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**THALMANN ALGORITHM PARAMETER SETS FOR
SUPPORT OF CONSTANT 1.3 ATM PO₂ HE-O₂ DIVING
TO 300 FSW**



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14. ABSTRACT The current Navy Dive Computer (NDC) and Navy Dive Planner (NDP) can only support 1.3 atm PO ₂ He-O ₂ diving to a maximum depth of 200 feet of sea water (fsw), not the 300 fsw maximum depth supported by the 1.3 atm PO ₂ He-O ₂ Decompression Tables in the <i>U.S. Navy Diving Manual</i> . In these tables, schedules for depths deeper than 200 fsw are computed using the LEM-he8n25 probabilistic decompression model with a target probability of decompression sickness (P _{DCS}) of 2.3 %. Probabilistic decompression algorithms are too computationally expensive to be implemented in a diver-worn decompression computer (dive computer) such as the NDC. Previously, the XVal-He-4 and XVal-He-4B parameterizations of the Thalmann Algorithm were developed to emulate the LEM-he8n25 2.3 % P _{DCS} 1.3 atm PO ₂ He-O ₂ decompression schedules for depths of 200 fsw and shallower. The Thalmann Algorithm is the computationally inexpensive deterministic decompression algorithm currently implemented in the NDC and NDP. This work refined the technique used to generate the XVal-He-4 and XVal-He-4B parameters and used the refined technique to produce new parameter sets. With the new parameter sets XVal-He-9_023, XVal-He-9_040, and XVal-He-9_050, the Thalmann Algorithm can compute decompression schedules for undersea operations to depths up to 300 fsw and with P _{DCS} near 2.3 %, 4 %, or 5 %, respectively. The Thalmann Algorithm with these parameter sets can be implemented in currently available dive computer hardware.									
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INTRODUCTION

The current Navy Dive Computer (NDC) used for MK 16 MOD 1 He-O₂ diving (NSW He III 200-1.3)¹ and the Navy Dive Planner (NDP)² can only support MK 16 MOD 1 He-O₂ diving to a maximum depth of 200 feet of sea water (fsw), not the 300 fsw maximum normal exposure depth supported by the 1.3 atm PO₂ He-O₂ Decompression Tables in the *U.S. Navy Diving Manual*.³ This depth limitation is because 1.3 atm PO₂ He-O₂ decompression schedules in the *U.S. Navy Diving Manual* for depths deeper than 200 fsw and those for depths of 200 fsw and shallower were computed using different decompression algorithms, and it is the algorithm used to calculate the shallower schedules that is implemented in NDC and NDP.

The 1.3 atm PO₂ He-O₂ Decompression Tables in the *U.S. Navy Diving Manual* for depths deeper than 200 fsw were computed using the linear-exponential multi-gas 'probabilistic' decompression model parameterized with the LEM-He parameter set (LEM-He) in conjunction with a search algorithm to find the shortest decompression schedules not exceeding 2.3 % estimated probability of decompression sickness (P_{DCS}).⁴ To facilitate producing repetitive diving schedules in the 1.3 atm PO₂ He-O₂ Decompression Tables for depths of 200 fsw or shallower, these schedules were computed with the 'deterministic' U.S. Navy Thalmann Algorithm^{5,6} parameterized with XVal-He-4. XVal-He-4 is a parameter set that causes the Thalmann Algorithm to compute decompression schedules similar to those produced by LEM-He with the 2.3 % target P_{DCS} for dives to depths of 200 fsw and shallower.⁴

Producing a probabilistic decompression schedule is compute-intensive, and the required algorithm is not implemented in any diver-worn real-time decompression computer (dive computer). Deterministic decompression algorithms are not compute-intensive, and these are implemented in dive computers. It is the Thalmann Algorithm that is implemented in the NDC and NDP. XVal-He-4 will not produce schedules for 1.3 atm PO₂ dives to depths deeper than 211 fsw and is therefore unsuitable for use in an NDC in the event a diver exceeds 211 fsw depth. An empirical modification to XVal-He-4, denoted XVal-He4B, overcomes this limitation⁷, and it is the XVal-He4B Thalmann Algorithm which is implemented in the NSW He III 200-1.3 NDC and NDP. However, for dives deeper than 200 fsw, the XVal-He4B Thalmann Algorithm produces decompression schedules with unacceptably high estimated P_{DCS}.⁷ Therefore the NSW He III 200-1.3 NDC is authorized only for use to 200 fsw and there is no NDC which supports deeper 1.3 atm PO₂ He-O₂ diving.

We have identified shortcomings in the approach used to produce the XVal-He-4 and XVal-He4B parameter sets, and developed a method to produce parameter sets to cause the Thalmann Algorithm to compute near-uniform-P_{DCS} decompression schedules across a broader range of depths and bottom times. In this report we describe the development of a parameter set for the Thalmann Algorithm that closely emulates the 1.3 atm PO₂ He-O₂ Decompression Tables in the *U.S. Navy Diving Manual* across the entire 300 fsw operational depth range. In addition, we describe development of parameter sets for accelerated decompression from 1.3 atm PO₂ He-O₂ dives that

emulate LEM-he8n25 1.3 atm PO₂ He-O₂ decompression schedules with 4 % and 5 % target P_{DCS}. These parameter sets could be programmed into currently available dive computers and dive planning software that use the Thalmann Algorithm to compute decompression schedules.

METHODS

The general approach was to produce parameter sets for the Thalmann Algorithm that cause it to compute decompression schedules that emulate those produced by the LEM-he8n25 probabilistic decompression model. The method assumes that a large data set of schedules contains sufficient information to parameterize the Thalmann Algorithm and that the Thalmann Algorithm is sufficiently flexible to emulate LEM schedules. The validity of the former assumption has been confirmed in previous work by computing a large data set of VVal-18 Thalmann Algorithm schedules and then using the methods that will be outlined below to extract parameters from those schedules that matched the VVal-18 parameter set.⁴ The latter assumption is reasonable since the Thalmann Algorithm and the LEM model have similar structures. Both are 'gas content models', which schedule decompression to limit gas supersaturation (sum of dissolved gas partial pressures greater than ambient pressure) in a collection of gas exchange compartments representing theoretical tissue sites. In both the LEM model and the Thalmann Algorithm the compartments exchange gas with the blood but not each other, and compartmental gas kinetics can transition from exponential to linear if there is sufficient compartmental gas supersaturation.

LEM-he8n25 is a probabilistic decompression model which estimates P_{DCS} of a dive profile (depth/time/breathing gas history) as a function of the duration and magnitude of gas supersaturation in three compartments. Probabilistic decompression models are calibrated by optimization of their parameters to best fit the occurrence and time of onset of decompression sickness (DCS) associated with well-defined dive profiles of actual man-dives.^{8,9} In the case of LEM-he8n25, fitted model parameters include compartment gas kinetic half-times and supersaturation thresholds for risk accumulation and onset of linear kinetics. The 'he8n25' database includes 4,669 air, nitrox, heliox, and trimix dives with 242 cases of DCS and 118 cases of marginal DCS (fleeting symptoms that resolved spontaneously).⁴ In conjunction with a search algorithm, probabilistic decompression models can be used to compute a decompression schedule by finding the shortest schedule not exceeding a target estimated P_{DCS}.^{4,10} The current search algorithm has a high computational cost because hundreds of thousands of candidate schedules may be evaluated during each search (see Figure 1).⁴

The Thalmann Algorithm is a deterministic decompression algorithm in which decompression schedules are computed so that depth-dependent maximum permissible tissue compartment gas tensions (MPTTs or M-values) in a collection of compartments are not exceeded (see Appendix A for more detail). Because a single analytical solution exists for any model state, deterministic decompression algorithms are computationally inexpensive. Thalmann Algorithm parameter sets include a table defining compartment half-times and the MPTT at each decompression stop depth in

each compartment. Traditionally, MPTT tables are constructed from surfacing MPTT values (sometimes referred to as M_0 values) that are defined to just allow well accepted no-stop bottom times. These surfacing values are then projected to decompression stop depths, generally as linear functions of depth.^{11,12} Decompression schedules computed with candidate MPTT tables may be man-dived, and if the incidence of DCS is unacceptable the MPTT table adjusted. This process is iterated until an acceptable level of DCS results from the man-diving (see Figure 1).

Deterministic decompression algorithms developed as just described typically compute decompression schedules that have increasing P_{DCS} with increasing depth and bottom time (see for instance reference 12). To our knowledge, NEDU has produced the only deterministic decompression algorithms (Thalman Algorithm with the XValSS-DISSUB7, XVal-He-4, and XVal-He-4B parameter sets) that compute schedules with near-uniform P_{DCS} .^{4,7,13} This has been accomplished by producing a large ‘standard set’ of decompression schedules with a probabilistic decompression model with a specified target P_{DCS} and then using least squares optimization of Thalman Algorithm parameters to fit the Thalman Algorithm schedules to the standard set schedules (see Figure 1). A refinement of the techniques used to produce these earlier parameter sets was used in the current work.

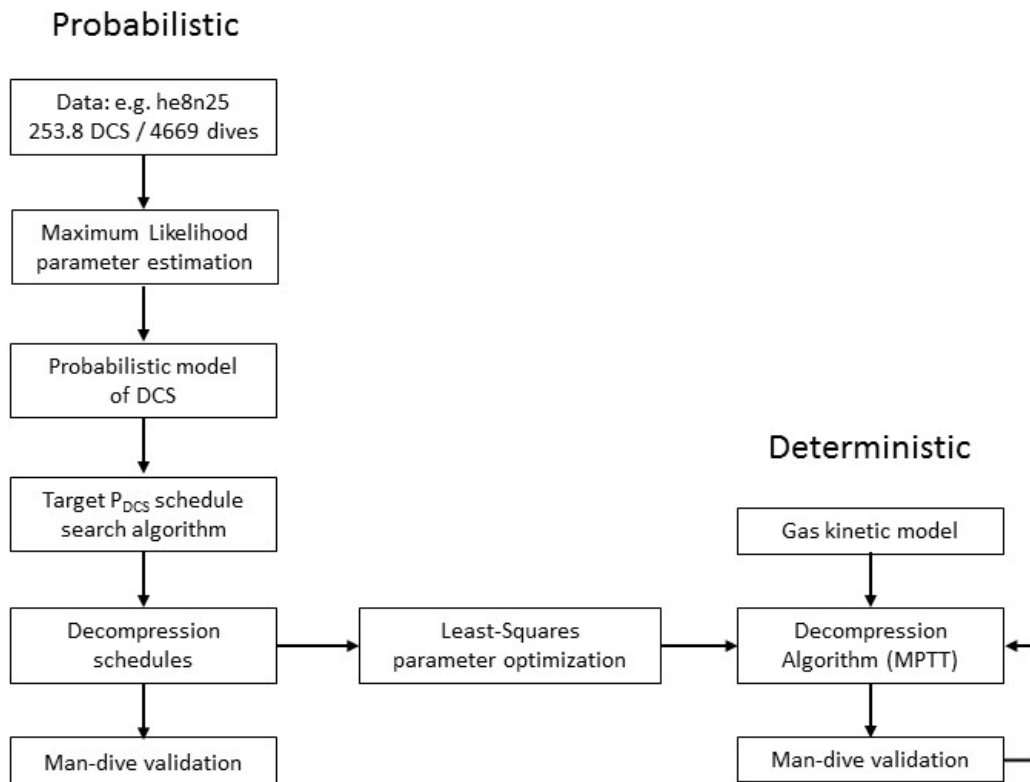


Figure 1. Deterministic decompression algorithms, probabilistic decompression models, and mapping of deterministic algorithms to probabilistic schedules (adapted from Figure 3 in reference 4).

DATA

The Thalmann Algorithm was optimized about standard sets of 6,500 dive profiles generated from a single set of 6,500 profile templates in planner coordinate format (PCF). PCF profile templates, which describe incomplete dive profiles for which decompression schedules are to be computed, serve as input for the Thalmann Algorithm and probabilistic dive planner.⁵ 6,250 PCF profiles were single or repetitive square dives (bottom time spent at one depth) randomly generated according to the parameters in Table 1 using a previously developed FORTRAN tool.⁴ The remaining 250 PCF templates were single multilevel profiles generated by a script written in R: A language and environment for statistical computing (R Foundation for Statistical Computing; 2017). There were 170 multilevel templates that had the bottom time spent at two depths, with the total bottom time and depths randomly selected from the ranges in Table 1. The remaining 80 multilevel templates had a 1–3 hour hold at 20 fsw breathing 1.3 atm PO₂ prior to descent to a maximum depth of 140–300 fsw for up to 120 minutes. Decompression schedules for each of the 6,500 PCF templates were then generated with the probabilistic decompression planner operating the LEM-he8n25 probabilistic model.^{4,10} Separate standard sets of completed dive profiles were generated with LEM-he8n25-estimated target P_{DCS} of 2.3 %, 3 %, 3.5 %, 4 %, 4.5 %, and 5 %, although not all sets were used in the present work. Decompression stop times were computed to 1-minute resolution.

Table 1: Parameters used to randomly generate the PCF templates for the standard set.

Parameter	Value
Number of Profiles	6,500
Depths	40 – 300 fsw in 10 fsw increments
Bottom Times	5 – 240 min in 5 min increments
Descent Rate	60 fsw/min
Ascent Rate	30 – 120 fsw/min in 5 min increments
Surface Interval	15 – 720 min in 5 min increments
Maximum Number of Repetitive Dives	2

A second set of PCF profile templates was built to validate performance of the Thalmann Algorithm with candidate parameter sets on repetitive dives. This set consisted of 1,024 templates, each containing at least one repetitive dive randomly generated according to the parameters in Table 2 and Table 3. Bottom times were restricted to the longest bottom times that are assigned a repetitive group in the 1.3 atm PO₂ He-O₂ Decompression Table in *U.S. Navy Diving Manual, Revision 7*, as detailed in Table 3. The resulting PCF templates were completed with decompression schedules computed with the Thalmann Algorithm DMDB7 subroutine^{5,6} and candidate parameter sets. LEM-he8n25-estimated P_{DCS} was calculated for the resulting decompression schedules.

Table 2: Parameters used to randomly generate the PCF profiles for the repetitive dive validation set.

Parameter	Value
Number of Profiles	1,024
Depth Range	50 – 200 fsw in 10 fsw increments
Bottom Times	See Table 3
Descent Rate	60 fsw/min
Ascent Rate	30 fsw/min
Surface Interval	5 – 720 min in 5 min increments
Maximum Number of Repetitive Dives	2

Table 3: Maximum allowable bottom times in the repetitive dive validation set

Depth (fsw)	Bottom Time	Depth (fsw)	Bottom Time
50	360	130	45
60	170	140	30
70	90	150	35
80	65	160	25
90	55	170	30
100	45	180	25
110	40	190	20
120	35	200	25

OPTIMIZATION

Optimization of Thalmann Algorithm parameters was accomplished with a modified version of a previously developed FORTRAN tool.⁴ The process by which Thalmann Algorithm decompression is computed, and how the algorithm parameters can be optimized, is summarized here. We define the MPTT (M) in the i^{th} of n compartments as a function of depth (D) and a vector β_i of Ω parameters as:

$$M_{i,D} = f(\beta_i, D); [\beta_{i,1}, \dots, \beta_{i,\Omega}]. \quad (1)$$

Decompression begins by ascending to the shallowest depth at which none of the MPTTs are exceeded; i.e., the shallowest depth D_λ where the following condition is satisfied:

$$(p_i - M_{i,D_\lambda}) \leq 0, \quad (2)$$

where p_i is the inert gas tension^a in the i^{th} compartment, D_λ is an integer multiple of the stop depth increment ($D_\lambda = \lambda \cdot DINC; \lambda = 0, 1, 2, 3, \dots$), and M_{i,D_λ} is the MPTT of the i^{th} compartment at the stop depth. Ascent to each subsequent stop occurs when

$$\max[(p_i - M_{i,D_{\lambda-1}}), i = 1, 2, \dots, n] = 0. \quad (3)$$

Ascent continues in this fashion ascending from stop-to-stop (decrementing λ) until D_0 , the surface, is reached. The compartment i that satisfies the left-hand side of equation 3 is the controlling compartment for that stop.

A parameter vector β can be found for equation (2) to produce a MPTT table that causes the Thalmann Algorithm to emulate LEM-he8n25 schedules in a particular standard set. The process entails minimizing the sum of squares error (SSE) between the standard LEM-he8n25 profiles and Thalmann Algorithm prescriptions for the same dives computed with MPTT tables from various trial β s. As in earlier work,⁴ such minimizations were performed in present work using the Levenberg-Marquardt numerical optimization algorithm.¹⁴ The scope of any resultant Thalmann Algorithm emulation is limited to the target P_{DCS} and range of profiles in the standard set against which the optimization was performed (e.g., see Table 1).

XVal-He-4 is an example of a MPTT table generated by SSE minimization in which equation (3) was modified by assuming the compartment with the greatest tissue tension at the end of a stop is the controlling compartment:⁴

$$(p_i - M_{i,D_{\lambda-1}})|_{p_{i,max}} = 0, \quad (4)$$

where $p_{i,max}$ is the maximum tissue tension at the end of stop λ . With equation (4) as the definition of the controlling compartment for stop λ , SSE for XVAL-He-4 was calculated as:

$$SSE = \sum_{\eta=1}^N \sum_{\delta=1}^{A_\eta} \sum_{\lambda=A_{\eta,\delta}}^1 \left((p_{i,\eta,\delta,\lambda} - M_{i,D_{\lambda-1}})|_{p_{i,\eta,\delta,\lambda}} \right)^2, \quad (5)$$

^a The Thalmann Algorithm was previously called the EL-RTA, and MPTT was defined as the maximum permissible tissue inert gas tension. Some algorithms, including Thalmann's DCM-II, have used MPTT that include other gases in addition to the inert gases.

for N dive profiles with Δ dives on each profile and Λ decompression stops. Note that $\Delta = 1$ for the XVal-He-4 standard set, a convention that was also adopted for the standard sets in present work.

