7	12	13	14	15	16	17	19	20	23	23	16	99	299
	5			9	12	13	14	15	16	17	19	20	23	23	16	99	301
	5			10	12	13	13	15	16	17	19	20	23	23	16	99	302

TABLE 1–23*a*.—*Helium-oxygen decompression table for exceptional exposures*—Continued

Time of dive	Time to first stop	Feet and minutes															Total time
		180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	
PARTIAL PRESSURE (340)																	
10	5		0	0	0	7	0	0	0	2	3	3	4	7	10	59	100
20	5		0	0	7	0	0	2	3	4	6	5	10	10	10	90	152
30	5		0	0	7	0	1	4	5	6	8	8	13	17	14	98	186
40	5		0	7	0	1	4	5	7	7	10	12	17	22	16	99	212
60	5		0	7	0	5	6	8	9	11	15	20	23	23	16	99	247
80	5		0	7	2	7	8	10	13	15	19	20	23	23	16	99	267
100	5		0	7	5	9	9	13	16	17	19	20	23	23	16	99	281
120	5		7	1	7	10	13	15	16	17	19	20	23	23	16	99	291
140	5		7	2	9	12	14	15	16	17	19	20	23	23	16	99	297
160	5		7	4	10	13	14	15	16	17	19	20	23	23	16	99	301
180	5		7	5	12	13	14	15	16	17	19	20	23	23	16	99	304
200	5		7	6	12	13	14	15	16	17	19	20	23	23	16	99	305
220	5		7	8	12	13	14	15	16	17	19	20	23	23	16	99	307
240	5		7	10	12	13	14	15	16	17	19	20	23	23	16	99	309
PARTIAL PRESSURE (350)																	
10	5		0	0	0	7	0	0	0	3	3	3	4	7	10	61	103
20	5		0	0	7	0	0	2	4	5	7	8	9	10	10	90	157
30	5		0	7	0	0	3	5	5	6	8	9	13	18	14	98	191
40	5		0	7	0	2	4	6	7	8	10	13	16	22	16	99	215
60	5		7	0	3	5	6	9	10	13	16	18	21	23	16	99	251
80	5		7	0	7	7	8	11	13	15	19	20	23	23	16	99	273
100	5		7	2	8	8	12	13	16	17	19	20	23	23	16	99	288
120	5		7	4	9	11	13	15	16	17	19	20	23	23	16	99	297
140	5		7	6	11	13	14	15	16	17	19	20	23	23	16	99	304
160	5		7	9	11	13	14	15	16	17	19	20	23	23	16	99	307
180	5		8	9	12	13	14	15	16	17	19	20	23	23	16	99	309
200	5		8	11	12	13	14	15	16	17	19	20	23	23	16	99	311
220	5		10	11	12	13	14	15	16	17	19	20	23	23	16	99	313
240	5		11	11	12	13	14	15	16	17	19	20	23	23	16	99	314
PARTIAL PRESSURE (360)																	
10	5	0	0	0	7	0	0	0	2	2	3	3	5	7	10	64	108
20	5	0	0	7	0	0	0	4	4	5	5	7	9	13	10	94	163
30	5	0	0	7	0	1	4	4	5	7	8	11	13	18	14	99	196
40	5	0	7	0	1	3	5	6	7	8	11	14	17	23	16	99	222
60	5	0	7	0	5	5	8	8	11	12	16	19	23	23	16	99	257
80	5	0	7	2	7	7	10	11	13	17	19	20	23	23	16	99	279
100	5	7	0	6	8	9	11	15	16	17	19	20	23	23	16	99	294
120	5	7	1	7	9	12	14	15	16	17	19	20	23	23	16	99	303
140	5	7	3	9	11	13	14	15	16	17	19	20	23	23	16	99	310
160	5	7	4	10	12	13	14	15	16	17	19	20	23	23	16	99	313
180	5	7	5	11	12	13	14	15	16	17	19	20	23	23	16	99	315
200	5	7	7	11	12	13	14	15	16	17	19	20	23	23	16	99	317
220	5	7	9	11	12	13	14	15	16	17	19	20	23	23	16	99	319
240	5	7	11	11	12	13	14	15	16	17	19	20	23	23	16	99	321

(FORMERLY TABLE 1-15, 1963 DIVING MANUAL)

TABLE 1-24.—*Emergency table* ($He-O_2$)

Depth (feet)	Time (min)
50	26
40	30
30	35
20	42
10	55

(FORMERLY TABLE 1-16, 1963 DIVING MANUAL)