However, the compartment with the greatest end-stop tissue tension is not always the controlling compartment. This situation was accommodated in NEDU TR 02-10 by incorporating equation (3) into a definition of SSE that was not used to calculate XVal-He-4 or any of the parameter sets presented here:⁴

$$SSE = \sum_{\eta=1}^N \left\{ \sum_{\delta=1}^{\Delta_{\eta}} \left\{ \sum_{\lambda=\Lambda_{\eta,\delta}}^1 (\max[(p_{i,\eta,\delta,\lambda} - M_{i,D_{\lambda-1}}), i = 1, 2, \dots, n])^2 \right\} \right\}. \quad (6)$$

This definition treats each individual decompression stop as a measurement and squares its error. In present work we treated each individual profile as a measurement by squaring the sum of the error accumulated by the decompression stops in each profile, rewriting equation (6) as:

$$SSE = \sum_{\eta=1}^N \left\{ \sum_{\delta=1}^{\Delta_{\eta}} \left\{ \sum_{\lambda=\Lambda_{\eta,\delta}}^1 |\max[(p_{i,\eta,\delta,\lambda} - M_{i,D_{\lambda-1}}), i = 1, 2, \dots, n]| \right\}^2 \right\}. \quad (7)$$

Equation (7) uses the more rigorous definition of the controlling compartment provided in equation (3). Because the difference between tissue tension and MPTT in equation (7) may be either positive or negative at the end of a stop, the absolute value of the maximum difference was taken to prevent differences of opposite signs from cancelling each other in the summation. Treating each profile as an observation considers that stops within a given profile are a time series of dependent events.

In accord with earlier MPTT tables developed for the Thalmann Algorithm, MPTTs were a linear function of stop depth. The specific form of the MPTT table generating function optimized in the present work was:

$$M_i = \beta_{i,0} + \beta_{i,1}D. \quad (8)$$

In addition to the table of MPTTs, Thalmann Algorithm parameter sets include several parameters that are not compartment-specific. These parameters were fixed at the values used in VVal-18 and XVal-He-4 as follows (all in fsw): PACO₂ = 1.5; PVCO₂ = 2.3; PVO₂ = 2; PH₂O = 0; AMBAO₂ = 0; PBOVP = 0. PACO₂ is the arterial partial pressure of carbon dioxide, PVCO₂ is the venous partial pressure of carbon dioxide, PVO₂ is the venous partial pressure of oxygen, PH₂O is the partial pressure of water

vapor, AMBAO₂ is the ambient-arterial oxygen gradient, and PBOVP is a threshold for linear gas washout.

DETERMINATION OF COMPARTMENT HALF-TIMES

A principal shortcoming of the earlier method used to produce the XVal-He-4 and XValSS-DISSUB7 parameter sets is that it used a fixed set of nine compartments with blood:tissue gas exchange half-times equal to the empirical half-times of earlier Thalmann Algorithm parameter sets. It was found in the present work that emulation of LEM-he₂₅ probabilistic schedules to 300 fsw requires half-times not included in these earlier parameter sets, and can be accomplished with fewer than nine compartments. The superfluous compartments from these earlier parameter sets become nuisance parameters that can produce undesirable behavior. In the present work, three approaches were tried to select the appropriate number of compartments with the appropriate half-times. Two approaches to using the mapping software to fit compartment half-times to the training data sets were tried unsuccessfully. One approach was to treat the half-times as fitted parameters and the other approach was to fit multiple compartments with a range of half-times. Because neither approach resulted in good fits to the standard sets, these approaches were abandoned in favor of choosing compartment half-times guided by inspection of characteristic decompression stop times in exploratory decompression tables computed with LEM-he₃₅ with the same target P_{DCS} values used to compute the standard sets. The exploratory decompression tables were calculated with LEM-he₂₅ for depths from 80 to 300 fsw in 10-fsw increments, for bottom times from 10 to 240 minutes in 10-minute increments at each depth, and without travel time in decompression stop times. Excerpts of these tables appear in the results section. Inspection of the schedules in these tables reveals three characteristic decompression stop times. The deepest stops are about 2–3 minutes in duration and the intermediate stops are about 10–11 minutes in duration, irrespective of the target P_{DCS}. Shallow stops at 30 fsw and deeper are about 80–95 minutes in duration, depending on the target P_{DCS}. The longest of 20 fsw last stops are about twice the characteristic duration of shallow stops.

Figure 2 illustrates the relationship between decompression stop times (2.3 % target P_{DCS}) and the washout of inert gas from the three LEM-he₂₅ compartments. The sum of inert gas partial pressures shown for each compartment in the figure consists predominantly of helium, which has compartmental gas exchange half-times of 10, 22, and 202 minutes. The short, deep stops act to limit supersaturation in the fast, 10-minute helium half-time compartment. The intermediate stops act to limit supersaturation in the intermediate, 22-minute helium half-time compartment. The fast and intermediate compartments are supersaturated, and manifest linear washout throughout the short and intermediate stops, respectively. The long, shallow stops act to limit supersaturation in the slow, 202-minute helium half-time compartment. The slow compartment is only supersaturated for the initial portion of these stops. This compartment does not manifest linear gas washout in LEM-he₂₅, irrespective of the level of supersaturation.

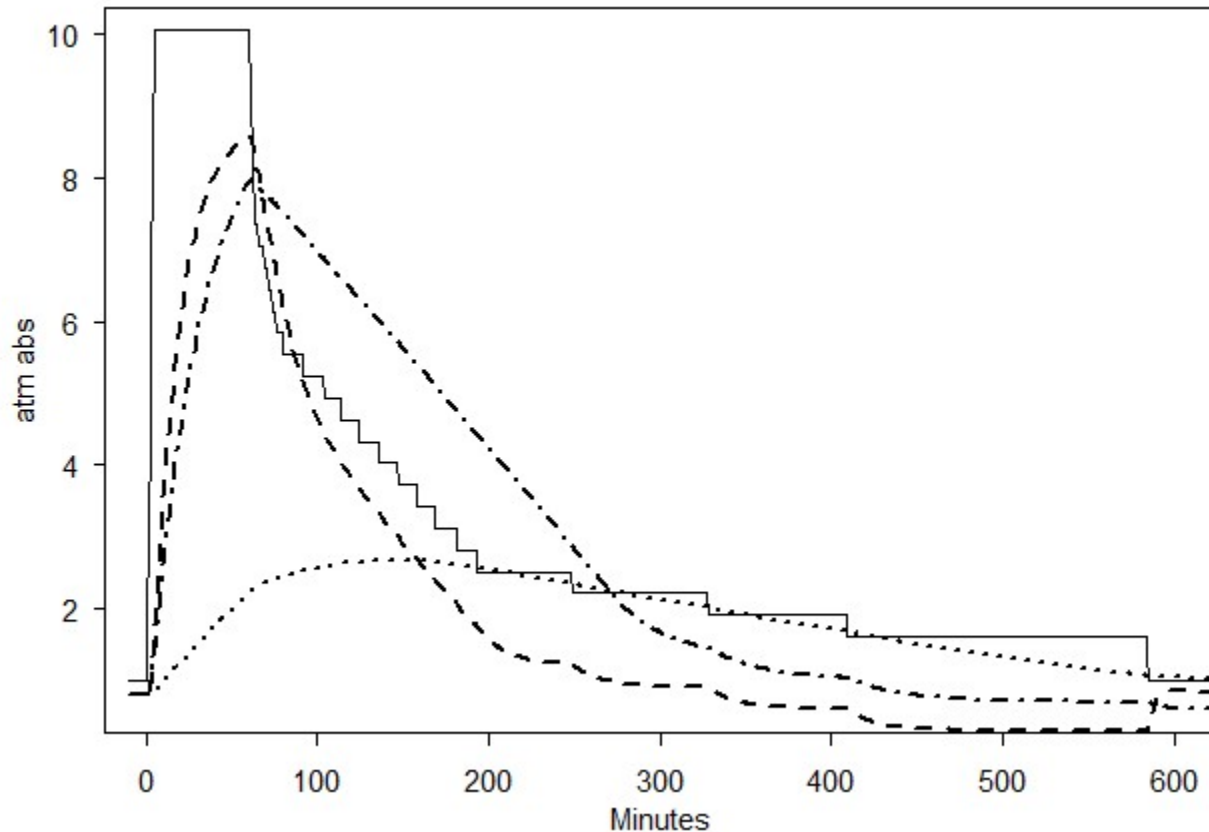


Figure 2. LEM-he8n25-modelled inert gas uptake and washout during a 300 fsw for 60-minute bottom time 1.3 atm constant PO_2 He- O_2 decompression schedule as given in Table 4. The solid line is the ambient pressure. The broken lines are the sums of inert gas partial pressures (as they would be if the all gas were in solution) in each of the three compartments in LEM-he8n25. For the fast half-time (dashed) and slow half-time (dotted) compartments the inert gases are helium and nitrogen. In the intermediate half-time compartment (dot-dash) the "inert" gases are helium, nitrogen, and any component of inspired oxygen partial pressures (PIO_2) above 0.91 atm (positive values of $PIO_2 - 0.91$ atm). Except for this latter contribution of oxygen, compartmental oxygen, carbon dioxide, and water vapor partial pressures are zero in LEM-he8n25.

The Thalmann Algorithm has exponential-linear kinetics that manifest in a similar fashion to those illustrated for LEM-he8n25 in Figure 2. With constant inspired PO_2 and linear gas washout, the Thalmann Algorithm produces decompression stop times that are dependent on the controlling compartment half-time, and are independent of depth. This relationship was used to guide the selection of Thalmann Algorithm half-times that would produce the characteristic stop times of the LEM-he8n25 decompression schedules.

Thalman Algorithm gas kinetics are exponential unless:

$$P_{amb} < p_i + P_{FVG} - PBOVP \quad (9)$$

where $P_{FVG} = PVO_2 + PVCO_2 + PH_2O$, in which case gas kinetics are linear. P_{amb} is the ambient pressure, P_{FVG} is the partial pressure of fixed venous gases ($PVO_2 + PVCO_2 + PH_2O$). The update for tissue inert gas partial pressure over a dive profile segment with linear gas washout is:

$$p_i = p_{i.0} + \left[(P_{a.0} - P_{amb.0} + P_{FVG} - PBOVP) \times t + (R_a - R_{amb}) \times t^2 / 2 \right] \times \ln 2 / HT \quad (10)$$

where $p_{i.0}$, $P_{a.0}$, and $P_{amb.0}$ are the tissue inert gas pressure, arterial inert gas pressure, and ambient pressure at the beginning of the segment, t is duration of the segment, HT is half-time, and R_a and R_{amb} are the rates of change in arterial inert gas pressure and ambient pressure during the segment. For an isobaric segment such as a decompression stop, P_a and P_{amb} are constant, and R_a and R_{amb} are zero so that the second term inside the square brackets disappears. Solving the isobaric update equation for HT gives:

$$HT = \frac{(P_a - P_{amb} + P_{FVG} - PBOVP)}{p_i - p_{i.0}} \times \ln(2) \times t \quad (11)$$

For most decompression stops, $p_i - p_{i.0}$ is approximately $-\beta_1 \times DINC$, where β_1 is the slope of the MPTT generating function (commonly $\beta_1 = 1$) and $DINC$ is the stop depth increment (in this work $DINC = 10$ fsw). For the first stop controlled by a particular compartment, $p_i - p_{i.0}$ may be less than $-\beta_1 \times DINC$. Using Thalman Algorithm conventions and the blood parameters specified in the methods (page 7), the arterial PO_2 for constant 1.3 atm inspired PO_2 is:

$$\begin{aligned} P_{AO_2} &= P_{IO_2} \times (1 - PH_2O/P_{amb}) = 1.3 \text{ atm} \times 33 \frac{\text{fsw}}{\text{atm}} \times (1 - 0/P_{amb}) \\ &= 42.9 \text{ fsw} \end{aligned} \quad (12)$$

and the arterial inert gas partial pressure is:

$$P_a = P_{amb} - (P_{AO_2} + PACO_2 + PH_2O) = P_{amb} - (42.9 \text{ fsw} + 1.5 \text{ fsw} + 0 \text{ fsw}) \quad (13)$$

Substituting into the HT equation

$$\begin{aligned}
 HT &= \frac{(P_{amb} - 44.4 fsw - P_{amb} + 4.3 fsw - 0)}{-\beta_1 \times DINC} \times \ln(2) \times t \\
 &= \frac{40.1}{\beta_1 \times 10} \times \ln(2) \times t
 \end{aligned}
 \tag{14}$$

Equation (14) was used with characteristic stop times of LEM-he8n25 schedules, t , to guide selection of Thalmann Algorithm half-times.

RESULTS

TARGET P_{DCS} 2.3 % PARAMETER SETS

Table 4 is an excerpt of the exploratory table of LEM-he8n25 2.3 % target P_{DCS} 1.3 atm PO₂ He-O₂ schedules. Inspection of these schedules reveals the three characteristic decompression stop durations: short, deep stops of 2–3 minutes duration; intermediate stops of 10–11 minutes duration; and the long shallow stops of about 80 minutes duration (median of stops 70 minutes or longer and 30 fsw or deeper). The longest 20 fsw last stops are about twice the characteristic duration of shallow stops.

In all Thalmann Algorithm fits to the 2.3 % P_{DCS} standard set β_1 was fixed equal to one. Table 5 shows some pairs of Thalmann Algorithm half-times and decompression stop times calculated for 1.3 atm PO₂, linear gas washout, $\beta_1 = 1$, and $DINC = 10$ using equation (14). These conditions and parameters are used in the following development unless otherwise noted. Parameter sets in which the fastest half-time had values of 6 to 10 minutes produced similar fits to the standard set. A Thalmann Algorithm MPTT table with a 10-minute half-time was selected for the fastest compartment, the same as the fastest helium half-time in LEM-he8n25.

A Thalmann Algorithm half-time of about 30 minutes will produce decompression stop times of 10–11 minutes. However, MPTT tables arising from fit of a 30-minute half-time to the standard set resulted in poor emulation of LEM-he8n25 decompression schedules for dives with bottom times longer than about 110 minutes. Such Thalmann Algorithm schedules had 11-minute stops starting deeper than in the corresponding LEM-he8n25 schedules. In Table 4, for the 300 fsw schedules, the dotted line indicates that the depth of the first 11-minute stop increases with increasing bottom time until a bottom time of 110 minutes and there is no further increase in depth of the first 11-minute stop for longer bottom times. A similar pattern is evident for the 200 fsw schedules, and the pattern is repeated for all bottom depths (not shown). However, in Thalmann Algorithm schedules calculated with a 30-minute half-time, the depth of the first 11-minute stop increased with bottom time longer than 110 minutes. The LEM-he8n25 behavior could be emulated by manipulating the Thalmann Algorithm compartment Saturation / Desaturation Ratio (SDR) parameter. Setting the SDR to a value other than one causes compartment gas uptake (saturation) and gas washout

(desaturation) to occur with different half-times. An intermediate compartment with half-time of 20 minutes (gas uptake) with SDR = 0.67 was found to emulate the LEM-he8n25 behavior. With a 20-minute half-time for gas uptake, near-equilibrium with inspired gas is reached at about 120 minutes of bottom time (6 half-times), and there is little change in the decompression stops governed by such a compartment with longer bottom times. With a 20-minute half-time and SDR = 0.67, gas washout occurs with approximately a 30-minute half-time and produces 11-minute stops.

Table 4. Excerpt of LEM-he8n25 2.3 % P_{DCS} 1.3 atm PO₂ He-O₂ exploratory table

BT (min)	DECOMPRESSION STOPS (fsw)																														
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20										
200 fsw																															
10																				1	2										
20																1	2	2	3	2	18										
30														2	2	2	3	2	2	9	68										
40									1	2	2	2	2	2	3	8	11	12	102												
50									2	2	3	2	3	11	11	11	12	134													
60								1	2	2	2	4	11	11	11	11	11	166													
70								1	3	2	2	10	11	11	12	11	11	36	170												
80								2	2	2	6	11	11	11	12	11	62	172													
90								2	3	2	9	11	10	11	12	18	84	170													
100								2	2	3	11	11	11	11	11	42	81	175													
110								2	2	5	11	11	10	11	11	66	82	174													
120								2	2	6	11	11	11	10	21	79	81	176													
130								2	2	7	11	11	10	11	43	80	81	175													
140								2	2	8	11	10	11	12	63	79	82	176													
150								2	2	8	11	11	10	11	83	79	81	180													
160								2	2	8	11	11	11	28	87	79	81	179													
170								2	2	8	11	11	11	51	83	78	81	181													
180								2	2	8	11	11	11	76	77	79	80	182													
300 fsw																															
10																2	2	2	3	2	8										
20										5	2	2	3	2	2	2	7	12	12	95											
30									5	2	2	2	2	3	3	3	12	11	11	11	13	167									
40									3	2	2	3	2	2	2	4	11	11	11	11	12	77	172								
50									1	2	2	2	3	2	2	6	12	11	10	11	12	11	10	10	11	69	81	175			
60									2	3	2	2	2	4	11	12	10	10	11	11	11	10	12	12	55	79	81	175			
70									1	2	2	2	3	6	11	11	10	11	11	11	10	11	10	11	28	85	79	81	180		
80									1	2	3	2	5	11	11	11	11	10	11	10	11	10	11	11	10	11	78	77	79	81	182
90									2	2	2	3	12	9	11	11	10	11	11	10	11	10	11	28	97	78	79	81	184		
100									2	2	2	7	11	11	11	10	11	10	11	10	11	10	11	77	84	77	79	82	185		
110									2	2	2	10	11	11	10	11	10	11	11	10	10	11	18	108	76	77	79	82	188		
120									2	2	4	10	11	11	10	11	10	11	11	10	11	10	59	97	76	78	79	81	190		
130									2	2	5	11	10	11	11	10	11	10	11	10	11	10	11	101	83	76	78	80	81	191	
140									2	2	6	11	10	11	11	10	11	10	11	11	11	42	108	75	76	78	80	81	190		
150									2	2	7	11	10	11	11	10	10	11	10	11	11	77	97	75	77	78	80	82	192		
160									2	2	7	11	11	10	11	11	10	10	11	11	18	109	83	75	77	78	80	82	194		
170									2	3	7	10	11	10	11	11	10	11	10	11	50	112	74	75	77	79	80	82	194		
180									2	2	8	11	10	11	11	10	10	11	11	10	88	98	74	76	77	79	79	83	195		

Table 5. Thalmann Algorithm half-times and characteristic decompression stop times for 1.3 atm PO₂, linear gas washout, $\beta_I=1$, and $DINC=10$.

Stop Time	Half-Time
2	6
3	8
4	11
7	20
10	28
11	31
80	222

To produce decompression stops of about 80 minutes duration requires a half-time in the vicinity of 200 minutes. As is evident in Figure 2, during these shallow stops the inert gas partial pressure in a compartment with such a half-time will mostly be lower than ambient pressure, and as a result gas washout will mostly be exponential in the Thalmann Algorithm with PBOVP = 0. With exponential gas washout, the relationship between half-time and stop duration is depth-dependent, so it was not possible to select a unique half-time a priori. By trial and error, a 210 minute half-time was found to produce the best fit to the 2.3 % P_{DCS} standard set and produce good Thalmann Algorithm tables.

Table 6. XVal-He-8_023 MPTT generating parameters. Fixed values in square brackets.

Half-Time	[10]	[20]	[210]
SDR	[1]	[0.67]	[1]
β_0 (atm)	1.693	2.202	0.731
M ₀ (fsw)	66.016	82.825	34.165
β_1	[1]	[1]	[1]

Table 6 shows the MPTT generating parameters arising from fit of the Thalmann Algorithm to the 2.3 % P_{DCS} standard set. MPTT tables generated from these parameters are designated XVal-He-8_023, with digits after the underscore representing the target P_{DCS} of the standard set. The half-times, SDR, and β_1 were fixed and the β_0 were fitted. The M₀ values are calculated from the β_0 values.^b The XVal-He-8_023 MPTT table is given in Appendix A. Example XVal-He-8_023 decompression schedules are given in Table 7. For comparison with the exploratory table, the example schedules are calculated without travel time in stops.

^b Unlike the Thalmann Algorithm which uses the U.S. Navy rounded conversion factor of 33 fsw/atm, the fitting software uses the conversion factor 33.078 fsw/atm, and this factor was used to calculate M₀ values in fsw from the β_0 values.

Table 7. XVal-He8_023 and XVal-He-9_023 Thalmann Algorithm 1.3 atm PO₂ He-O₂ schedules (300 fsw)

BT (min)	DECOMPRESSION STOPS (fsw)																				
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20
XVal-He-8_023 300 fsw																					
10														1	3	3	4	3	3	3	10
20							2	3	3	4	3	3	3	4	3	3	3	11	10	112	
30				4	3	3	3	4	3	3	3	4	3	8	11	10	11	10	17	177	
40		3	3	4	3	3	3	4	3	3	8	10	11	10	10	11	10	17	77	178	
50		3	3	4	3	3	3	4	3	9	11	10	11	10	10	11	10	11	76	77	178
60	1	4	3	3	3	4	3	9	10	11	10	10	11	10	11	10	10	65	77	78	177
70	2	3	4	3	3	5	10	10	11	10	11	10	10	11	10	11	47	77	77	78	177
80	3	3	3	3	5	10	11	10	10	11	10	11	10	11	10	24	78	77	77	78	177
90	3	3	3	4	9	11	10	11	10	10	11	10	11	10	10	65	77	78	77	77	178
100	3	3	3	7	10	11	10	10	11	10	11	10	10	11	35	78	77	77	78	77	178
110	3	3	4	9	10	10	11	10	11	10	10	11	10	11	69	78	77	78	77	77	178
120	3	3	4	10	11	10	11	10	10	11	10	11	10	36	78	77	78	77	77	78	177
130	3	3	5	11	10	11	10	10	11	10	11	10	11	67	77	78	77	78	77	77	178
140	3	3	6	11	10	11	10	10	11	10	11	10	32	77	78	77	77	78	77	78	177
150	3	3	7	11	10	10	11	10	11	10	10	11	61	77	78	77	78	77	77	78	177
160	3	3	8	10	10	11	10	11	10	10	11	23	77	78	77	78	77	77	78	77	178
170	3	3	8	10	11	10	11	10	10	11	10	51	78	77	78	77	77	78	77	78	177
180	3	3	8	11	10	10	11	10	11	10	11	78	77	77	78	77	77	78	77	78	177
XVal-He-9_023 300 fsw																					
10																1	3	3	3	4	6
20								2	3	3	3	4	3	3	3	7	10	11	97		
30						3	4	3	3	3	4	3	5	10	11	10	10	11	10	171	
40				3	3	3	4	3	3	6	11	10	10	11	10	11	10	10	73	177	
50			3	3	3	4	3	9	10	11	10	11	10	10	11	10	11	68	78	177	
60		1	3	4	3	8	11	10	10	11	10	11	10	10	11	10	59	77	78	177	
70		2	3	4	10	11	10	11	10	10	11	10	11	10	10	42	78	77	78	177	
80	1	3	4	9	10	10	11	10	11	10	11	10	10	11	21	77	78	77	77	178	
90	3	3	6	10	11	10	10	11	10	11	10	10	11	10	63	77	78	77	77	178	
100	1	3	3	9	10	10	11	10	11	10	10	11	10	11	34	77	78	77	77	78	177
110	2	3	3	10	11	10	11	10	10	11	10	11	10	10	69	78	77	77	78	77	178
120	2	4	4	10	11	10	10	11	10	11	10	11	10	36	77	78	77	78	77	77	178
130	3	3	5	11	10	10	11	10	11	10	11	10	10	68	77	78	77	77	78	77	178
140	3	3	6	11	10	10	11	10	11	10	10	11	32	77	77	78	77	77	78	77	178
150	3	4	6	10	11	10	11	10	10	11	10	11	61	77	78	77	77	78	77	77	178
160	3	4	6	11	10	11	10	10	11	10	11	23	77	78	77	77	78	77	78	77	177
170	4	3	7	10	11	10	10	11	10	11	10	52	77	77	78	77	78	77	77	78	177
180	4	3	7	10	11	10	11	10	10	11	11	77	78	77	78	77	77	78	77	78	177

Although XVal-He-8_023 emulates LEM-he8n25 target 2.3 % P_{DCS} decompression schedules well, the no-stop limits for depths of 90 fsw and deeper are shorter than the corresponding no-stop limits that appear in the 1.3 atm PO₂ He-O₂ Decompression Tables of the *U.S. Navy Diving Manual* (see Table 8). From 35 fsw to 200 fsw, the no-stop limits are calculated directly to the nearest minute using the XVal-He-4 Thalmann Algorithm^c and the results of man-testing of no-stop limits for depths of 120–200 fsw indicates that the XVal-He-4 Thalmann Algorithm no-stop limits in this range are of appropriate duration (Table 8).^{4,15} Therefore, it was desirable to produce a MPTT table that would replicate these no-stop limits.

Table 8. No-stop limits and man testing for 1.3 atm PO₂ He-O₂ diving

fsw	Dive Man. min	XVal-He-8_023 min	XVal-He-9_023 min	tested min (DCS/dives)*		
30 [†]	332	359	359			
35 [†]	190	216	216			
40	unlimited	unlimited	unlimited			
50	325	352	352			
60	134	155	155			
70	86	101	101			
80	63	75	75	110 (0/7)	130 (0/24)	
90	44	27	46			
100	31	18	32			
110	24	14	25			
120	20	11	21	20 (2.2/29)	27 (1.2/24)	30 (0/16)
130	17	10	18			
140	15	8	15			
150	13	7	13			
160	12	6	11	13 (1.2/24)	16 (0/16)	18 (1/4)
170	11	6	10			
180	10	5	9			
190	9	5	8			
200	8	4	7	9 (0/16)	10 (1.3/16)	11 (2/24)
210	5	4	7			
220	5	-‡	6			
230	5	-‡	6			
240	5	-‡	5			
250	5	-‡	5			
260	5	-‡	-‡			

*Fractional DCS represent marginal DCS cases, each assigned a value of 0.1; †No-stop limits calculated for 0.7 atm PO₂; ‡No-stop limit shorter than descent time.

^c In the 1.3 atm PO₂ He-O₂ Decompression Tables, the no-stop limits for depths deeper than 200 fsw are not directly calculated. At these depths, decompression schedules were calculated with LEM-he8n25 with 2.3 % target P_{DCS} for bottom times in 5-minute increments, and the tabulated no-stop limit is the longest of these bottom times not requiring decompression stops.

A new set of MPTT generating parameters, designated XVal-He-9_023, was produced by modifying XVal-He-8_023 based on the following observations. Table 9 gives the 1.3 atm PO₂ He-O₂ no-stop limits that appear in the *U.S. Navy Diving Manual* and the inert gas tension in various Thalmann Algorithm compartments on reaching surface after no-stop dives to these limits. For no-stop dives of 90 fsw and deeper, the surfacing inert gas tensions in the 10-minute half-time compartment in Table 9 are substantially higher than the XVal-He-8_023 M₀ of 66.016 fsw. An XVal-He-9_023 10-minute half-time compartment with a M₀ in the vicinity of the surfacing values shown in Table 9 is necessary. By trial and error, a M₀ of 85 fsw was found to be the smallest value that did not result in no-stop limits substantially shorter than XVal-He-4, but this change to the 10-minute half-time compartment did not itself reproduce the XVal-He-4 no-stop limits. The XVal-He-4 Thalmann Algorithm no-stop limits for 90 fsw and deeper are governed by the 20-minute half-time compartment and its M₀ of 64.879. However, a compartment with these parameters produced schedules with undesirable 7-minute stops where the exploratory table had short, deep stops. Instead, a compartment with a 20-minute half-time and SDR of 2 (so that gas washed out with a 10-minute half-time) was added to XVal-He-9_023. By trial and error, an M₀ of 64 fsw for this compartment was found to closely reproduce the XVal-He-4 no-stop limits and, except for dives with short bottom times, to replace the short, deep decompression stops that would otherwise be lost because of the higher M₀ for the 10-minute compartment compared to XVal-He-8_023.

So that XVal-He-9_023 could support calculation of repetitive group designators consistent with those in the 1.3 atm PO₂ He-O₂ Decompression Tables of the *U.S. Navy Diving Manual*, a 120-minute half-time reference compartment was added with the XVal-He-4 M₀ of 41.731 fsw. Repetitive groups designators represent ranges of inert gas tensions in the reference compartment between its M₀ and 24.57 fsw. The compartment was assigned a $\beta_1 = 2$ so that its MPTTs would increase rapidly with depth ensuring that this compartment would not control any decompression stops.

Table 10 gives the XVal-He-9_023 MPTT generating function. Note that XVal-He-9_023 retains the same 20-minute compartment with SDR 0.67, with the M₀ for the 20-minute compartment rounded to 83 fsw, and 210-minute half-time compartment as XVal-He-8_023. The complete XVal-He-9_023 MPTT table is given in Appendix A.

Example XVal-He-9_023 decompression schedules are given in Table 7. Complete tables of XVal-He-9_023 Thalmann Algorithm decompression schedules with dive depths in fsw and msw and bottom times corresponding to the 1.3 atm PO₂ He-O₂ Decompression Tables of the *U.S. Navy Diving Manual* are given in Appendix B and Appendix C. The tables in the appendices are calculated with the same conventions used for the 1.3 atm PO₂ He-O₂ Decompression Tables of the *U.S. Navy Diving Manual* since Revision 6: repetitive group designators are suppressed for increasing bottom time from the first bottom time with a repetitive group designator lower than the preceding bottom time¹⁶, and, unlike the exploratory tables and example schedules in the body of the report, travel time between decompression stops is included in decompression stop time.¹⁷

Table 9. Compartment gas tensions on reaching surface after dives to the 1.3 atm PO₂ He-O₂ no-stop limits in the *U.S. Navy Diving Manual*.

No-stop limits		Half-Time	10	20	20	20	210
fsw	min	SDR	1	1	0.67	2	1
30*	332		38	38	38	38	34
35*	190		43	43	43	42	33
50	325		37	38	38	37	34
60	134		46	47	47	46	33
70	86		55	55	56	53	33
80	63		63	61	62	59	33
90	44		71	64	65	62	32
100	31		75	64	65	62	31
110	24		78	63	64	61	30
120	20		80	63	64	61	30
130	17		81	63	64	61	30
140	15		83	63	64	61	30
150	13		83	63	64	60	29
160	12		85	64	64	61	29
170	11		86	64	65	62	29
180	10		87	64	65	62	29
190	9		86	63	64	61	29
200	8		85	62	63	60	29
210	5		70	52	53	50	28
220	5		73	54	55	52	28
230	5		76	56	57	54	28
240	5		79	58	59	56	29
250	5		82	60	61	58	29
260	5		85	62	63	60	29

*No-stop limits and gas tensions calculated for 0.7 atm PO₂

Table 10. XVal-He-9_023 MPTT generating parameters. Fixed values in square brackets.

Half-Time	[10]	[20]	[20]	[120]	[210]
SDR	[1]	[2]	[0.67]	[1]	[1]
β ₀ (atm)	-	-	-	-	[0.731]
M ₀ (fsw)	[85]	[64]	[83]	[41.731]	[34.165]
β ₁	[1]	[1]	[1]	[2]	[1]

Figure 3 illustrates the LEM-he8n25-estimated P_{DCS} of XVal-He-9_023 Thalmann Algorithm schedules for most depth and bottom time combinations that appear in the 1.3 atm PO₂ He-O₂ Decompression Tables of the *U.S. Navy Diving Manual, Revision 7* (most no-stop schedules and all schedules for depths deeper than 300 fsw are not illustrated). The P_{DCS} of all schedules are given in Appendix B and P_{DCS} for msw schedules are tabulated in Appendix C. The estimated P_{DCS} of corresponding XVal-He-4B Thalmann Algorithm schedules are also shown in Figure 3, these illustrate

that XVal-He-9_023 corrects the shortcomings of XVal-He-4B that produced high- P_{DCS} schedules for dive depth deeper than 200 fsw.

Figure 4A compares the TST for XVal-He-9_023 Thalmann Algorithm schedules and the optimum (shortest) TST of LEM-he8n25 2.3 % target P_{DCS} schedules. Most schedules fall near the identity line, indicating that XVal-He-9_023 Thalmann Algorithm schedules have similar TST to corresponding LEM-he8n25 2.3 % target P_{DCS} schedules. Together, Figure 3 and Figure 4A illustrate that XVal-He-9_023 Thalmann Algorithm produces decompression schedules with near-uniform 2.3 % P_{DCS} and near-optimum TST. The XVal-He-9_023 Thalmann Algorithm emulation of LEM-he8n25 2.3 % target P_{DCS} schedules is good for more depth-bottom times combinations than illustrated in Figure 3 and Figure 4A, with good emulation of the entire 240-minute bottom time range of the LEM-he8n25 2.3 % target P_{DCS} exploratory table.

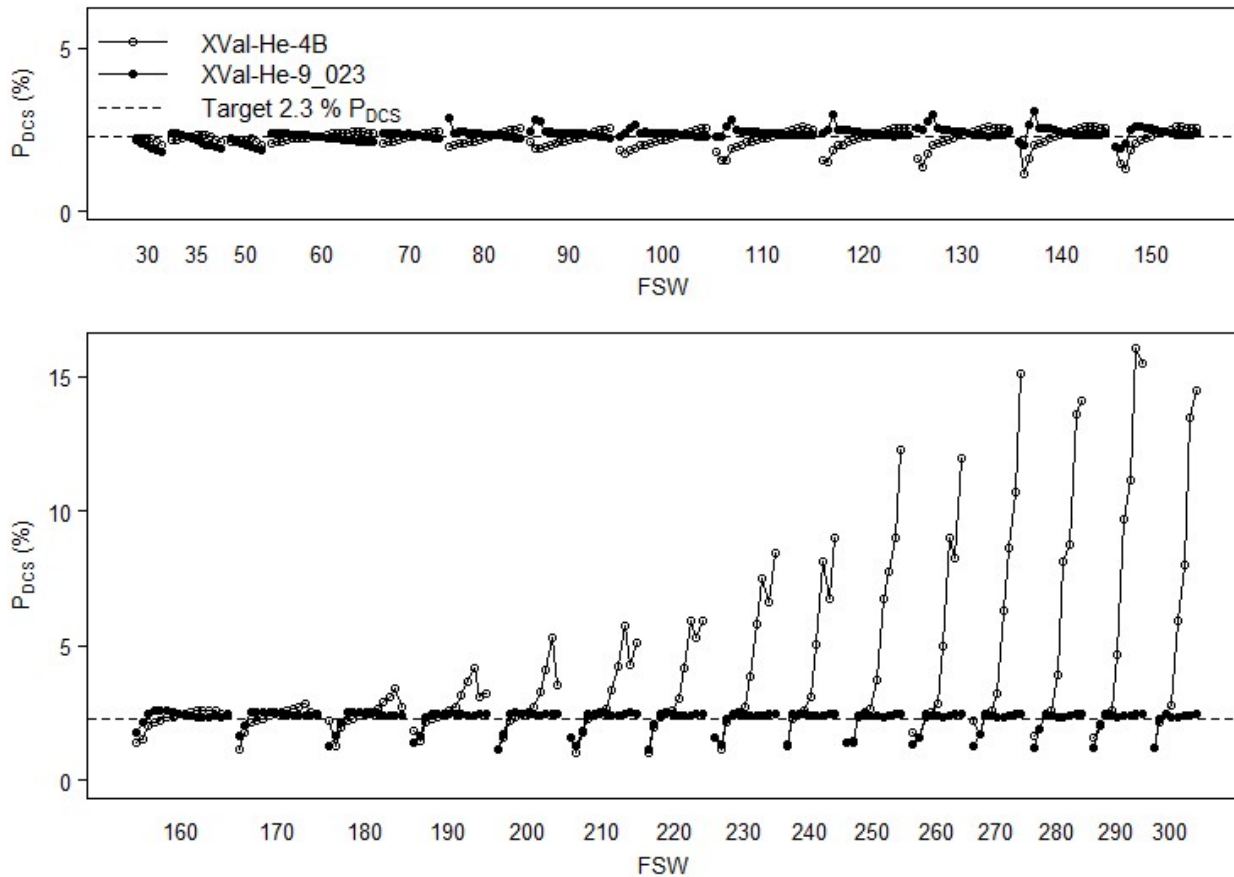


Figure 3. P_{DCS} of XVal-He-9_023 (solid points) and corresponding XVal-He-4B (open points) decompression schedules. Each point indicates a depth and bottom time combination. Depth groups are indicated on the x-axis. Within each depth group bottom times increase from left to right, from near the no-stop limit up to the maximum bottom time in the 1.3 atm PO_2 He- O_2 Decompression Tables of the *U.S. Navy Diving Manual, Revision 7*. Most corresponding XVal-He-9_023 and XVal-He-4B no-stop limits differ slightly (see Table 8), and to facilitate aligning the traces, these and any intervening bottom times are omitted.