TABLE 1-25.—*Emergency table* (*air*)

Stops (feet)	Depth up to (feet)—						
	100	150	200	250	300	350	400
230	-----	-----	-----	-----	-----	-----	-----
220	-----	-----	-----	-----	-----	-----	-----
210	-----	-----	-----	-----	-----	-----	-----
200	-----	-----	-----	-----	-----	-----	-----
190	-----	-----	-----	-----	-----	-----	3
180	-----	-----	-----	-----	-----	-----	11
170	-----	-----	-----	-----	-----	-----	12
160	-----	-----	-----	-----	-----	9	12
150	-----	-----	-----	-----	-----	13	13
140	-----	-----	-----	-----	4	13	14
130	-----	-----	-----	-----	14	15	15
120	-----	-----	-----	-----	16	16	16
110	-----	-----	-----	13	16	17	17
100	-----	-----	-----	18	18	18	18
90	-----	-----	7	19	19	20	20
80	-----	-----	22	22	22	22	22
70	-----	-----	24	24	24	24	24
60	-----	22	26	26	26	27	27
50	-----	30	30	30	30	30	30
40	14	35	35	35	35	35	35
30	42	42	42	42	42	42	42
20	52	52	52	52	52	52	52
10	68	68	68	68	68	68	68

$$\text{Maximum oxygen percentage} = \frac{(F \times 33)}{(D+33)}$$

where

D = gage depth in feet of sea water

F = maximum oxygen partial pressure in atmospheres from table 1-16

For a dive with a bottom time of 30 minutes or less, the permissible oxygen partial pressure in table 1-16 is 1.6 atmospheres absolute. In diving to 297 feet for 30 minutes or less, the maximum oxygen percentage would work out to be 16 percent according to the formula:

$$\text{Maximum } O_2 \text{ percentage} = \frac{(1.6 \times 33)}{(297+33)} = \frac{52.8}{330} = 0.16 = 16 \text{ percent}$$

Because 16 percent oxygen is the minimum oxygen percentage allowed in helium-oxygen deep-sea diving, 30 minutes is the maximum bottom time for a dive to 297 feet using these tables. Use of a breathing mixture with a smaller proportion of oxygen would expose the diver to the risk of decompression sickness.

Sequence of Computations

(5) Specific instructions are given on the use of the various tables. After determining the proper oxygen concentrations (1.5.4(4)), the general sequence of computations and the use of the tables are—

(*a*) Determine the partial pressure of all other gases (AOG), except oxygen, for the depth of the dive and the percentage of oxygen in the breathing medium. Compute by formula or use the Partial-Pressure Table.

(*b*) From knowledge of the partial pressure and the actual bottom time of the dive, select the proper decompression schedule. Use the Helium-Oxygen Decompression Table.

(*c*) Compute the rate of ascent to the first stop. Use the time listed in the "To First Stop" column of the proper decompression schedule.

(*d*) Remain at the first stop for the number of minutes specified.

(*e*) Ascend at the rate of 60 feet per minute between stops and remain at the stops the required number of minutes. Include each time of ascent in the subsequent stop.

(*f*) Shift to oxygen as the breathing medium at the 50-foot stop. Follow the outlined procedure.

(*g*) Use emergency tables if required.

Partial-Pressure Table

(6) The use of partial pressure of inert gas instead of actual depth of dive is the main difference between the air and helium-oxygen decompression methods. Table 1-22, "Table of Partial Pressures for Helium-Oxygen," provides the partial pressure of the inert gas. The table is based on the formula:

$$PP(AOG)=(D+33)\times(1.00-(O_2-0.02))$$

where

PP(AOG)=partial pressure in feet of all other gases except oxygen
D=actual gage depth of water in feet
O_2=decimal equivalent of oxygen percentage
0.02=an assumed loss of 2 percent of oxygen in the helmet

Example: To dive to 290 feet with an 84 percent helium–16 percent oxygen mixture:

$$PP=(290+33)\times(1.00-(0.16-0.02))$$
$$PP=323\times(1.00-0.14)$$
$$PP=323\times0.86$$
$$PP=277.8$$

Results are raised to the next larger even foot, so the partial pressure in the example would be 278 feet of sea water.

(7) When entering table 1–22, use the exact or next greater depth, the exact or next lesser oxygen percentage, and the exact or next greater partial pressure table obtained. Enter the table with the depth on the left side of the table. Follow across to the column headed by the average percentage oxygen of the bank in use. The table also gives 278 as the partial pressure (AOG) for a dive to 290 feet using 16 percent oxygen.