Figure 4B compares the TST for XVal-He-9_023 and XVal-He-4B Thalmann Algorithm schedules for depths of 200 fsw or less, the operational range of the latter parameter set. XVal-He-4B Thalmann Algorithm produces schedules that are either identical (for depths of 180 fsw or less) or similar (for depths of 190 fsw and 200 fsw) to the XVal-He-4 schedules in the 1.3 atm PO₂ He-O₂ Decompression Tables.⁷

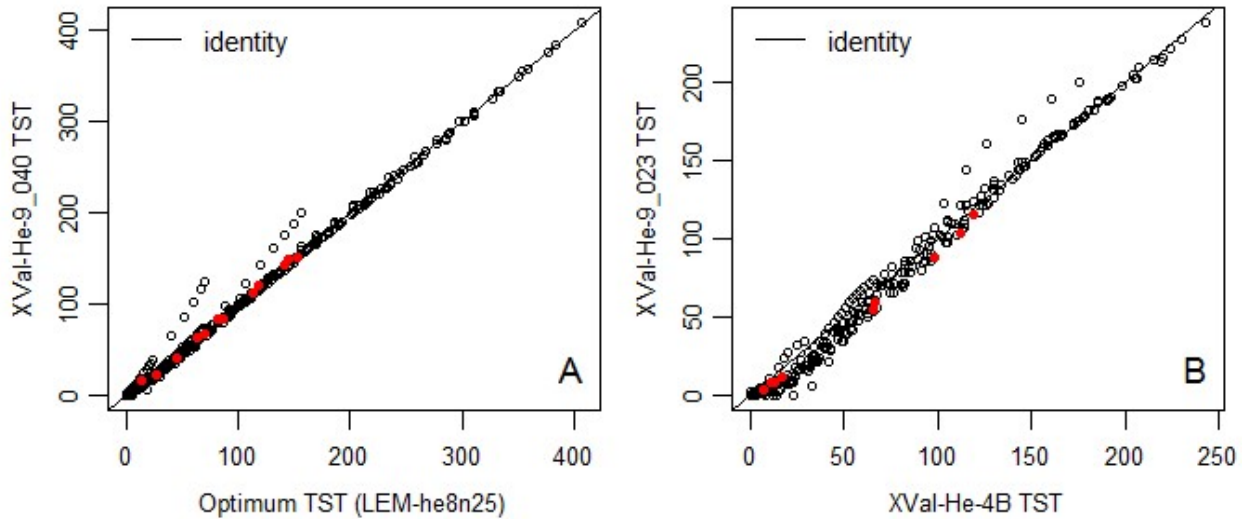


Figure 4. Panel A. Comparison of TST for XVal-He-9_023 Thalmann Algorithm and LEM-he8n25 schedules. Each point indicates a depth-bottom time combination in the 1.3 atm PO₂ He-O₂ Decompression Tables of the *U.S. Navy Diving Manual, Revision 7*. Red, filled points indicate single dive (not part of a repetitive series) LEM-he8n25 schedules man-tested.⁴ The few points separated from the cluster of points along the identity line are for bottom times of 6–12 hours at 30 and 35 fsw, depths for which schedules are calculated for 0.7 atm PO₂ He-O₂. Panel B. Comparison of TST for XVal-He-9_023 Thalmann Algorithm and XVal-He-4B Thalmann Algorithm. Each point indicates a depth-bottom time combination in the 1.3 atm PO₂ He-O₂ Decompression Tables for depths of 200 fsw and shallower. Red, filled points indicate single dive (not part of a repetitive series) XVal-He-4 Thalmann Algorithm schedules that have been man-tested.⁴

Figure 5 illustrates LEM-he8n25-estimated conditional P_{DCS} of first and repetitive dives computed using XVal-He-9_023 Thalmann Algorithm with the repetitive diving validation PCF set. For calculation of conditional P_{DCS} for repetitive dives, the LEM-he8n25 model state is calculated for the entire repetitive dive profile, but P_{DCS} is reset to zero at the end of each surface interval. Schedules were computed either in table mode or algorithm mode. In table mode the repetitive dive equivalent single dive time is calculated from the repetitive group of the preceding dive and the residual helium timetable, and the decompression schedule is for a tabulated bottom time closest to but not less than the equivalent single dive time. The table mode approximations generally result in conservative decompression schedules and in conditional P_{DCS} being centered around a lower value than the target 2.3% (Figure 5, left panel). Some of repetitive dives represented in Figure 5 may not be allowed by using the 1.3 atm PO₂ He-O₂ Decompression Tables and associated rules. First, the software for calculating repetitive schedules (DMDB7) does not suppress repetitive groups in the same manner as in tables. Second, some repetitive profiles may include three decompression dives whereas only two decompression dives are allowed. In algorithm mode the repetitive

schedules are calculated exactly for the surface intervals and bottom times in the input PCF profiles, such as would occur with an NDC. Consequently the conditional P_{DCS} are centered around the target 2.3% (Figure 5, right panel). For both modes, the maximum conditional P_{DCS} of any repetitive dive is about 3.3 %.

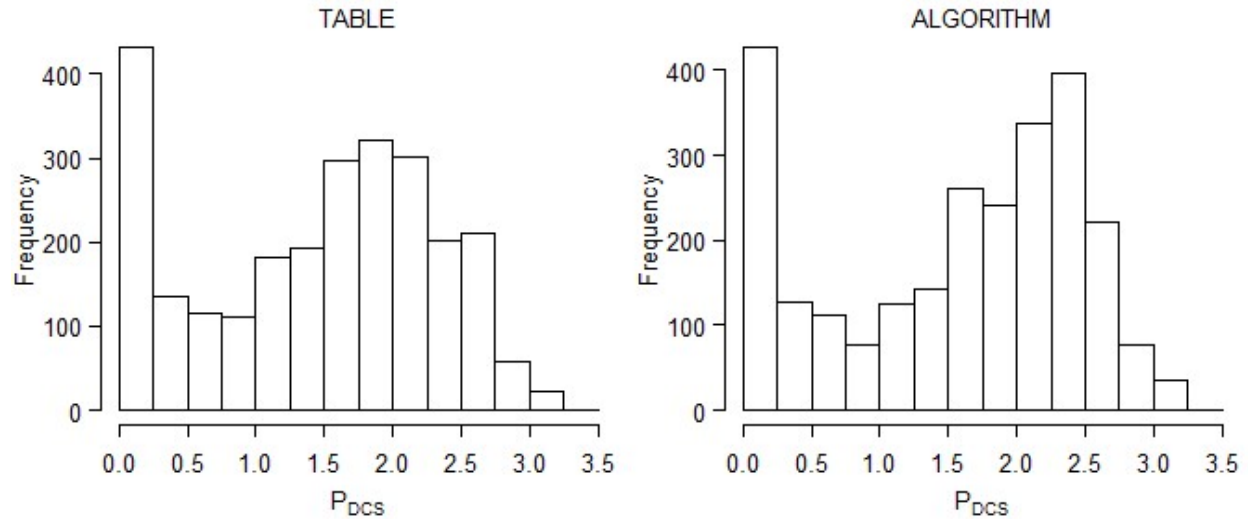


Figure 5. Conditional P_{DCS} of individual dives in repetitive dive series calculated using XVal-He-9_023 Thalmann Algorithm. Histograms are of all 2,579 first and repetitive dives in the 1,024 repetitive dive series. The left panel illustrates P_{DCS} for the repetitive dives as they would be scheduled using repetitive groups and the residual helium timetable. The right panel illustrates P_{DCS} for the dives as they would be calculated using the algorithm to follow the profile of dives and surface intervals exactly. The substantial number of dives with low conditional P_{DCS} are for depth-bottom time combinations shorter than the no-stop limits.

TARGET P_{DCS} 4 % AND 5 % PARAMETER SETS

Table 11 shows excerpts of the exploratory tables of LEM-he8n25 schedules with target P_{DCS} of 2.3 %, 4 %, and 5 %. Inspection of these schedules reveals that depths of onset and characteristic durations of the short, deep (2–3 minutes) stops and the intermediate 10–11 minute) stops are the same for corresponding schedules with different target P_{DCS} . Based on this observation, compartments with fixed 10-minute half-time and 20-minute half-time with SDR 0.67 were retained for the higher P_{DCS} parameter sets. The long, shallow decompression stops are of longer duration but shallower depth of onset with increasing target P_{DCS} . These shallow stops have characteristic durations of 86 minutes for 4 % P_{DCS} schedules and 94 minutes for 5 % P_{DCS} schedules (median of stops 70 minutes or longer and 30 fsw or deeper from exploratory tables). Additionally, the 20 fsw last stops are slightly shorter with increasing target P_{DCS} . These different characteristics of the long, shallow stops could not be achieved by manipulating the compartment half-time alone, but could be emulated by using a value of β_1 greater than one, and in fit of the Thalmann Algorithm to the higher P_{DCS} standard sets, β_1 for the slowest compartment was a fitted parameter. By trial and error, slow compartments with half-times fixed at 200 minutes and 190 minutes were found to produce the best results for the 4 % P_{DCS} and 5 % P_{DCS} standard sets respectively.

Table 11. Excerpts of LEM-he8n25 2.3 %, 4 %, and 5 % P_{DCS} 1.3 atm PO₂ He-O₂ exploratory tables

BT (min)	DECOMPRESSION STOPS (fsw)																					
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
290 fsw 2.3 % P_{DCS}																						
10																	1	2	2	2	3	6
20											3	3	2	2	3	2	2	3	12	11	88	
30							2	3	2	2	3	2	2	3	8	11	12	11	11	12	155	
40				3	2	2	3	2	2	2	7	11	12	11	11	11	11	10	11	61	173	
50		1	3	1	3	2	2	3	8	11	11	12	10	11	10	11	12	50	81	174		
60			2	3	2	2	2	6	11	11	11	10	11	11	11	10	12	34	79	81	175	
70	1	2	2	2	3	8	10	11	11	11	10	12	9	11	12	11	78	79	81	179		
80	1	2	3	2	6	11	11	11	11	10	11	11	10	11	11	46	83	79	81	181		
90	2	2	2	4	10	11	11	10	11	11	10	11	10	11	11	90	77	79	82	181		
100	2	2	2	8	10	11	11	11	10	11	10	11	11	10	40	93	78	79	81	185		
110	2	2	2	10	11	11	11	10	11	11	10	10	11	11	83	82	78	79	81	185		
120	2	2	4	11	10	11	11	10	11	10	11	10	11	23	106	76	78	79	81	187		
130	2	2	5	11	11	10	11	10	11	10	11	11	10	63	95	76	78	79	82	188		
140	2	2	6	11	11	10	11	10	11	10	11	11	10	102	82	76	79	79	81	190		
150	2	2	7	11	10	11	10	11	11	10	11	10	36	110	75	76	78	79	82	192		
290 fsw 4 % P_{DCS}																						
10																	1	4	2	2	2	
20											3	4	3	2	2	2	4	11	12	42		
30							2	5	2	2	3	2	2	9	11	11	12	11	11	110		
40					4	3	2	2	2	3	7	11	12	11	10	11	11	11	41	145		
50			2	3	2	2	3	2	9	11	11	11	11	11	10	11	11	12	96	147		
60		2	2	3	2	2	5	12	11	10	11	11	11	11	10	11	12	55	99	152		
70		3	2	2	2	8	11	12	10	11	10	11	10	11	11	11	10	109	87	156		
80	1	2	2	3	6	11	11	11	11	10	11	11	10	11	10	11	48	116	79	160		
90	1	3	2	3	11	11	11	11	10	11	10	11	10	11	11	11	90	105	79	164		
100	1	3	2	7	11	12	10	10	12	10	10	11	10	11	12	35	110	93	79	165		
110	2	2	2	10	11	11	11	10	11	10	11	10	11	12	10	68	114	84	79	168		
120	2	2	4	10	11	12	10	10	11	10	11	10	11	11	15	98	112	77	80	171		
130	2	2	5	11	11	10	12	10	10	11	10	11	11	10	45	104	102	78	80	172		
140	2	2	6	11	11	10	11	10	11	10	11	11	11	10	73	108	92	78	80	176		
150	2	2	7	11	10	11	10	11	11	10	11	10	11	19	93	113	82	78	81	177		
290 fsw 5 % P_{DCS}																						
10																	1	4	2	2	1	
20											1	4	4	3	2	3	3	12	11	22		
30								3	5	3	2	2	3	9	11	11	12	11	11	87		
40						3	6	2	2	3	7	12	11	11	11	10	11	11	11	151		
50				3	4	2	2	3	9	11	11	11	11	10	11	11	12	11	71	147		
60			4	2	2	3	5	12	11	10	11	11	11	10	11	11	12	19	120	140		
70		2	3	2	2	8	11	11	11	10	11	11	11	10	12	11	10	68	113	143		
80	1	2	2	2	7	11	12	10	11	10	11	10	11	12	9	11	16	107	102	149		
90	1	3	1	4	11	11	11	10	11	11	10	11	10	11	11	12	52	112	93	150		
100	1	2	3	7	11	11	11	10	11	11	10	11	11	10	11	11	86	117	82	155		
110	1	3	2	10	11	11	11	10	11	10	11	10	11	11	11	30	99	114	79	158		
120	1	3	4	10	11	11	10	12	10	11	10	10	11	11	11	60	102	106	79	161		
130	2	2	5	11	11	10	11	10	11	10	11	11	11	11	12	90	111	92	81	159		
140	2	2	6	11	11	10	12	9	12	9	11	12	9	11	34	94	111	87	80	166		
150	2	2	7	11	10	11	10	11	11	10	11	11	11	11	59	95	115	79	79	168		

Table 12 and Table 13 shows the MPTT generating parameters arising from fit of the Thalmann Algorithm to the 4 % and 5 % P_{DCS} standard sets. MPTT tables generated from these parameters are designated XVal-He-8_040 and XVal-He-8_050, with digits after the underscore representing the target P_{DCS} of the standard set. The half-times and SDR for all compartments, and β_1 for the fast and intermediate compartment were fixed. The β_0 for all compartments and β_1 for the slow compartment were fitted. The M₀ values are calculated from the β_0 's. The XVal-He-8_040 and XVal-He-8_050 MPTT tables are given in Appendix A and example XVal-He-8_040 and XVal-He-8_050 decompression schedules are given in Table 14 and Table 15.

Table 12. XVal-He-8_040 MPTT generating parameters. Fixed values in square brackets.

Half-Time	[10]	[20]	[200]
SDR	[1]	[0.67]	[1]
β_0 (atm)	1.839	2.213	0.798
M ₀ (fsw)	70.820	83.204	38.274
β_1	[1]	[1]	1.188

Table 13. XVal-He-8_050 MPTT generating parameters. Fixed values in square brackets.

Half-Time	[10]	[20]	[190]
SDR	[1]	[0.67]	[1]
β_0 (atm)	1.859	2.212	0.827
M ₀ (fsw)	71.500	83.171	40.437
β_1	[1]	[1]	1.310

Additional sets of MPTT generating parameters, designated XVal-He-9_040 and XVal-He-9_050 (see Table 16 and Table 17), were produced that would support calculation of no stop limits for 90 fsw and deeper the same as XVal-He-9_023 and in accord with that appear in the 1.3 atm PO₂ He-O₂ Decompression Tables of the *U.S. Navy Diving Manual*. Whereas it would be technically possible to design MPTT tables that would support computation of longer no-stop limits and accordingly with higher P_{DCS}, this was considered unwise. Even though many of XVal-He-9_023 no-stop limits — those for depths of 140 fsw and deeper — have LEM-estimated P_{DCS} less than 2.3 %, it is possible that extending these deeper no-stop limits may result in severe DCS. This concern was based on previous man-testing of extended no-stop limits for air diving to depths of 130 fsw and deeper with estimated P_{DCS} in the vicinity of 2.3 %.¹⁸ These dives resulted in only a 1.3 % cumulative incidence of DCS (exact 95 % confidence limits 0.5 %, 3.0 %) but all cases were unacceptably severe. XVal-He-9_040 and XVal-He-9_050 generating parameters were modified from XVal-He-9_023 (Table 10) by changing the slowest compartment parameters to those of XVal-He-8_040 and XVal-He-8_050, respectively (Table 12 and Table 13). The no-stop limits computed with the Thalmann Algorithm using XVal-He-9_023, XVal-He-9_040, and XVal-He-9_050 are the same for depths of 90 fsw and deeper. Table 18 shows the different no-stop limits for depths of 80 fsw and shallower, and for comparison the no-stop limits for 1.3 atm PO₂ He-O₂ and N₂-O₂ diving in the *U.S. Navy Diving Manual*.

By retaining the 120 minute half-time compartment from XVal-He-9_023, XVal-He-9_040 and XVal-He-9_050 can support calculation of repetitive group designators consistent with those in the 1.3 atm PO₂ He-O₂ Decompression Tables of the *U.S. Navy Diving Manual*. However, XVal-He-9_040 and XVal-He-9_050 were developed to support extended bottom time single dives rather than repetitive diving. The XVal-He-9_040 and XVal-He-9_040 MPTT tables are given in Appendix A.