(8) It is also possible to interpolate exactly using table 1–17. For example, to dive to 195 feet with an 82-percent helium–18-percent oxygen mixture:

	17	18	19
190	190	188	186
195	194. 5	192. 3	190
200	199	196. 5	194

(9) However, in such cases it is usually easier to use the formula:

$$PP=(195+33)\times(1.00-(0.18-0.02))$$
$$PP=228\times(1.00-0.16)$$
$$PP=228\times0.84$$
$$PP=191.5 \text{ (which is raised to 192)}$$

(10) After the partial pressure of the gases used in the dive is determined either from table 1–22 or from the formula, the decompression schedule is chosen from table 1–23, "Helium-Oxygen Decompression Table."

Helium-Oxygen Decompression Tables

(11) There are two partial-pressure decompression tables in this manual. Table 1–23 is the Helium-Oxygen Decompression table, which shall be used for all routine diving operations. It contains schedules for each 10 feet of partial pressure from 60 to 290 feet, for varying bottom times in increments of about 10 minutes. The maximum bottom time given for each partial pressure is based upon the maximum allowable partial pressure of oxygen as dictated by table 1–16 if 16 percent oxygen is used in the breathing mixture. Note that this amount is also the minimum percentage of oxygen that can be used for helium-oxygen diving. If these schedules are properly followed, the incidence of decompression sickness should be mimimal.

(12) Table 1–23*a* is the *Helium-Oxygen Decompression Table for Exceptional Exposures*, and should never be used except in cases of extreme operational necessity or in the case of a fouled diver who has exceeded the maximum bottom time allowed by table 1–23. The use of these schedules for operational dives shall be directed only by the commanding officer of the diving activity involved, and he shall assume the responsibility for any mishap which might occur because of their use. The only exception to the above limitations is that these schedules may be used with discretion at the Naval School, Diving and Salvage, during certain phases of diver training. Decompression schedules are given for each 10 feet of partial pressure from 190 to 360 feet. If bottom times of 30 minutes or less are used, and if 16 percent oxygen is used as the supply gas, these tables will be within the exceptional oxygen limits of table 1–16*a*. Bottom times of greater than 30 minutes carry a large risk of oxygen toxicity. The evaluations of these tables for longer exposures have been inadequate, and there is some doubt as to their value.

(13) Details on the use of the Helium-Oxygen Decompression Table are—

(*a*) To obtain the decompression schedule, use the partial pressure group that is exactly equal to or is the next greater than that computed. Use the bottom time that is exactly equal to or is the next longer than the actual bottom time of the dive. Do not interpolate. Example: Assume

(*a*) If the diver is within 5 minutes of completing required water stops for surface decompression (see 1. 5. 5 (17) and (18)):

1. Start ascent at once.

2. Place diver in chamber immediately.

3. Proceed with surface decompression.

4. Double the missed time and add to chamber stop.

5. Use oxygen in chamber, but watch carefully for reappearance of symptoms.

6. Keep diver close to chamber following decompression and observe carefully for symptoms of decompression sickness.

(*b*) If prompt ascent for surface decompression is *not* allowable:

1. Bring the diver up 10 feet at once.

2. Promptly shift to air.

3. Have the diver open the exhaust valve, ventilate, and remain on open circuit.

4. Be alert for possible blowup.

5. Complete decompression according to the Emergency Air Table.

6. Bring the diver up for surface decompression following the completion of the 30-foot stop listed on the Emergency Table, if desired. Take the diver to 40 feet in the chamber, and complete the decompression with oxygen as if oxygen had been used throughout.

(*c*) If symptoms proceed to convulsion in spite of the measures taken:

1. Bring the diver to the surface at a moderate rate.

2. Place him in a recompression chamber at once.

3. Take him to 165 feet. (See tables 1–30 and 1–31.)

4. Follow Treatment Table 3, 4, or 6A, depending on the diver's condition at the end of 30 minutes at 165 feet.

NOTE

The danger of causing air embolism by bringing the diver up during a convulsion caused by oxygen decompression is outweighed by the dangers of failing to do so. Since the possibility that air embolism has occurred cannot be ruled out in these cases, they require treatment for such.