Table 14. XVal-He8_040 and XVal-He-9_040 Thalmann Algorithm 1.3 atm PO He-O₂ schedules (290 fsw)

BT (min)	DECOMPRESSION STOPS (fsw)																				
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20
XVal-He-8_040 290 fsw																					
10															1	3	3	4	3	3	7
20								1	3	4	3	3	3	4	3	3	3	7	11	58	
30					2	4	3	3	3	4	3	3	3	5	10	11	10	11	10	123	
40			2	3	3	4	3	3	3	4	3	10	11	10	11	10	10	10	11	10	183
50		1	4	3	3	4	3	3	6	10	11	10	10	11	10	11	10	10	65	183	
60		3	3	4	3	3	4	11	10	11	10	10	11	10	11	10	10	39	86	182	
70	1	3	3	3	4	6	11	10	10	11	10	11	10	11	10	10	11	83	85	183	
80	1	3	3	4	6	11	10	10	11	10	11	10	10	11	10	11	48	86	85	182	
90	1	3	4	4	10	11	10	11	10	10	11	10	11	10	10	11	85	85	86	182	
100	1	3	4	8	10	11	10	10	11	10	11	10	10	11	10	45	85	85	86	182	
110	1	4	3	10	11	10	11	10	10	11	10	11	10	10	11	77	85	85	85	183	
120	1	4	5	10	11	10	10	11	10	11	10	11	10	10	33	85	85	86	85	182	
130	1	4	6	11	10	10	11	10	11	10	10	11	10	11	61	86	85	85	85	183	
140	1	4	7	11	10	10	11	10	11	10	10	11	10	15	86	85	85	85	85	183	
150	1	4	8	10	11	10	10	11	10	11	10	10	11	42	85	85	86	85	85	182	
160	1	4	8	11	10	10	11	10	11	10	10	11	10	69	85	85	85	86	85	182	
170	1	4	9	10	10	11	10	11	10	10	11	10	20	85	85	85	85	86	85	182	
180	1	4	9	10	11	10	10	11	10	11	10	10	45	85	86	85	85	85	85	183	
XVal-He-9_040 290 fsw																					
10																	2	3	4	3	7
20										2	4	3	3	4	3	3	3	11	10	49	
30						1	3	3	3	4	3	3	3	9	10	10	11	10	11	114	
40					3	3	4	3	3	3	9	10	11	10	11	10	10	11	10	175	
50				3	3	3	4	4	10	10	11	10	11	10	10	11	10	11	59	182	
60			1	3	4	3	10	10	10	11	10	11	10	10	11	10	11	35	85	182	
70			2	4	4	10	11	10	11	10	11	10	10	11	10	11	10	81	85	182	
80		1	4	3	9	11	10	11	10	10	11	10	11	10	10	11	47	86	85	182	
90		3	3	6	11	10	10	11	10	11	10	10	11	10	11	10	85	85	85	183	
100	1	3	3	9	10	11	10	11	10	10	11	10	10	10	45	86	85	85	182		
110	2	3	3	11	10	10	11	10	11	10	10	11	10	11	10	77	85	86	85	182	
120	2	4	4	10	11	10	11	10	11	10	10	11	10	11	33	85	85	85	85	183	
130	3	3	5	11	10	11	10	10	11	10	11	10	10	11	62	85	86	85	85	182	
140	3	3	6	11	10	11	10	10	11	10	11	10	10	16	85	86	85	85	85	183	
150	3	4	6	10	11	10	11	10	10	11	10	11	10	43	85	85	85	86	85	182	
160	3	4	6	11	10	11	10	10	11	10	11	10	11	69	85	85	85	86	85	182	
170	4	3	7	10	11	10	10	11	10	11	10	10	21	85	85	86	85	85	85	183	
180	4	3	7	10	11	10	11	10	10	11	10	11	45	86	85	85	85	85	85	183	

Table 15. XVal-He8_050 and XVal-He-9_050 Thalmann Algorithm 1.3 atm PO He-O₂ schedules (290 fsw)

BT (min)	DECOMPRESSION STOPS (fsw)																				
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20
XVal-He-8_050 290 fsw																					
10															1	3	4	3	4	4	7
20								1	3	4	4	3	4	3	4	4	4	3	8	10	42
30					2	4	3	4	3	4	4	3	4	5	11	10	11	11	11	11	104
40			1	4	4	3	4	3	4	4	4	10	11	11	10	11	11	11	11	10	162
50		1	4	3	4	4	3	4	6	11	11	10	11	11	11	10	11	11	11	40	185
60		3	3	4	4	3	5	11	11	10	11	11	11	10	11	11	10	11	11	88	186
70		4	3	4	3	8	10	11	11	11	10	11	11	11	10	11	11	11	51	90	186
80	1	3	4	3	8	10	11	11	11	10	11	11	10	11	11	11	11	11	90	90	185
90	1	3	4	5	11	11	10	11	11	10	11	11	11	10	11	11	11	47	90	89	186
100	1	4	3	9	11	10	11	11	10	11	11	11	10	11	11	11	11	80	90	89	186
110	1	4	4	10	11	11	11	10	11	11	11	10	11	11	11	11	32	90	89	90	186
120	1	4	6	10	11	11	11	10	11	11	10	11	11	11	10	62	90	90	89	186	
130	1	4	7	11	10	11	11	11	10	11	11	11	10	11	11	12	89	90	89	90	186
140	1	4	8	11	10	11	11	11	10	11	11	10	11	11	39	89	90	89	90	186	
150	1	4	8	11	11	11	10	11	11	11	10	11	11	11	65	89	90	89	90	185	
160	1	4	9	11	10	11	11	11	10	11	11	11	10	12	89	90	89	90	90	185	
170	1	4	9	11	11	10	11	11	11	10	11	11	11	36	90	89	90	89	90	186	
180	1	4	10	10	11	11	10	11	11	11	10	11	11	61	89	90	89	90	89	186	
XVal-He-9_050 290 fsw																					
10																	2	3	4	3	7
20										2	4	3	3	4	3	3	3	11	10	49	
30						1	3	3	3	4	3	3	3	9	10	10	11	10	11	114	
40					3	3	4	3	3	3	9	10	11	10	11	10	10	11	10	175	
50				3	3	3	4	4	10	10	11	10	11	10	10	11	10	11	59	182	
60			1	3	4	3	10	10	10	11	10	11	10	10	11	10	11	35	85	182	
70			2	4	4	10	11	10	11	10	11	10	10	11	10	11	10	81	85	182	
80		1	4	3	9	11	10	11	10	10	11	10	11	10	10	11	47	86	85	182	
90		3	3	6	11	10	10	11	10	11	10	10	11	10	11	10	85	85	85	183	
100	1	3	3	9	10	11	10	11	10	10	11	10	11	10	10	45	86	85	85	182	
110	2	3	3	11	10	10	11	10	11	10	10	11	10	11	10	77	85	86	85	182	
120	2	4	4	10	11	10	11	10	11	10	10	11	10	11	33	85	85	85	85	183	
130	3	3	5	11	10	11	10	10	11	10	11	10	10	11	62	85	86	85	85	182	
140	3	3	6	11	10	11	10	10	11	10	11	10	10	16	85	86	85	85	85	183	
150	3	4	6	10	11	10	11	10	10	11	10	11	10	43	85	85	85	86	85	182	
160	3	4	6	11	10	11	10	10	11	10	11	10	11	69	85	85	85	86	85	182	
170	4	3	7	10	11	10	10	11	10	11	10	10	21	85	85	86	85	85	85	183	
180	4	3	7	10	11	10	11	10	10	11	10	11	45	86	85	85	85	85	85	183	

Table 16. XVal-He-9_040 MPTT generating parameters. Fixed values in square brackets.

Half-Time	[10]	[20]	[20]	[120]	[200]
SDR	[1]	[2]	[0.67]	[1]	[1]
β_0 (atm)	-	-	-	-	[0.798]
M_0 (fsw)	[85]	[64]	[83]	[41.731]	[38.274]
β_1	[1]	[1]	[1]	[2]	[1.188]

Table 17. XVal-He-9_050 MPTT generating parameters. Fixed values in square brackets.

Half-Time	[10]	[20]	[20]	[120]	[190]
SDR	[1]	[2]	[0.67]	[1]	[1]
β_0 (atm)	-	-	-	-	[0.827]
M_0 (fsw)	[85]	[64]	[83]	[41.731]	[40.437]
β_1	[1]	[1]	[1]	[2]	[1.310]

Table 18. Shallow no-stop limits for 1.3 atm PO₂ diving

fsw	Xval-He-9_023 min	XVal-He-9_040 min	Xval-He-9_050 min	Dive Man. He-O ₂ min	Dive Man. N ₂ -O ₂ min
30*	359	unlimited	unlimited	332	unlimited
35*	216	376	421	190	unlimited
40	unlimited	unlimited	unlimited	unlimited	unlimited
50	352	unlimited	unlimited	325	unlimited
60	155	220	220	134	297
70	101	123	123	86	130
80	75	86	86	63	70

Example XVal-He-8_040 and XVal-He-9_040 decompression schedules are given in Table 14 and Table 15. XVal-He-9_040 and XVal-He-9_050 Thalmann Algorithm decompression tables in fsw and msw for depths of 80 to 300 fsw and for an extended bottom time range are given in Appendix D through Appendix G.

Figure 6 and Figure 8 illustrate the LEM-he8n25-estimated P_{DCS} of XVal-He-9_040 and XVal-He-9_050 Thalmann Algorithm schedules. Because of the decision not to extend no-stop limits, schedules at and near the no-stop limits have P_{DCS} well below the target of 4 % or 5 %. The P_{DCS} are tabulated for fsw and msw schedules in Appendix D through Appendix G. Figure 7 and Figure 9 compare the TST for XVal-He-9_040 and XVal-He-9_050 Thalmann Algorithm schedules and optimum (shortest) TST of the corresponding LEM-he8n25 schedules. Most schedules fall near the identity line, indicating that XVal-He-9_040 and XVal-He-9_050 Thalmann Algorithm schedules have similar TST to the corresponding LEM-he8n25 schedules.

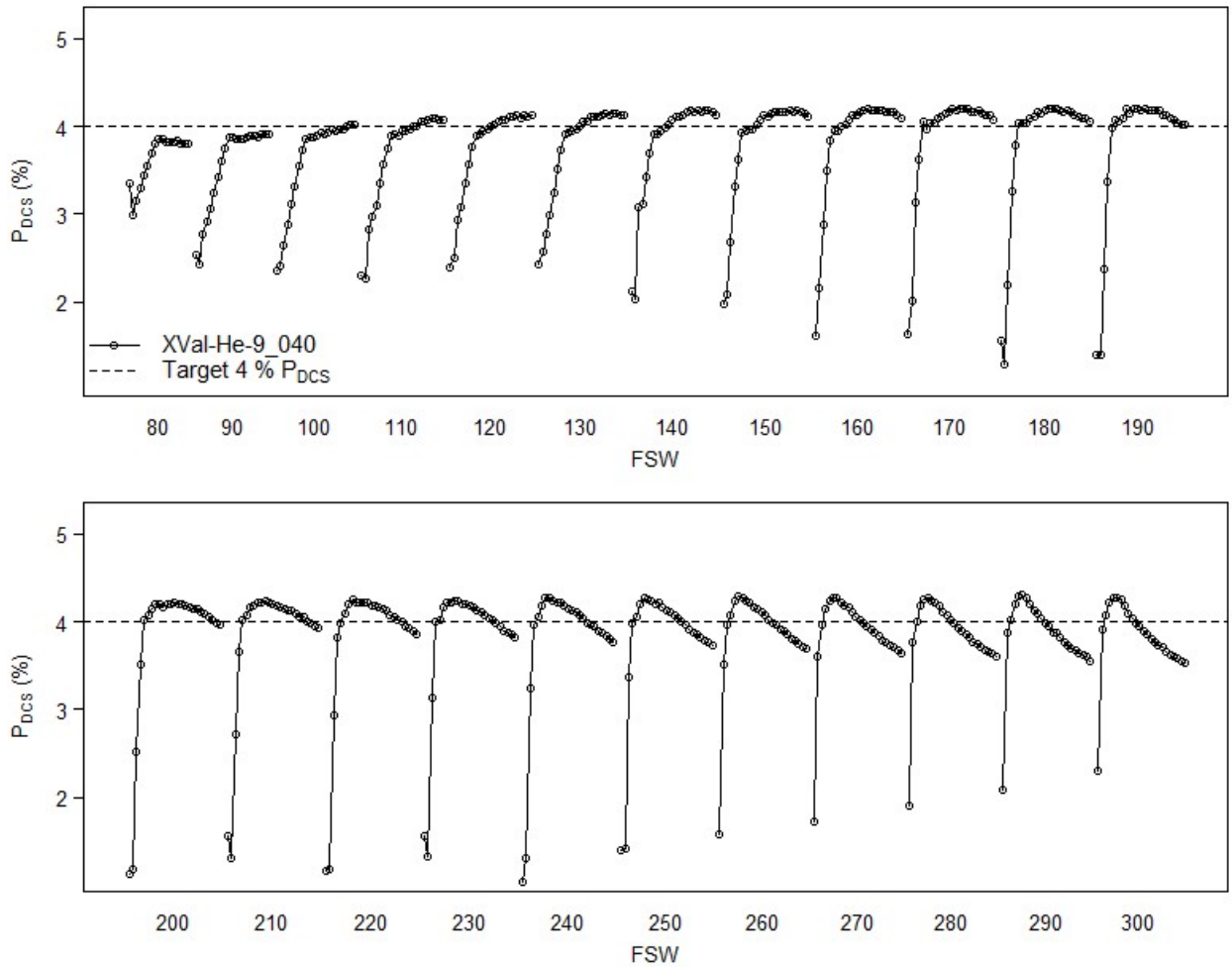


Figure 6. P_{DCS} of XVal-He-9_040 Thalmann Algorithm 1.3 atm PO₂ He-O₂ decompression schedules. Each point indicates a depth and bottom time combination. Depth groups are indicated on the x-axis. Within each depth group bottom times decrease from right to left in 10-minute increments from 240 minutes, and the left-most point is 10 minutes (260–300 fsw) or the no-stop limit.

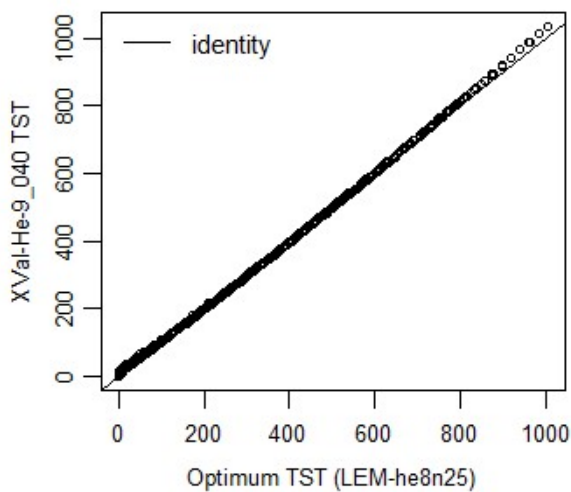


Figure 7. Comparison of TST for XVal-He-9_040 Thalmann Algorithm and LEM-he8n25 1.3 atm PO₂ He-O₂ schedules. Each point indicates a depth-bottom time combination from those illustrated in Figure 6.

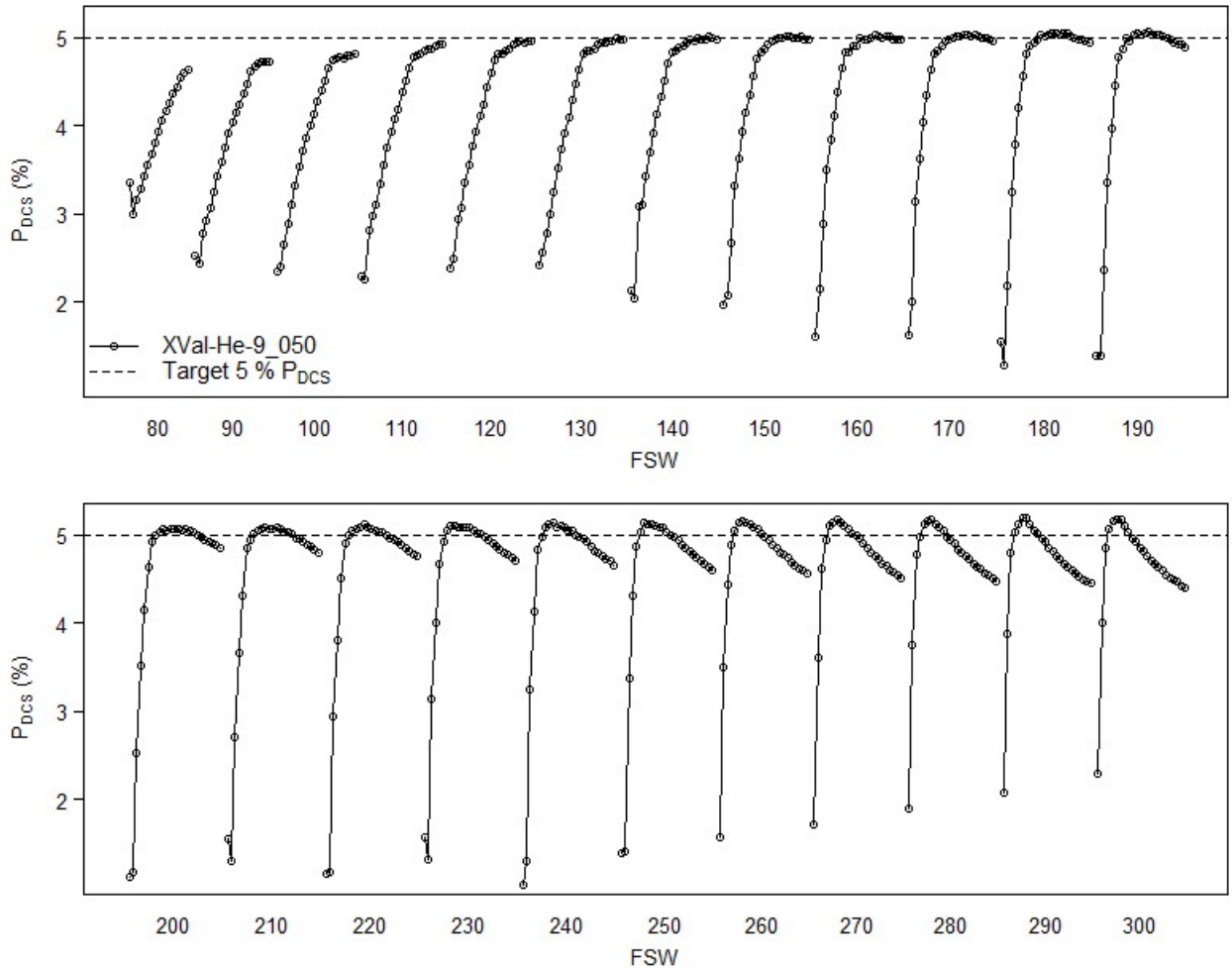


Figure 8. P_{DCS} of XVal-He-9_050Thalman Algorithm 1.3 atm PO₂ He-O₂ decompression schedules. Each point indicates a depth and bottom time combination. Depth groups are indicated on the x-axis. Within each depth group bottom times decrease from right to left in 10-minute increments from 240 minutes, and the left-most point is 10 minutes (260–300 fsw) or the no-stop limit.

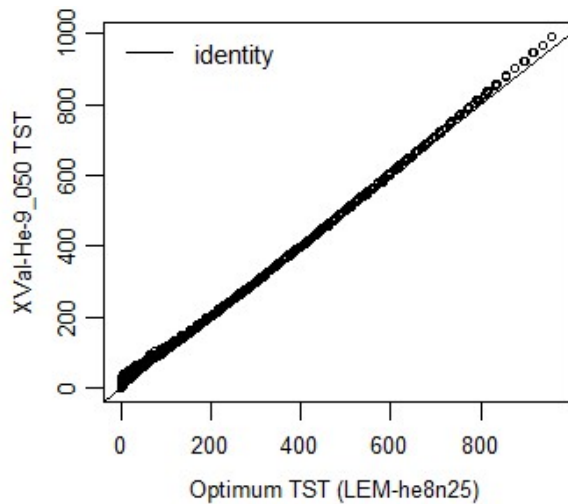


Figure 9. Comparison of TST for XVal-He-9_040 Thalman Algorithm and LEM-he8n25 1.3 atm PO₂ He-O₂ schedules. Each point indicates a depth-bottom time combination from those illustrated in Figure 8.

DISCUSSION

The Thalmann Algorithm parameterized with XVal-He-9_023 emulates LEM-he8n25 by computing 1.3 atm PO₂ He-O₂ decompression schedules with estimated P_{DCS} near 2.3 % and which have TST similar to corresponding LEM-he8n25 schedules. This emulation is good for all depths in, and for bottom times exceeding those in, the 1.3 atm PO₂ He-O₂ Decompression Tables in the *U.S. Navy Diving Manual, Revision 7*. Unlike LEM-he8n25, XVal-He-9_023 Thalmann Algorithm is computationally inexpensive and can be implemented in current dive computer hardware.

The XVal-He-9_023 Thalmann Algorithm computes 1.3 atm PO₂ He-O₂ no-stop limits at depths of 90 fsw and deeper that are similar to those in the *U.S. Navy Diving Manual*. At depths of 80 fsw and shallower, XVal-He-9_023 Thalmann Algorithm produces 1.3 atm PO₂ He-O₂ no-stop limits that are longer than those in the *U.S. Navy Diving Manual*. We argue that these extended shallow no-stop limits are acceptable for the following reasons. The XVal-He-9_023 Thalmann Algorithm 1.3 atm PO₂ He-O₂ no-stop limits at 70 fsw and 80 fsw are substantially shorter than 80 fsw no-stop limits tested without DCS at NEDU (see Table 8).⁴ There are no reported tests of 1.3 atm PO₂ He-O₂ no-stop limits at depths of 60 fsw and shallower, but the XVal-He-9_023 Thalmann Algorithm 1.3 atm PO₂ He-O₂ no-stop limits at these depths are substantially shorter than corresponding 1.3 atm PO₂ N₂-O₂ no-stop limits in the *U.S. Navy Diving Manual*, most of which are unlimited. There is no reason why He-O₂ no-stop limits should be shorter than N₂-O₂ no-stop limits. Indeed experimental evidence for shallow, fixed-fraction diving indicates He-O₂ no-stop limits should be the same or possibly longer than N₂-O₂ no-stop limits.^{19,20}

The XVal-He-9_040 and XVal-He-9_050 parameter sets were designed to cause the Thalmann Algorithm to compute 1.3 atm PO₂ He-O₂ decompression schedules with approximately 4 % or 5 % estimated P_{DCS}, respectively. Higher accepted P_{DCS} allows accelerated decompression. The Thalmann Algorithm emulation of LEM-he8n25 schedules is slightly poorer with increasing LEM-he8n25 target P_{DCS}, such that XVal-He-9_040 and XVal-He-9_050 Thalmann Algorithm schedules have less uniform P_{DCS} than XVal-He-9_023 Thalmann Algorithm schedules. Nevertheless, the emulation is still acceptable and the XVal-He-9_040 and XVal-He-9_050 Thalmann Algorithm schedules are computed with near-optimal TST. A limited set of decompression schedules computed with XVal-He-9_040 / XVal-He-8_040 Thalmann Algorithm are currently being man-tested.

The 1.3 atm PO₂ He-O₂ Decompression Tables in the *U.S. Navy Diving Manual* were developed to support repetitive and multi-day diving. In that context, a relatively low P_{DCS} for each exposure is appropriate, accomplished using the current 1.3 atm PO₂ He-O₂ Decompression Tables or XVal-He-9_023 Thalmann Algorithm. To illustrate, before a diver sets out to perform a repetitive series of three dives, each with 2.3 % P_{DCS}, the risk of DCS on at least one of the dives is the binomial probability of no DCS on all dives and is $1 - \binom{3}{0} \cdot 0.023^0 \cdot (1 - 0.023)^3 = 0.067$. This is a higher risk than performing a single dive using an XVal-He-9_040 or XVal-He-9_050 Thalmann Algorithm accelerated

decompression schedules. Such accelerated decompression might be considered for long duration, single dives.

Conversely, it would not be appropriate to perform repetitive diving using accelerated, higher P_{DCS} , decompression schedules. Although the XVal-He-9_040 or XVal-He-9_050 parameter sets were designed to allow calculation of repetitive group designators, none are provided in the decompression tables in Appendix D through Appendix G. The XVal-He-9_023 Thalmann Algorithm tables in Appendix B and Appendix C do have repetitive group designators for all depths, including deeper than 200 fsw. During the development of the 1.3 atm PO_2 He- O_2 tables, in accord with stated requirements, repetitive diving was only tested for dives 200 fsw and shallower.⁴ Schedules deeper than 200 fsw with repetitive group designators represent repetitive diving that may be feasible, but this should be confirmed with man-testing.

Several refinements of the technique used to produce the XVal-He-4 parameter set⁴ were employed to develop these new parameter sets. Instead of using a set of nine compartment half-times fixed at the values chosen a priori for earlier Thalmann Algorithm applications, for the present parameter sets, half-times and SDR were selected specifically to emulate LEM-he8n25 behavior. In addition, decompression stop times in the standard set used to produce XVal-He-4 were computed only to 5-minute resolution, but were computed to 1-minute resolution in the present work. The finer stop time resolution allowed short stop times governed by half-times faster than 20 minutes (see Table 5 in results) to manifest in the standard set, and against which Thalmann Algorithm parameters could be optimized. This increased resolution was practicable because of greater available computing resources. Finally, rather than the approximation used in earlier work, a more exact objective function was minimized to optimize the Thalmann Algorithm against the standard sets.

Despite these refinements, limitations persist in the current approach. Fitting the Thalmann Algorithm with half-times and SDR used in the XVal-He-9 series (Table 10, Table 16, and Table 17) to the respective standard sets produced poorer results than using the fixed parameters. This fact indicates that additional refinement to the optimization technique is necessary. One potential refinement identified is that there is an inappropriate contribution to the SSE at the end of the bottom time. ‘Stops’ evaluated in equation (7) were any isobaric hold followed by an ascent; therefore, equation (7) was evaluated on leaving bottom. It is not advantageous to minimize this error on leaving bottom under any circumstance, but in particular for no-stop dives $(p_{i,\lambda} - M_{i,D_{\lambda-1}})$ can be large, and is the only contribution to the SSE. In the present work, the inappropriate contribution of the no-stop dives to the SSE was reduced by use of equation (7) to minimize per profile error compared to, for instance, using equation (6) to minimize per stop error. Equation (7) results in a smaller relative contribution to the SSE of dives with fewer isobaric holds (including no-stop dives with a single hold) than of dives with more isobaric holds. However, for the same reason equation (7) likely sacrifices fit to dives with fewer decompression stops in favor of fit to the longer, deeper dives with many decompression stops, but this was not formally assessed. Another modification was tried whereby contribution to the error was excluded if there was no gas supersaturation in any compartment — a condition that prevails at end of bottom

time. However, this condition also prevails during some of the shallower decompression stops, and it was found that this modification degraded the overall quality of fit and was therefore not used in any of the results described in this document. Modifications to exclude the evaluation of the error at the end of bottom time only would require redevelopment of the software that was beyond the scope of the current project.

CONCLUSIONS AND RECOMMENDATIONS

- The Thalmann Algorithm parameterized with XVal-He-9_023, XVal-He-9_040, or XVal-He-9_050 can support 1.3 atm PO₂ He-O₂ diving to 300 fsw.
- XVal-He-9_023, XVal-He-9_040, and XVal-He-9_050 parameter sets could be implemented in currently available dive computers and dive planning software that use the Thalmann Algorithm.
- Implementation of two or more of the parameter sets in a dive computer would allow selection of P_{DCS} in accord mission requirements.
- Decompression schedules computed using XVal-He-9_040 and XVal-He-9_050 parameter sets should be man-tested prior to adoption for routine use.

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APPENDIX A MPTT TABLES

MPTT (or M-values), as defined by Workman, are the maximum permissible gas tensions at the surface (M_0) and at decompression stop depths.¹¹ However, for computing decompression tables, compartment gas tensions are evaluated against MPTT at the end of the preceding decompression stop, to determine if ascent to the new stop depth is permissible.^{5,11,21} Therefore, in U.S. Navy MPTT tables, the MPTT (M) are associated with the stop depth at which they are evaluated, if D_λ is an integer multiple of the stop depth increment ($D_\lambda = \lambda \cdot DINC; \lambda = 0, 1, 2, 3, \dots$), the $M_{i,D_\lambda-1}$ are labelled with depth D_λ .^{5,11,21} So for instance in the Thalmann Algorithm, columns define compartment half-times and rows define decompression stop depths, and the surfacing MPTT (M_0) appears in the first row which is the last (shallowest) possible stop depth. If the units are fsw and the stop depth increment is 10 fsw, this first row is the 10 fsw stop. In the Thalmann Algorithm, the MPTT define the maximum permissible inert gas pressure.

The last possible stop defined by the first row of the MPTT table may not be the last allowed stop, for instance in 1.3 atm PO₂ He-O₂ decompression schedules, the last allowed stop is 20 fsw, and in the Thalmann Algorithm this is handled internally by overwriting the 20 fsw row of the MPTT table with the surfacing values from the 10 fsw row.

Unlike the Thalmann Algorithm which uses the U.S. Navy rounded conversion factor of 33 fsw/atm, the optimization software used to produce the MPTT generating functions uses the conversion factor 33.078 fsw/atm, and this factor was used to calculate M_0 values in fsw from the β_0 's.

The surfacing MPTT is independent of the stop depth increment and units (e.g. fsw vs msw). Therefore, MPTT tables calculated for different stop depth increments and units are calculated from the M_0 values (not β_0 's) and β_1 's. For computing decompression tables with depths in meters of sea water (msw), the Thalmann Algorithm uses stop depth increments in msw but MPTT in fsw. The MPTT are projected to depth from the M_0 values using the β_1 's and the Thalmann Algorithm 'metric geometric' conversion 0.3048 msw/fsw.²²

XVAL-HE-8_023 (FSW)

Stop Depth (fsw)	Half-times (mins)		
	10	20	210
	1	SDR 0.67	1
10	66.016	82.825	34.165
20	76.016	92.825	44.165
30	86.016	102.825	54.165
40	96.016	112.825	64.165
50	106.016	122.825	74.165
60	116.016	132.825	84.165
70	126.016	142.825	94.165
80	136.016	152.825	104.165
90	146.016	162.825	114.165
100	156.016	172.825	124.165
110	166.016	182.825	134.165
120	176.016	192.825	144.165
130	186.016	202.825	154.165
140	196.016	212.825	164.165
150	206.016	222.825	174.165
160	216.016	232.825	184.165
170	226.016	242.825	194.165
180	236.016	252.825	204.165
190	246.016	262.825	214.165
200	256.016	272.825	224.165
210	266.016	282.825	234.165
220	276.016	292.825	244.165
230	286.016	302.825	254.165
240	296.016	312.825	264.165
250	306.016	322.825	274.165
260	316.016	332.825	284.165
270	326.016	342.825	294.165
280	336.016	352.825	304.165
290	346.016	362.825	314.165
300	356.016	372.825	324.165
310	366.016	382.825	334.165
320	376.016	392.825	344.165

XVAL-HE-8_023 (MSW)

Stop Depth (msw)	Half-times (mins)		
	10	20 SDR 0.67	210
3	66.016	82.825	34.165
6	75.859	92.668	44.007
9	85.701	102.510	53.850
12	95.544	112.353	63.692
15	105.386	122.195	73.535
18	115.229	132.038	83.377
21	125.071	141.880	93.220
24	134.914	151.723	103.062
27	144.756	161.565	112.905
30	154.599	171.408	122.747
33	164.441	181.251	132.590
36	174.284	191.093	142.432
39	184.126	200.936	152.275
42	193.969	210.778	162.117
45	203.811	220.621	171.960
48	213.654	230.463	181.802
51	223.496	240.306	191.645
54	233.339	250.148	201.488
57	243.181	259.991	211.330
60	253.024	269.833	221.173
63	262.866	279.676	231.015
66	272.709	289.518	240.858
69	282.551	299.361	250.700
72	292.394	309.203	260.543
75	302.236	319.046	270.385
78	312.079	328.888	280.228
81	321.921	338.731	290.070
84	331.764	348.573	299.913
87	341.607	358.416	309.755
90	351.449	368.258	319.598
93	361.292	378.101	329.440
96	371.134	387.943	339.283

XVAL-HE-9_023 (FSW)

Stop Depth (fsw)	Half-times (mins)				
	10	20	20 SDR 0.67	120	210
	1	2		1	1
10	85.000	64.000	83.000	41.731	34.165
20	95.000	74.000	93.000	61.731	44.165
30	105.000	84.000	103.000	81.731	54.165
40	115.000	94.000	113.000	101.731	64.165
50	125.000	104.000	123.000	121.731	74.165
60	135.000	114.000	133.000	141.731	84.165
70	145.000	124.000	143.000	161.731	94.165
80	155.000	134.000	153.000	181.731	104.165
90	165.000	144.000	163.000	201.731	114.165
100	175.000	154.000	173.000	221.731	124.165
110	185.000	164.000	183.000	241.731	134.165
120	195.000	174.000	193.000	261.731	144.165
130	205.000	184.000	203.000	281.731	154.165
140	215.000	194.000	213.000	301.731	164.165
150	225.000	204.000	223.000	321.731	174.165
160	235.000	214.000	233.000	341.731	184.165
170	245.000	224.000	243.000	361.731	194.165
180	255.000	234.000	253.000	381.731	204.165
190	265.000	244.000	263.000	401.731	214.165
200	275.000	254.000	273.000	421.731	224.165
210	285.000	264.000	283.000	441.731	234.165
220	295.000	274.000	293.000	461.731	244.165
230	305.000	284.000	303.000	481.731	254.165
240	315.000	294.000	313.000	501.731	264.165
250	325.000	304.000	323.000	521.731	274.165
260	335.000	314.000	333.000	541.731	284.165
270	345.000	324.000	343.000	561.731	294.165
280	355.000	334.000	353.000	581.731	304.165
290	365.000	344.000	363.000	601.731	314.165
300	375.000	354.000	373.000	621.731	324.165
310	385.000	364.000	383.000	641.731	334.165
320	395.000	374.000	393.000	661.731	344.165

XVAL-HE-9_023 (MSW)

Stop Depth (msw)	Half-times (mins)				
	10	20	20 SDR 0.67	120	210
	1	2		1	1
3	85.000	64.000	83.000	41.731	34.165
6	94.843	73.843	92.843	61.416	44.007
9	104.685	83.685	102.685	81.101	53.850
12	114.528	93.528	112.528	100.786	63.692
15	124.370	103.370	122.370	120.471	73.535
18	134.213	113.213	132.213	140.156	83.377
21	144.055	123.055	142.055	159.841	93.220
24	153.898	132.898	151.898	179.526	103.062
27	163.740	142.740	161.740	199.211	112.905
30	173.583	152.583	171.583	218.896	122.747
33	183.425	162.425	181.425	238.581	132.590
36	193.268	172.268	191.268	258.266	142.432
39	203.110	182.110	201.110	277.951	152.275
42	212.953	191.953	210.953	297.637	162.117
45	222.795	201.795	220.795	317.322	171.960
48	232.638	211.638	230.638	337.007	181.802
51	242.480	221.480	240.480	356.692	191.645
54	252.323	231.323	250.323	376.377	201.488
57	262.165	241.165	260.165	396.062	211.330
60	272.008	251.008	270.008	415.747	221.173
63	281.850	260.850	279.850	435.432	231.015
66	291.693	270.693	289.693	455.117	240.858
69	301.535	280.535	299.535	474.802	250.700
72	311.378	290.378	309.378	494.487	260.543
75	321.220	300.220	319.220	514.172	270.385
78	331.063	310.063	329.063	533.857	280.228
81	340.906	319.906	338.906	553.542	290.070
84	350.748	329.748	348.748	573.227	299.913
87	360.591	339.591	358.591	592.912	309.755
90	370.433	349.433	368.433	612.597	319.598
93	380.276	359.276	378.276	632.282	329.440
96	390.118	369.118	388.118	651.967	339.283

XVAL-HE-8_040 (FSW)

Stop Depth (fsw)	Half-times (mins)		
	10	20	200
	1	SDR 0.67	1
10	70.820	83.204	38.274
20	80.820	93.204	50.157
30	90.820	103.204	62.039
40	100.820	113.204	73.921
50	110.820	123.204	85.803
60	120.820	133.204	97.685
70	130.820	143.204	109.567
80	140.820	153.204	121.449
90	150.820	163.204	133.331
100	160.820	173.204	145.213
110	170.820	183.204	157.095
120	180.820	193.204	168.977
130	190.820	203.204	180.859
140	200.820	213.204	192.741
150	210.820	223.204	204.623
160	220.820	233.204	216.506
170	230.820	243.204	228.388
180	240.820	253.204	240.270
190	250.820	263.204	252.152
200	260.820	273.204	264.034
210	270.820	283.204	275.916
220	280.820	293.204	287.798
230	290.820	303.204	299.680
240	300.820	313.204	311.562
250	310.820	323.204	323.444
260	320.820	333.204	335.326
270	330.820	343.204	347.208
280	340.820	353.204	359.090
290	350.820	363.204	370.972
300	360.820	373.204	382.855
310	370.820	383.204	394.737
320	380.820	393.204	406.619