1.5.5 SURFACE DECOMPRESSION

(1) In surface-decompression procedures, stage decompression in the water is reduced to a minimum or is eliminated, and the major part of decompression is accomplished in a recompression chamber on the surface. Oxygen is the standard breathing medium during the decompression period on the surface. Air or gas mixtures are alternate breathing mediums. There are separate decompression tables and procedures which apply specifically to the breathing medium used.

(2) In the U.S. Navy at present, surface decompression procedures expose the diver to atmospheric pressure for a *brief surface interval* between his leaving the water and his attaining the scheduled decompression-stop depth in the recompression chamber. The interval *must* be as short as possible.

(3) The principal advantages of surface decompression are the comfort and security provided to the diver by allowing him to surface in case of extremely cold or rough sea, physical exhaustion, and the like. In certain dives, surface decompression with pure oxygen has the additional advantage of saving an appreciable amount of the total decompression time required for straight air decompression.

(4) Surface decompression schedules may be applied to emergencies where a surface interval *must* come between the dive and the major part of the decompression. Such cases may be emergencies forcing unscheduled surfacing (1.5.6 (1)), or situations in scuba diving when the diver *must* surface to obtain a new air supply (1.5.5(9)). Although it is possible, when air is the breathing medium, for the decompression period following the surface interval to be in the water, *recompression in a chamber (if available) is always to be preferred.*

Oxygen Following an Air Dive

(5) If a recompression chamber is available and is equipped with proper oxygen-breathing equipment (1.6.18(17)), the procedure outlined in the Surface Decompression Table Using Oxygen (table 1–26) may be used in a routine manner. Follow the instructions accurately and take all precautions to insure that only pure oxygen is breathed. Maintain *breathing* equipment in perfect working condition to insure successful results from this table.

(6) In the event of oxygen toxicity symptoms, or failure of the oxygen supply, give

(FORMERLY TABLE 1–17, 1963 DIVING MANUAL)

TABLE 1–26.—*Surface decompression table using oxygen*

1 Depth (ft, gage)	2 Bottom time (min) [1]	3 Time to first stop or surface [2]	4 Time (min) breathing air at water stops (ft) [3]				5 Surface interval [4]	6 Time at 40-foot chamber stop (min) on oxygen [5]	7 Surface [6]	8 Total decompression time (min: sec) [7]
			60	50	40	30				
70	52	2:48	0	0	0	0	SURFACE INTERVAL NOT TO EXCEED 5 MINUTES	0	2-MINUTE ASCENT FROM 40 FEET IN CHAMBER TO SURFACE WHILE BREATHING OXYGEN	2:48
	90	2:48	0	0	0	0		15		23:48
	[8] 120	2:48	0	0	0	0		23		31:48
	150	2:28	0	0	0	0		31		39:48
	180	2:48	0	0	0	0		39		47:48
80	40	3:12	0	0	0	0		0		3:12
	70	3:12	0	0	0	0		14		23:12
	85	3:12	0	0	0	0		20		29:12
	100	3:12	0	0	0	0		26		35:12
	[8] 115	3:12	0	0	0	0		31		40:12
	130	3:12	0	0	0	0		37		46:12
	150	3:12	0	0	0	0		44		53:12
90	32	3:36	0	0	0	0		0		3:36
	60	3:36	0	0	0	0		14		23:36
	70	3:36	0	0	0	0		20		29:36
	80	3:36	0	0	0	0		25		34:36
	[8] 90	3:36	0	0	0	0		30		39:36
	100	3:36	0	0	0	0		34		43:36
	110	3:36	0	0	0	0		39		48:36
	120	3:36	0	0	0	0		43		52:36
	130	3:36	0	0	0	0		48		57:36
100	26	4:00	0	0	0	0		0		4:00
	50	4:00	0	0	0	0		14		24:00
	60	4:00	0	0	0	0		20		30:00
	70	4:00	0	0	0	0		26		36:00
	[8] 80	4:00	0	0	0	0		32		42:00
	90	4:00	0	0	0	0		38		48:00
	100	4:00	0	0	0	0		44		54:00
	110	4:00	0	0	0	0		49		59:00
	120	4:00	0	0	0	0		53		63:00
110	22	4:24	0	0	0	0		0		4:24
	40	4:24	0	0	0	0		12		22:24
	50	4:24	0	0	0	0		19		29:24
	60	4:24	0	0	0	0		26		36:24
	[8] 70	4:24	0	0	0	0		33		43:24
	80	3:12	0	0	0	1		40		51:12
	90	3:12	0	0	0	2		46		58:12
	100	3:12	0	0	0	5		51		66:12
	110	3:12	0	0	0	12		54		76:12
120	18	4:48	0	0	0	0		0		4:48
	30	4:48	0	0	0	0		9		19:48
	40	4:48	0	0	0	0		16		26:48
	50	4:48	0	0	0	0		24		34:48
	[8] 60	3:36	0	0	0	2		32		44:36
	70	3:36	0	0	0	4		39		53:36
	80	3:36	0	0	0	5		46		61:36
	90	3:12	0	0	3	7		51		73:12
	100	3:12	0	0	6	15		54		86:12
130	15	5:12	0	0	0	0		0		5:12
	30	5:12	0	0	0	0		12		23:12
	40	5:12	0	0	0	0		21		32:12
	50	4:00	0	0	0	3		29		43:00
	[8] 60	4:00	0	0	0	5		37		53:00
	70	4:00	0	0	0	7		45		63:00
	80	3:36	0	0	6	7		51		75:36
	90	3:36	0	0	10	12		56		89:36