XVAL-HE-8_040 (MSW)

Stop Depth (msw)	Half-times (mins)		
	10	20	200
	1	SDR 0.67	1
3	70.820	83.204	38.274
6	80.663	93.046	49.969
9	90.505	102.889	61.664
12	100.348	112.731	73.359
15	110.190	122.574	85.054
18	120.033	132.416	96.749
21	129.875	142.259	108.444
24	139.718	152.101	120.139
27	149.560	161.944	131.834
30	159.403	171.786	143.529
33	169.245	181.629	155.224
36	179.088	191.471	166.919
39	188.930	201.314	178.614
42	198.773	211.157	190.309
45	208.615	220.999	202.004
48	218.458	230.842	213.699
51	228.300	240.684	225.394
54	238.143	250.527	237.089
57	247.985	260.369	248.784
60	257.828	270.212	260.479
63	267.670	280.054	272.173
66	277.513	289.897	283.868
69	287.355	299.739	295.563
72	297.198	309.582	307.258
75	307.041	319.424	318.953
78	316.883	329.267	330.648
81	326.726	339.109	342.343
84	336.568	348.952	354.038
87	346.411	358.794	365.733
90	356.253	368.637	377.428
93	366.096	378.479	389.123
96	375.938	388.322	400.818

XVAL-HE-9_040 (FSW)

Stop Depth (fsw)	Half-times (mins)				
	10	20	20 SDR 0.67	120	200
	1	2		1	1
10	85.000	64.000	83.000	41.731	38.274
20	95.000	74.000	93.000	61.731	50.157
30	105.000	84.000	103.000	81.731	62.039
40	115.000	94.000	113.000	101.731	73.921
50	125.000	104.000	123.000	121.731	85.803
60	135.000	114.000	133.000	141.731	97.685
70	145.000	124.000	143.000	161.731	109.567
80	155.000	134.000	153.000	181.731	121.449
90	165.000	144.000	163.000	201.731	133.331
100	175.000	154.000	173.000	221.731	145.213
110	185.000	164.000	183.000	241.731	157.095
120	195.000	174.000	193.000	261.731	168.977
130	205.000	184.000	203.000	281.731	180.859
140	215.000	194.000	213.000	301.731	192.741
150	225.000	204.000	223.000	321.731	204.623
160	235.000	214.000	233.000	341.731	216.506
170	245.000	224.000	243.000	361.731	228.388
180	255.000	234.000	253.000	381.731	240.270
190	265.000	244.000	263.000	401.731	252.152
200	275.000	254.000	273.000	421.731	264.034
210	285.000	264.000	283.000	441.731	275.916
220	295.000	274.000	293.000	461.731	287.798
230	305.000	284.000	303.000	481.731	299.680
240	315.000	294.000	313.000	501.731	311.562
250	325.000	304.000	323.000	521.731	323.444
260	335.000	314.000	333.000	541.731	335.326
270	345.000	324.000	343.000	561.731	347.208
280	355.000	334.000	353.000	581.731	359.090
290	365.000	344.000	363.000	601.731	370.972
300	375.000	354.000	373.000	621.731	382.855
310	385.000	364.000	383.000	641.731	394.737
320	395.000	374.000	393.000	661.731	406.619

XVAL-HE-9_040 (MSW)

Stop Depth (msw)	Half-times (mins)				
	10	20	20 SDR 0.67	120	200
	1	2		1	1
3	85.000	64.000	83.000	41.731	38.274
6	94.843	73.843	92.843	61.416	49.969
9	104.685	83.685	102.685	81.101	61.664
12	114.528	93.528	112.528	100.786	73.359
15	124.370	103.370	122.370	120.471	85.054
18	134.213	113.213	132.213	140.156	96.749
21	144.055	123.055	142.055	159.841	108.444
24	153.898	132.898	151.898	179.526	120.139
27	163.740	142.740	161.740	199.211	131.834
30	173.583	152.583	171.583	218.896	143.529
33	183.425	162.425	181.425	238.581	155.224
36	193.268	172.268	191.268	258.266	166.919
39	203.110	182.110	201.110	277.951	178.614
42	212.953	191.953	210.953	297.637	190.309
45	222.795	201.795	220.795	317.322	202.004
48	232.638	211.638	230.638	337.007	213.699
51	242.480	221.480	240.480	356.692	225.394
54	252.323	231.323	250.323	376.377	237.089
57	262.165	241.165	260.165	396.062	248.784
60	272.008	251.008	270.008	415.747	260.479
63	281.850	260.850	279.850	435.432	272.173
66	291.693	270.693	289.693	455.117	283.868
69	301.535	280.535	299.535	474.802	295.563
72	311.378	290.378	309.378	494.487	307.258
75	321.220	300.220	319.220	514.172	318.953
78	331.063	310.063	329.063	533.857	330.648
81	340.906	319.906	338.906	553.542	342.343
84	350.748	329.748	348.748	573.227	354.038
87	360.591	339.591	358.591	592.912	365.733
90	370.433	349.433	368.433	612.597	377.428
93	380.276	359.276	378.276	632.282	389.123
96	390.118	369.118	388.118	651.967	400.818

XVAL-HE-8_050 (FSW)

Stop Depth (fsw)	Half-times (mins)		
	10	20	190
	1	SDR 0.67	1
10	71.500	83.171	40.437
20	81.500	93.171	53.533
30	91.500	103.171	66.628
40	101.500	113.171	79.724
50	111.500	123.171	92.820
60	121.500	133.171	105.915
70	131.500	143.171	119.011
80	141.500	153.171	132.107
90	151.500	163.171	145.203
100	161.500	173.171	158.298
110	171.500	183.171	171.394
120	181.500	193.171	184.490
130	191.500	203.171	197.585
140	201.500	213.171	210.681
150	211.500	223.171	223.777
160	221.500	233.171	236.873
170	231.500	243.171	249.968
180	241.500	253.171	263.064
190	251.500	263.171	276.160
200	261.500	273.171	289.255
210	271.500	283.171	302.351
220	281.500	293.171	315.447
230	291.500	303.171	328.543
240	301.500	313.171	341.638
250	311.500	323.171	354.734
260	321.500	333.171	367.830
270	331.500	343.171	380.925
280	341.500	353.171	394.021
290	351.500	363.171	407.117
300	361.500	373.171	420.213
310	371.500	383.171	433.308
320	381.500	393.171	446.404

XVAL-HE-8_050 (MSW)

Stop Depth (msw)	Half-times (mins)		
	10	20	190
	1	SDR 0.67	1
3	71.500	83.171	40.437
6	81.343	93.014	53.326
9	91.185	102.856	66.216
12	101.028	112.699	79.105
15	110.870	122.542	91.995
18	120.713	132.384	104.884
21	130.555	142.227	117.774
24	140.398	152.069	130.663
27	150.240	161.912	143.553
30	160.083	171.754	156.442
33	169.925	181.597	169.332
36	179.768	191.439	182.221
39	189.610	201.282	195.111
42	199.453	211.124	208.000
45	209.295	220.967	220.890
48	219.138	230.809	233.779
51	228.980	240.652	246.669
54	238.823	250.494	259.558
57	248.665	260.337	272.448
60	258.508	270.179	285.337
63	268.350	280.022	298.226
66	278.193	289.864	311.116
69	288.035	299.707	324.005
72	297.878	309.549	336.895
75	307.721	319.392	349.784
78	317.563	329.234	362.674
81	327.406	339.077	375.563
84	337.248	348.919	388.453
87	347.091	358.762	401.342
90	356.933	368.605	414.232
93	366.776	378.447	427.121
96	376.618	388.290	440.011

XVAL-HE-9_050 (FSW)

Stop Depth (fsw)	Half-times (mins)				
	10	20	20 SDR 0.67	120	190
	1	2		1	1
10	85.000	64.000	83.000	41.731	40.437
20	95.000	74.000	93.000	61.731	53.533
30	105.000	84.000	103.000	81.731	66.628
40	115.000	94.000	113.000	101.731	79.724
50	125.000	104.000	123.000	121.731	92.820
60	135.000	114.000	133.000	141.731	105.915
70	145.000	124.000	143.000	161.731	119.011
80	155.000	134.000	153.000	181.731	132.107
90	165.000	144.000	163.000	201.731	145.203
100	175.000	154.000	173.000	221.731	158.298
110	185.000	164.000	183.000	241.731	171.394
120	195.000	174.000	193.000	261.731	184.490
130	205.000	184.000	203.000	281.731	197.585
140	215.000	194.000	213.000	301.731	210.681
150	225.000	204.000	223.000	321.731	223.777
160	235.000	214.000	233.000	341.731	236.873
170	245.000	224.000	243.000	361.731	249.968
180	255.000	234.000	253.000	381.731	263.064
190	265.000	244.000	263.000	401.731	276.160
200	275.000	254.000	273.000	421.731	289.255
210	285.000	264.000	283.000	441.731	302.351
220	295.000	274.000	293.000	461.731	315.447
230	305.000	284.000	303.000	481.731	328.543
240	315.000	294.000	313.000	501.731	341.638
250	325.000	304.000	323.000	521.731	354.734
260	335.000	314.000	333.000	541.731	367.830
270	345.000	324.000	343.000	561.731	380.925
280	355.000	334.000	353.000	581.731	394.021
290	365.000	344.000	363.000	601.731	407.117
300	375.000	354.000	373.000	621.731	420.213
310	385.000	364.000	383.000	641.731	433.308
320	395.000	374.000	393.000	661.731	446.404

XVAL-HE-9_050 (MSW)

Stop Depth (msw)	Half-times (mins)				
	10	20	20 SDR 0.67	120	190
	1	2		1	1
3	85.000	64.000	83.000	41.731	40.437
6	94.843	73.843	92.843	61.416	53.326
9	104.685	83.685	102.685	81.101	66.216
12	114.528	93.528	112.528	100.786	79.105
15	124.370	103.370	122.370	120.471	91.995
18	134.213	113.213	132.213	140.156	104.884
21	144.055	123.055	142.055	159.841	117.774
24	153.898	132.898	151.898	179.526	130.663
27	163.740	142.740	161.740	199.211	143.553
30	173.583	152.583	171.583	218.896	156.442
33	183.425	162.425	181.425	238.581	169.332
36	193.268	172.268	191.268	258.266	182.221
39	203.110	182.110	201.110	277.951	195.111
42	212.953	191.953	210.953	297.637	208.000
45	222.795	201.795	220.795	317.322	220.890
48	232.638	211.638	230.638	337.007	233.779
51	242.480	221.480	240.480	356.692	246.669
54	252.323	231.323	250.323	376.377	259.558
57	262.165	241.165	260.165	396.062	272.448
60	272.008	251.008	270.008	415.747	285.337
63	281.850	260.850	279.850	435.432	298.226
66	291.693	270.693	289.693	455.117	311.116
69	301.535	280.535	299.535	474.802	324.005
72	311.378	290.378	309.378	494.487	336.895
75	321.220	300.220	319.220	514.172	349.784
78	331.063	310.063	329.063	533.857	362.674
81	340.906	319.906	338.906	553.542	375.563
84	350.748	329.748	348.748	573.227	388.453
87	360.591	339.591	358.591	592.912	401.342
90	370.433	349.433	368.433	612.597	414.232
93	380.276	359.276	378.276	632.282	427.121
96	390.118	369.118	388.118	651.967	440.011

OTHER THALMANN ALGORITHM PARAMETERS AND CONVENTIONS

All tables in the following appendices were computed with the following Thalmann Algorithm parameters and switches (as used for the 1.3 atm PO₂ He-O₂ Decompression Tables of the *U.S. Navy Diving Manual* since Revision 6). These parameters and switches are defined in NEDU TR 10-09.⁶ Note that in the following appendices TTIS (travel time in stops) was set to T (true) whereas for the exploratory tables in the body of this report, the same parameters and switches were used with the exception that TTIS was set to F (false).

Blood Parameters

PACO₂=1.50
PH₂O=0.00
PVCO₂=2.30
PVO₂=2.00
AMBAO₂=0
PBOVP=0

Other Algorithm Parameters

sPBOVP=0.000	BTMAX=720.000
TATMAX=1440.000	STIME=0.200
O2TIME=30.000	AIRTIME=5.000
O2TIME_FO2=0.700	CNDSDR_FO2=0.000
FFP=F	FORCE_STOP=F
O2CEIL=30.000	GSWLAT=0.000
GS_DEAD=T	AB_DEAD=T
OMIT_TRVL=T	TTIS=T
RNTMODE=0	RGD_SPPRSS=1
SRF_CNTRLT_MODE=1	RE_MODE=2
RNDUPD=T	LST_DOMode=1
PVSATerr=F	FRSTOPerr=F

Conventions (fsw)

60 fsw/min decent and 30 fsw/min ascent. For maximum depths of 40 fsw and deeper, descent began on 0.7 atm PO₂, switched to 1.3 atm PO₂ on descent through 32 fsw and switched back to 0.7 atm PO₂ on ascent through 12 fsw. For maximum depths of 35 fsw or shallower breathing gas was 0.7 atm PO₂ throughout.

Conventions (msw)

18 msw/min decent and 9 msw/min ascent. For maximum depths of 15 msw and deeper, descent began on 0.7 atm PO₂, switched to 1.3 atm PO₂ on descent through 9.75 msw and switched back to 0.7 atm PO₂ on ascent through 3.66 msw. For maximum depths of 12 msw or shallower breathing gas was 0.7 atm PO₂ throughout.

APPENDIX B XVAL-HE-9_023 1.3 ATM PO₂ HE-O₂ DECOMPRESSION TABLES (FSW)

No-Decompression Limits and Repetitive Group Designators

Depth (fsw)	No-Stop Limit	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Z
25	unlimited	129	269	*													
30	359	27	43	60	78	100	124	152	185	227	281	239					
35	216	19	30	41	54	67	81	97	114	133	154	178	207	216			
40	unlimited	122	246	*													
50	352	27	43	59	78	99	123	150	183	223	276	352					
60	155	15	24	32	41	51	61	72	83	95	108	123	138	155			
70	101	11	16	22	28	34	41	47	54	61	69	77	85	94	101		
80	75	8	12	17	21	26	30	35	40	45	51	56	62	67	74	75	
90	46	6	10	13	17	20	24	28	32	36	40	44	46				
100	32	5	8	11	14	17	20	23	26	30	32						
110	25	4	7	9	12	14	17	20	22	25							
120	21	4	6	8	10	13	15	17	19	21							
130	18	3	5	7	9	11	13	15	17	18							
140	15	3	4	6	8	10	12	13	15								
150	13	3	4	6	7	9	10	12	13								
160	11		3	5	6	8	9	11									
170	10		3	4	6	7	9	10									
180	9		3	4	5	6	8	9									
190	8			4	5	6	7	8									
200	7				4	5	7										

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*Highest repetitive group designator during dives to these depths

B-2

BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	RG	P _{DCS}			
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40				30	20	
30 fsw																							
359																					0	0	K 2.280
360																					1	1	K 2.276
420																					38	38	2.172
480																					66	66	2.078
540																					87	87	2.001
600																					103	103	1.938
660																					116	116	1.881
720																					125	125	1.842
35 fsw																							
216																					0	0	M 2.404
220																					6	6	M 2.398
230																					21	21	2.374
240																					35	35	2.348
270																					70	70	2.283
300																					99	99	2.217
330																					123	123	2.158
360																					144	144	2.098
390																					161	161	2.052
420																					176	176	2.006
450																					189	189	1.966
480																					200	200	1.932
50 fsw																							
352																					0	0	K 2.267
360																					2	2	K 2.235
420																					11	11	2.155
480																					18	18	2.086
540																					24	24	2.009
600																					28	28	1.968
660																					32	32	1.904
720																					35	35	1.856

BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	RG	P _{DCS}			
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40				30	20	
60	fsw																						
155																				0	0	M	2.411
160																				3	3	M	2.399
170																				8	8	M	2.400
180																				13	13	M	2.391
190																				18	18		2.373
200																				23	23		2.346
210																				27	27		2.346
220																				31	31		2.338
230																				35	35		2.323
240																				39	39		2.301
250																				43	43		2.274
260																				46	46		2.275
270																				50	50		2.237
280																				53	53		2.228
290																				56	56		2.215
300																				59	59		2.197
310																				62	62		2.175
320																				64	64		2.183
330																				67	67		2.154
340																				69	69		2.154
350																				72	72		2.119
360																				74	74		2.114

B-3

BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	RG	P _{DCS}		
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40				30	20
70	fsw																					
101																			0	0	N	2.428
110																			9	9	N	2.399
120																			17	17		2.415
130																			25	25		2.410
140																			33	33		2.388
150																			41	41		2.350
160																			47	47		2.364
170																			54	54		2.332
180																			60	60		2.321
190																			66	66		2.298
200																			72	72		2.265
210																			77	77		2.257
220																			82	82		2.239
80	fsw																					
75																			0	0	O	2.839
80																			7	7		2.410
85																			13	13		2.420
90																			19	19		2.420
95																			25	25		2.412
100																			31	31		2.396
110																			42	42		2.376
120																			52	52		2.363
130																			61	61		2.361
140																			70	70		2.338
150																			78	78		2.329
160																			86	86		2.304
170																			94	94		2.263
180																			101	101		2.242
190																			107	107		2.241

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BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	RG	P _{DCS}			
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40				30	20	
90	fsw																						
46																				0	0	L	2.539
50																				1	1	M	2.436
55																				1	1	N	2.793
60																				2	2	O	2.778
65																				9	9		2.422
70																				17	17		2.424
75																				25	25		2.412
80																				33	33		2.388
85																				40	40		2.386
90																				46	46		2.408
95																				53	53		2.387
100																				59	59		2.390
110																				71	71		2.371
120																				83	83		2.322
130																				93	93		2.314
140																				103	103		2.283
150																				112	112		2.266
160																				121	121		2.239

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BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	RG	P _{DCS}			
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40				30	20	
100	fsw																						
32																				0	0	J	2.355
35																				1	1	K	2.273
40																				2	2	L	2.412
45																				3	3	M	2.53
50																				4	4	O	2.651
55																				12	12		2.398
60																				21	21		2.425
65																				31	31		2.400
70																				40	40		2.393
75																				48	48		2.409
80																				56	56		2.401
85																				64	64		2.390
90																				71	71		2.392
95																				79	79		2.353
100																				86	86		2.339
110																				99	99		2.314
120																				111	111		2.292
130																				122	122		2.287
140																				132	132		2.305