See footnotes at end of table.

TABLE 1-26.—*Surface decompression table using oxygen*—Continued

1	2	3	4				5	6	7	8
Depth (ft, gage)	Bottom time (min) [1]	Time to first stop or surface [2]	Time (min) breathing air at water stops (ft) [3]				Surface interval [4]	Time at 40-foot chamber stop (min) on oxygen [5]	Surface [6]	Total decompression time (min: sec) [7]
			60	50	40	30				
140	13	5:36	0	0	0	0	SURFACE INTERVAL NOT TO EXCEED 5 MINUTES	0	2-MINUTE ASCENT FROM 40 FEET IN CHAMBER TO SURFACE WHILE BREATHING OXYGEN	5:36
	25	5:36	0	0	0	0		11		22:36
	30	5:36	0	0	0	0		15		26:36
	35	5:36	0	0	0	0		20		31:36
	40	4:24	0	0	0	2		24		37:24
	45	4:24	0	0	0	4		29		44:24
	50	4:24	0	0	0	6		33		50:24
	*55	4:24	0	0	0	7		38		56:24
	60	4:24	0	0	0	8		43		62:24
	65	4:00	0	0	3	7		48		70:00
	70	3:36	0	2	7	7		51		79:36
150	11	6:00	0	0	0	0		0		6:00
	25	6:00	0	0	0	0		13		25:00
	30	6:00	0	0	0	0		18		30:00
	35	4:48	0	0	0	4		23		38:48
	40	4:24	0	0	3	6		27		48:24
	45	4:24	0	0	5	7		33		57:24
	*50	4:00	0	2	5	8		38		66:00
	55	3:36	2	5	9	4		44		77:36
160	9	6:24	0	0	0	0		0		6:24
	20	6:24	0	0	0	0		11		23:24
	25	6:24	0	0	0	0		16		28:24
	30	5:12	0	0	0	2		21		35:12
	35	4:48	0	0	4	6		26		48:48
	40	4:24	0	3	5	8		32		61:24
	*45	4:00	3	4	8	6		38		73:00
170	7	6:48	0	0	0	0		0		6:48
	20	6:48	0	0	0	0		13		25:48
	25	6:48	0	0	0	0		19		31:48
	30	5:12	0	0	3	5		23		44:12
	35	4:48	0	4	4	7		29		57:48
	*40	4:24	4	4	8	6		36		72:24

[1] Time interval in minutes from leaving the surface to leaving the bottom.

[2] Time of ascent in minutes and seconds to the first stop or to the surface at a rate of 25 feet per minute.

[3] Water stops: Time spent at tabulated stops using air. If no water stops are required, use a 25-foot-per-minute rate of ascent to the surface. When water stops are required, use a 25-foot-per-minute rate of ascent to the first stop. Take an additional minute between stops. Use 1 minute for the ascent from 30 feet to the surface.

[4] Surface interval: The surface interval shall not exceed 5 minutes and is composed of the following elements:

a. Time of ascent from the 30-foot water stop to the surface (1 minute).

b. Time on the surface for landing the diver on deck and undressing (not to exceed 3 minutes and 30 seconds).

c. Time of descent in the recompression chamber from the surface to 40 feet (about 30 seconds).

[5] During the period of oxygen breathing, the chamber shall be ventilated unless an oxygen-elimination system is used.

[6] Surfacing: Oxygen breathing during this 2-minute period shall follow without interruption the period of oxygen breathing tabulated in col. 6.

[7] Total decompression time in minutes and seconds. This time includes:

a. Time of ascent from the bottom to the first stop at 25 feet per minute, col. 3.

b. Sum of tabulated water stops, col. 4.

c. One minute between water stops.

d. The surface interval, col. 5.

e. Time at 40 feet in the recompression chamber, col. 6.

f. Time of ascent, an additional 2 minutes, from 40 feet to the surface, col. 7.

The total decompression time may be shortened only by decreasing the time required to undress the diver on deck.

[8] These are the optimum exposure times for each depth and represent for the average diver the best balance of safety, length of work period, and amount of useful work. Exposure beyond these limits of time is permitted only under special conditions.

(FORMERLY TABLE 1–18, 1963 DIVING MANUAL)

TABLE 1–27.—*Surface decompression table using air*

Depth (ft)	Bottom time (min)	Time to first stop (min:sec)	Time at water stops (min)				Chamber stops (air) (min)		Total ascent time (min:sec)
			30	20	10		20	10	
40	230	0:30			3	TIME ON SURFACE NOT TO EXCEED 3 MINUTES AND 30 SECONDS		7	14:30
	250	:30			3			11	18:30
	270	:30			3			15	22:30
	300	:30			3			19	26:30
50	120	:40			3			5	12:40
	140	:40			3			10	17:40
	160	:40			3			21	28:40
	180	:40			3			29	36:40
	200	:40			3			35	42:40
	220	:40			3			40	47:40
	240	:40			3			47	54:40
60	80	:50			3			7	14:50
	100	:50			3			14	21:50
	120	:50			3			26	33:50
	140	:50			3			39	46:50
	160	:50			3			48	55:50
	180	:50			3			56	63:50
	200	:40		3			3	69	80:10
70	60	1:00			3			8	16:00
	70	1:00			3			14	22:00
	80	1:00			3			18	26:00
	90	1:00			3			23	31:00
	100	1:00			3			33	41:00
	110	:50		3			3	41	52:20
	120	:50		3			4	47	59:20
	130	:50		3			6	52	66:20
	140	:50		3			8	56	72:20
	150	:50		3			9	61	78:20
	160	:50		3			13	72	93:20
	170	:50		3			19	79	106:20
80	50	1:10			3			10	18:10
	60	1:10			3			17	25:10
	70	1:10			3			23	31:10
	80	1:00		3			3	31	42:30
	90	1:00		3			7	39	54:30
	100	1:00		3			11	46	65:30
	110	1:00		3			13	53	74:30
	120	1:00		3			17	56	81:30
	130	1:00		3			19	63	90:30
	140	1:00		26			26	69	126:30
	150	1:00		32			32	77	146:30
90	40	1:20			3			7	15:20
	50	1:20			3			18	26:20
	60	1:20			3			25	33:20
	70	1:10		3			7	30	45:40
	80	1:10		13			13	40	71:40
	90	1:10		18			18	48	89:40
	100	1:10		21			21	54	101:40
	110	1:10		24			24	61	114:40
	120	1:10		32			32	68	137:40
	130	1:00	5	36			36	74	156:40

TABLE 1-27.—*Surface decompression table using air*—Continued

Depth (ft)	Bottom time (min)	Time to first stop (min:sec)	Time at water stops (min)						Chamber stops (air) (min)		Total ascent time (min:sec)
			50	40	30	20	10		20	10	
100	40	1:30					3	TIME ON SURFACE NOT TO EXCEED 3 MINUTES AND 30 SECONDS		15	23:30
	50	1:20				3			3	24	35:50
	60	1:20				3			9	28	45:50
	70	1:20				3			17	39	64:50
	80	1:20				23			23	48	99:50
	90	1:10			3	23			23	57	111:50
	100	1:10			7	23			23	66	124:50
	110	1:10			10	34			34	72	155:50
	120	1:10			12	41			41	78	177:50
	30	1:40					3			7	15:40
	40	1:30				3			3	21	33:00
	50	1:30				3			8	26	43:00
	60	1:30				18			18	36	78:00
	70	1:20			1	23			23	48	101:00
	80	1:20			7	23			23	57	116:00
110	90	1:20			12	30			30	64	142:00
	100	1:20			15	37			37	72	167:00
120	25	1:50					3			6	14:50
	30	1:50					3			14	22:50
	40	1:40				3			5	25	39:10
	50	1:40				15			15	31	67:10
	60	1:30			2	22			22	45	97:10
	70	1:30			9	23			23	55	116:10
	80	1:30			15	27			27	63	138:10
	90	1:30			19	37			37	74	173:10
	100	1:30			23	45			45	80	189:10
130	25	2:00					3			10	19:00
	30	1:50				3			3	18	30:20
	40	1:50				10			10	25	51:20
	50	1:40			3	21			21	37	88:20
	60	1:40			9	23			23	52	113:20
	70	1:40			16	24			24	61	131:20
	80	1:30		3	19	35			35	72	170:20
	90	1:30		8	19	45			45	80	203:20
140	20	2:10					3			6	15:10
	25	2:00				3			3	14	26:30
	30	2:00				5			5	21	37:30
	40	1:50			2	16			16	26	66:30
	50	1:30			6	24			24	44	104:30
	60	1:50			16	23			23	56	124:30
	70	1:40		4	19	32			32	68	161:30
	80	1:40		10	23	41			41	79	200:30
150	20	2:10				3			3	7	19:40
	25	2:10				4			4	17	31:40
	30	2:10				8			8	24	46:40
	40	2:00			5	19			19	33	82:40
	50	2:00			12	23			23	51	115:40
	60	1:50		3	19	26			26	62	142:40
	70	1:50		11	19	30			30	75	189:40
	80	1:40	1	17	19	50			50	84	227:40
160	20	2:20				3			3	11	23:50
	25	2:20				7			7	20	40:50
	30	2:10			2	11			11	26	55:50
	40	2:10			7	23			23	39	98:50
	50	2:00		2	16	23			23	55	126:50
	60	2:00		9	19	33			33	69	169:50
	70	1:50	1	17	22	44			44	80	214:50
170	15	2:30				3			3	5	18:00
	20	2:30				4			4	15	30:00
	25	2:20			2	7			7	23	46:00
	30	2:20			4	13			13	26	63:00
	40	2:10		1	10	23			23	45	109:00
	50	2:10		5	18	23			23	61	137:00
	60	2:00	2	15	22	37			37	74	194:00
	70	2:00	8	17	19	51			51	86	239:00

TABLE 1–27.—*Surface decompression table using air*—Continued

Depth (ft)	Bottom time (min)	Time to first stop (min:sec)	Time at water stops (min)					TIME ON SURFACE NOT TO EXCEED 3 MINUTES AND 30 SECONDS	Chamber stops (air) (min)		Total ascent time (min:sec)
			50	40	30	20	10		20	10	
180	15	2:40				3			3	6	19:10
	20	2:30			1	5			5	17	35:10
	25	2:30			3	10			10	24	54:10
	30	2:30			6	17			17	27	74:10
	40	2:20		3	14	23			23	50	120:10
	50	2:10	2	9	19	30			30	65	162:10
	60	2:10	5	16	19	44			44	81	216:10
190	15	2:50				4			4	7	22:20
	20	2:40			2	6			6	20	41:20
	25	2:40			5	11			11	25	59:20
	30	2:30		1	8	19			19	32	86:20
	40	2:30		8	14	23			23	55	130:20
	50	2:20	4	13	22	33			33	72	184:20
	60	2:20	10	17	19	50			50	84	237:20

NOTE.—The ascent rates in this table are 60 feet per minute to the first stop, between stops and to the surface in the water and in the chamber. The descent rate in the chamber is also 60 feet per minute. The total ascent time may be shortened only by shortening the surface interval.

decompression in accordance with table 1–27, disregarding time spent on oxygen.

(7) Table 1–26 has not been recomputed in accordance with the concepts established in the calculation of the Standard Air Decompression Tables. There are some discrepancies in the limits of allowable exposures. However, this table is considered to be safe in its present form. Note that ascent at the rate of 25 feet per minute is required for the initial ascent when this table is used.

Air Following an Air Dive

(8) The Surface Decompression Table Using Air (table 1–27) may be used in any situation that requires surface decompression when the breathing of oxygen in a chamber is impossible. Because there is no saving of time over ordinary decompression methods, the comfort and security of the diver are the only advantages in the use of this surface decompression method.

(9) In self-contained diving, it may be impossible for the diver to carry a sufficient air supply for the duration of the entire dive and the standard decompression. If this situation occurs, the diver may surface (in accordance with either table 1–26 or 1–27) and receive the major part of his decompression in a recompression chamber. If no chamber is available, he may take (in accordance with table 1–27) the water stops in the water, surface, obtain a new air supply, and return in the water to the scheduled stop depths. However, providing *surface-supplied air or extra air cylinders* for use at the decompression stop depth, with decompression according to standard tables, is a safer and more reasonable procedure.

(10) Table 1–27 requires repetition of one stop and increases by that amount the total decompression time required by the same schedule in the Standard Air Decompression Table. There is no procedure for surface decompression following a dive on the Standard Air Decompression Table for Exceptional Exposures.

(11) Ascend from the last water stop to the surface at the rate of 60 feet per minute. Keep the time on the surface to the absolute minimum. Do not exceed the 3½-minute limit. Descend to the first chamber stop at the normal rate.

Oxygen Following a Nitrogen-Oxygen Dive

(12) Table 1–26 or table 1–27 may be used routinely for decompression from dives using nitrogen-oxygen mixtures as the breathing medium.

(13) After the corresponding equivalent air depth is determined in accordance with the procedure outlined in 1.5.3, table 1–26 or table 1–27 may be used in the standard manner.

Air Following a Nitrogen-Oxygen Dive

(14) All the previous statements relative to the use of air in surface decompression apply to nitrogen-oxygen mixed-gas diving.

(15) A high oxygen percentage mixture of nitrogen-oxygen is more efficient than air as a

breathing medium for surface decompression. Use it if it is available, but the same restrictions and precautions applicable to air apply to these mixtures as well.

Oxygen Following a Helium-Oxygen Dive

(16) Recompression chambers equipped with oxygen are available at any helium-oxygen diving operation. Surface decompression may be used as a routine procedure, as described in the following paragraphs.

(17) In tables where the first stop is 40 feet, bring the diver to 40 feet, shift his breathing medium to oxygen, and have him remain at 40 feet for 10 minutes. Surface the diver in 1 minute and return him to 40 feet in the recompression chamber on oxygen for the full time of the 40-foot stop. Not more than 5 minutes should elapse from the time the diver leaves the water stop to the time he reaches the chamber stop. During the last 5 minutes of decompression time, surface the diver at a uniform rate.

Example:

Partial pressure	100
Time of dive (minutes)	40
Time (minutes):	
Leave bottom	0
Reach 40	3
Ventilate 25 cubic feet of oxygen.	
Leave 40	13
Reach surface	14
Leave surface	16
Reach 40	16½
Leave 40	42½
Reach surface	47½

(18) In tables where the first stop is other than 40 feet, give decompression as listed until the diver reaches the 40-foot stop. Have him remain at 40 feet for a length of time equal to that of the 50-foot stop. Surface the diver in 1 minute and return him to 40 feet in the recompression chamber on oxygen for the full time of the 40-foot stop. Not more than 5 minutes should elapse from the diver's leaving the water stop to his reaching the chamber stop. During the last 5 minutes of decompression time, surface the diver at a uniform rate.

Example:

Partial pressure	160
Time of dive (minutes)	40
Leave bottom	0
Reach 60	3
Leave 60	10
Reach 50	10½
Ventilate 25 cubic feet of oxygen.	
Leave 50	20
Reach 40	20½
Leave 40	30
Reach surface	31
Leave surface	32½
Reach 40	33
Leave 40	93
Reach surface	98

Air or Helium-Oxygen Following a Helium-Oxygen Dive

(19) The use of air or helium-oxygen mixtures during surface decompression from a helium-oxygen dive is strictly an emergency procedure. The instructions in 1.5.4 (15 to 17) on emergency shifts to air or helium-oxygen mixtures apply to surface decompression.

1.5.6 OMITTED DECOMPRESSION IN EMERGENCIES

(1) Certain emergencies may interrupt or prevent specified decompression. Blowup, complete loss of communication without a standby diver, exhausted air supply, bodily injury, and the like are among such emergencies. If there are symptoms of decompression sickness or air embolism, immediate treatment by recompression (tables 1–30 and 1–31) is essential. Even without evidence of any ill effects, omitted decompression must be made up in some manner to avert later difficulty.

Use of Surface Decompression Tables

(2) It may *appear* that surface decompression schedules offer an immediate solution to the problem of interrupted decompression because they provide for a surface interval. Such schedules should *only* be used, however, *if the emergency surface interval occurs at such a time that water stops are not required or have already been completed* in accordance with whichever surface decompression table is considered most appropriate.

Surface Decompression Tables Not Applicable

(3) When the conditions in paragraph (2) above are *not* fulfilled, the diver's decompres-