B-6

BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	RG	P _{DCS}		
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40				30	20
110	fsw																					
25																			0	0	I	2.305
30																			2	2	K	2.262
35																			3	3	L	2.582
40																			4	4	N	2.824
45																			7	7	O	2.491
50																			19	19		2.437
55																			30	30		2.449
60																		1	40	41		2.435
65																		1	50	51		2.434
70																		2	59	61		2.407
75																		2	68	70		2.404
80																		2	77	79		2.384
85																		2	85	87		2.385
90																		3	93	96		2.340
95																		3	100	103		2.349
100																		3	108	111		2.312
110																		3	122	125		2.291
120																		3	134	137		2.324
130																		3	146	149		2.345
140																		4	157	161		2.356

B-7

BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	RG	P _{DCS}		
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40				30	20
120	fsw																					
21																			0	0	I	2.392
25																			2	2	J	2.382
30																			4	4	L	2.493
35																			5	5	N	2.935
40																			9	9	O	2.504
45																	1	22	23		2.491	
50																	2	34	36		2.481	
55																	3	46	49		2.440	
60																	3	57	60		2.452	
65																1	3	68	72		2.399	
70																1	4	77	82		2.396	
75																2	3	87	92		2.369	
80																2	4	96	102		2.337	
85																2	4	104	110		2.349	
90																3	3	113	119		2.318	
95																3	3	121	127		2.313	
100																3	3	129	135		2.305	
110																3	4	143	150		2.316	
120																3	4	157	164		2.342	

B-8

BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	RG	P _{DCS}		
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40				30	20
130	fsw																					
18																			0	0	I	2.429
20																			1	1	I	2.569
25																			4	4	K	2.502
30																			6	6	M	2.774
35																		1	8	9	O	2.760
40																		2	22	24		2.540
45																		4	35	39		2.520
50																1	4	49	54		2.477	
55																2	4	61	67		2.453	
60																3	4	72	79		2.441	
65																4	3	84	91		2.404	
70															1	4	3	95	103		2.356	
75															1	4	4	104	113		2.355	
80															2	3	4	114	123		2.323	
85															2	4	4	123	133		2.306	
90															2	4	5	131	142		2.308	
95															3	3	5	139	150		2.337	
100															3	3	6	147	159		2.328	
110															3	4	6	162	175		2.366	
120															3	4	7	176	190		2.413	

B-9

BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	RG	P _{DCS}		
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40				30	20
140	fsw																					
15																			0	0	H	2.127
20																			4	4	J	2.039
25																			6	6	L	2.662
30																		1	8	9	N	2.824
35																		3	19	22	N	2.576
40																	2	3	35	40		2.535
45																	3	3	49	55		2.550
50															1	3	4	63	71			2.485
55															2	3	4	76	85			2.445
60															3	3	6	87	99			2.401
65															3	4	7	97	111			2.401
70														1	3	4	8	108	124			2.340
75														1	4	3	10	117	135			2.327
80														2	3	4	10	127	146			2.302
85														2	4	3	11	136	156			2.308
90														2	4	4	11	144	165			2.340
95														2	4	5	11	152	174			2.365
100														3	3	6	10	162	184			2.363

B-10

BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	RG	P _{DCS}		
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40				30	20
150	fsw																					
13																			0	0	H	1.977
15																			2	2	I	1.907
20																			6	6	K	2.084
25																		2	7	9	M	2.591
30																	1	4	12	17	O	2.556
35																	2	4	30	36		2.607
40																1	3	4	47	55		2.565
45																2	4	4	62	72		2.519
50																3	4	7	74	88		2.509
55															1	4	3	10	86	104		2.453
60															2	4	4	11	98	119		2.394
65															3	4	6	10	110	133		2.358
70															4	3	8	10	120	145		2.364
75														1	3	4	9	10	131	158		2.334
80													1	4	4	9	11	140	169		2.334	
85												2	3	4	10	11	149	179		2.368		
90												2	4	4	10	11	159	190		2.372		

B-11

B-12

BT (min)	DECOMPRESSION STOPS (fsw)																		TST (min)	RG	P _{DCS}																													
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30				20																												
160 fsw																																																		
11																					0	0	G	1.616																										
15																					4	4	I	1.753																										
20																							2	7	9	L	1.945																							
25																							1	4	7	12	N	2.622																						
30																								4	3	22	29	N	2.604																					
35																										2	4	3	42	51		2.573																		
40																											3	4	6	57	70		2.584																	
45																											1	4	4	10	71	90		2.522																
50																											3	3	6	11	85	108		2.462																
55																															8	11	98	125		2.414														
60																															2	3	4	10	11	110	140		2.386											
65																															3	3	5	11	11	122	155		2.336											
70																															3	4	7	10	11	133	168		2.368											
75																															1	3	4	8	11	10	144	181		2.378										
80																															1	4	3	10	10	11	154	193		2.377										
85																															2	3	4	10	11	10	165	205		2.388										
90																															2	3	4	11	11	10	174	215		2.442										
170 fsw																																																		
10																																				0	0	G	1.636											
15																																				6	6	J	1.667											
20																																						1	3	8	12	L	1.946							
25																																						1	3	4	11	19	O	2.548						
30																																							3	4	3	33	43		2.573					
35																																							2	3	4	5	52	66		2.555				
40																																								3	4	3	11	66	87		2.564			
45																																								1	3	4	8	11	81	108		2.533		
50																																								2	4	4	11	11	96	128		2.444		
55																																								3	4	7	11	11	109	145		2.430		
60																																								1	4	3	10	11	11	122	162		2.381	
65																																								2	4	4	11	11	10	135	177		2.404	
70																																								3	4	6	10	11	11	147	192		2.371	
75																																								4	3	8	10	11	11	158	205		2.405	
80																																								1	3	4	9	11	10	11	169	218		2.433

BT (min)	DECOMPRESSION STOPS (fsw)																		TST (min)	RG	P _{DCS}
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			
180 fsw																					
9																			0		
10																			2		
15																		1	8		
20																	3	4	7		
25																3	4	4	20		
30																3	3	4	43		
35																1	4	4	60		
40																3	3	4	77		
45																4	3	7	92		
50																2	3	4	107		
55																3	4	6	122		
60																1	3	4	136		
65																2	3	4	149		
70																3	3	6	161		
190 fsw																					
8																			0		
10																			3		
15																		3	8		
20																		2	8		
25																		3	30		
30																		2	52		
35																		1	70		
40																		2	87		
45																		4	105		
50																		1	121		
55																		2	135		
60																		4	149		
65																		1	163		
70																		2	177		

B-13

BT (min)	DECOMPRESSION STOPS (fsw)																		TST (min)	RG	P _{DCS}
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			
200 fsw																					
7																			0		
10																			5		
15																2	4	7	13		
20												1	4	3	4	12	24	24	O		
25											2	4	3	4	3	41	57	57			
30											2	3	4	4	3	11	61	88			
35											1	3	4	3	4	11	11	80	117		
40											2	4	3	4	10	11	11	99	144		
45											3	4	4	9	10	11	11	117	169		
50											1	3	4	7	11	11	10	11	133		
55											2	4	3	11	11	11	10	11	149		
60											3	4	7	10	11	11	10	11	164		
210 fsw																					
7																			0		
10																			6		
15															1	3	4	7	15		
20														4	3	4	3	21	35		
25													1	4	4	3	4	5	50		
30												1	4	4	3	4	7	11	71		
35												4	3	4	3	8	11	11	91		
40												2	4	3	4	8	10	11	111		
45												3	4	3	7	11	11	10	11		
50												1	3	4	5	11	11	10	11		
55												1	4	4	9	11	11	10	11		
60												3	3	6	11	11	10	11	11		

B-14

BT (min)	DECOMPRESSION STOPS (fsw)																		TST (min)	RG	P _{DCS}						
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30				20					
220	fsw																										
6																			0	0	F	1.168					
10																		1	7	8	I	1.258					
15															3	3	4	7	17	M	2.077						
20												3	3	4	3	4	30	47	N	2.470							
25									1	3	4	4	3	4	8	58	85				2.477						
30								1	3	4	4	3	4	11	10	81	121				2.405						
35									3	4	3	4	5	11	11	10	103	154			2.426						
40									2	3	4	4	5	11	10	11	11	123	184		2.409						
45										3	4	3	5	11	10	11	11	142	211		2.422						
50									1	3	4	3	11	11	10	11	11	160	236		2.467						
55									1	4	3	9	10	11	11	11	10	12	177	259		2.525					
230	fsw																										
6																				0	0	G	1.568				
10																		3	7	10	J	1.198					
15														2	3	4	3	8	20	N	2.282						
20												2	3	4	3	4	4	39	59		2.459						
25											3	4	3	4	4	5	10	66	99		2.480						
30											4	3	4	3	4	8	10	11	91	138		2.431					
35												3	3	4	4	3	9	11	11	11	114	173	2.392				
40												1	4	4	3	4	10	10	11	11	11	136	205	2.379			
45													3	3	4	4	9	11	11	10	11	11	156	233	2.437		
50														4	3	4	8	11	11	11	10	11	11	175	259	2.507	
55														1	4	3	7	11	10	11	11	11	10	29	178	286	2.482

B-15

B-16

BT (min)	DECOMPRESSION STOPS (fsw)																		TST (min)	RG	P _{DCS}				
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30				20			
240 fsw																									
5																				0	0	F	1.038		
10																	1	3	8	12	J	1.280			
15															4	3	4	3	10	24	O	2.464			
20											1	3	4	3	4	4	4	4	4	48	71		2.446		
25										3	3	4	3	4	4	8	11	11	75	115		2.446			
30									3	4	3	4	3	5	10	11	11	101	155		2.414				
35									3	3	4	3	4	6	11	11	10	11	126	192		2.384			
40									1	4	3	4	4	7	11	10	11	11	148	225		2.427			
45									3	3	4	3	8	11	10	11	11	10	171	256		2.461			
50									4	3	4	6	11	11	11	10	11	25	178	285		2.46			
250 fsw																									
5																				0	0	G	1.399		
10																	2	4	7	13	K	1.432			
15														2	4	4	3	4	17	34	N	2.472			
20											3	4	3	4	3	4	7	56	84			2.433			
25										2	4	3	4	3	4	4	11	11	85	131		2.404			
30										3	3	4	3	4	8	10	11	11	113	174		2.361			
35										2	4	3	4	3	11	10	11	11	138	212		2.373			
40									1	4	3	4	3	5	11	11	10	11	162	247		2.415			
45										2	4	4	3	5	11	11	11	10	177	279		2.470			
50										3	4	4	4	11	11	11	10	11	177	310		2.481			
260 fsw																									
5																				1	1	G	1.323		
10																1	3	4	7	15	L	1.575			
15													1	4	3	4	3	4	25	44	N	2.461			
20											2	4	3	4	3	4	4	9	64	97		2.422			
25											1	4	3	4	3	4	7	11	11	95	147	2.386			
30											2	4	3	4	3	4	5	10	11	11	11	123	191	2.371	
35											2	3	4	4	3	4	7	11	11	11	11	151	232	2.384	
40											1	3	4	3	4	4	9	11	11	10	11	177	269	2.45	
45											2	4	3	4	4	10	11	10	11	11	10	36	178	305	2.436

B-17

BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	RG	P _{DCS}																	
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40				30	20															
270 fsw																																					
5																			2	2	G	1.265															
10															2	4	4	7	17	L	1.729																
15												3	4	3	4	3	4	33	54	M	2.457																
20									1	4	3	4	4	3	4	5	10	72	110		2.432																
25								1	3	4	3	4	3	4	4	10	11	11	104	162	2.382																
30								2	3	4	3	4	4	3	8	11	11	11	10	136	210	2.340															
35							1	4	4	3	4	3	5	11	10	11	11	11	10	164	252	2.403															
40							4	3	4	3	4	7	11	10	11	11	11	10	25	178	292	2.434															
45					2	4	3	4	3	8	11	11	11	10	11	11	11	51	178	329	2.460																
280 fsw																																					
5																			3	3	H	1.236															
10															1	3	4	3	8	19	M	1.884															
15												2	3	4	4	3	4	3	42	65	N	2.438															
20										3	4	4	3	4	3	4	8	11	80	124		2.405															
25									3	4	3	4	3	4	4	7	10	11	11	115	179	2.342															
30							1	4	3	4	3	4	4	4	11	11	10	11	11	146	227	2.379															
35							1	4	3	4	3	4	4	8	11	11	11	10	11	11	176	272	2.452														
40							3	4	4	3	4	4	11	11	10	11	11	10	11	41	177	315	2.451														
45					2	3	4	4	3	6	11	10	11	11	11	10	11	11	69	177	354	2.477															
290 fsw																																					
5																			4	4	H	1.216															
10																2	4	3	4	7	20	M	2.091														
15													4	3	4	4	3	4	3	50	75		2.442														
20										2	4	4	3	4	3	4	4	10	11	88	137		2.410														
25										2	4	4	3	4	3	4	4	10	10	11	11	125	195	2.341													
30											1	3	4	3	4	4	3	4	8	11	11	10	11	11	158	246	2.401										
35											1	3	4	3	4	4	3	6	10	11	11	11	11	10	11	24	178	294	2.432								
40												3	4	3	4	4	3	9	11	10	11	11	11	11	10	11	57	177	339	2.458							
45																			2	3	4	3	4	4	10	11	11	11	10	11	11	10	20	78	178	381	2.459

B-18

BT (min)	DECOMPRESSION STOPS (fsw)																		TST (min)	RG	P _{DCS}		
	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30				20	
300 fsw																							
5																			5	5	H	1.212	
10												1	3	4	3	4	7	22	N	2.287			
15									2	4	4	3	4	3	4	6	56	86		2.443			
20								2	3	4	3	4	3	4	4	6	11	11	97	152	2.380		
25						2	3	4	3	4	4	3	4	6	11	11	11	10	136	212	2.338		
30					3	4	3	4	4	3	4	5	11	11	10	11	11	11	11	170	265	2.425	
35				4	3	4	3	4	4	3	10	11	11	10	11	11	11	39	178	317	2.424		
40			3	3	4	4	3	4	6	11	11	10	11	11	10	11	11	73	178	364	2.452		
310 fsw																							
6																			3	7	10	1.187	
10													2	4	3	4	3	9	25		2.441		
15										1	4	3	4	4	3	4	3	8	64	98	2.410		
20							1	3	4	3	4	4	3	4	3	10	11	10	107	167	2.348		
25					1	3	4	4	3	4	3	4	4	10	10	11	11	11	145	228	2.376		
30				3	3	4	4	3	4	3	4	9	11	10	11	11	11	17	178	286	2.404		
35			3	4	3	4	4	3	4	7	11	10	11	11	10	11	11	55	177	339	2.451		
40		3	3	4	3	4	4	3	11	11	10	11	11	11	10	11	24	77	178	389	2.45		
320 fsw																							
6																			1	4	7	12	1.207
10													4	3	4	3	4	15	33		2.439		
15										3	4	3	4	3	4	4	3	10	70	108	2.426		
20							3	3	4	4	3	4	3	4	5	11	11	11	115	181	2.340		
25						3	4	4	3	4	3	4	4	6	11	10	11	11	11	156	245	2.397	
30				2	4	3	4	4	3	4	3	6	11	11	10	11	11	11	31	178	307	2.396	
35			3	3	4	4	3	4	3	5	10	11	11	10	11	11	11	10	70	178	362	2.458	
40	2	4	3	4	4	3	4	8	11	11	10	11	11	11	10	11	42	78	177	415	2.452		

APPENDIX C XVAL-HE-9_023 1.3 ATM PO₂ HE-O₂ DECOMPRESSION TABLES (MSW)

No-Decompression Limits and Repetitive Group Designators

Depth (msw)	No-Stop Limit	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Z
6	unlimited	147	340	*													
9	384	28	44	62	82	104	130	160	197	244	308	384					
12	162	15	24	33	42	52	63	74	86	99	113	128	144	162			
15	394	29	46	64	84	107	134	165	203	252	322	394					
18	164	16	25	34	43	53	64	75	87	100	115	130	147	164			
21	105	11	17	23	29	35	42	49	56	64	72	80	89	98	105		
24	77	8	13	17	22	26	31	36	42	47	52	58	64	70	76	77	
27	50	7	10	14	17	21	25	29	33	37	41	46	50				
30	34	5	8	11	14	17	21	24	27	30	34						
33	26	4	7	10	12	15	18	20	23	26							
36	22	4	6	8	11	13	15	18	20	22							
39	18	3	5	7	9	11	13	15	18								
42	16	3	5	6	8	10	12	14	16								
45	13	3	4	6	7	9	11	12	13								
48	12	4	5	7	8	10	11	12									
51	10	3	5	6	7	9	10										
54	9	3	4	5	7	8	9										
57	8	4	5	6	7	8											
60	8	4	6	7	8												

C-1

*Highest repetitive group designator during dives to these depths

C-2

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}		
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6
9	msw																					
384																			0	0	K	2.215
420																			21	21	K	2.146
480																			47	47		2.061
540																			68	68		1.977
600																			83	83		1.917
660																			96	96		1.856
720																			105	105		1.814
12	msw																					
162																			0	0	M	2.404
170																			17	17	M	2.387
180																			37	37		2.359
190																			55	55		2.331
200																			71	71		2.307
210																			86	86		2.280
220																			100	100		2.252
230																			113	113		2.224
240																			125	125		2.199
270																			156	156		2.130
300																			181	181		2.074
330																			203	203		2.015
360																			221	221		1.968
390																			237	237		1.921
420																			250	250		1.887
450																			262	262		1.850
480																			272	272		1.820
15	msw																					
394																			0	0	K	2.156
420																			4	4	K	2.104
480																			11	11		2.023
540																			16	16		1.969
600																			21	21		1.888
660																			24	24		1.850
720																			27	27		1.797

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}		
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6
18	msw																					
164																			0	0	M	2.370
170																			3	3	M	2.365
180																			8	8	M	2.348
190																			13	13		2.324
200																			18	18		2.290
210																			22	22		2.284
220																			26	26		2.271
230																			30	30		2.250
240																			33	33		2.258
250																			37	37		2.227
260																			40	40		2.223
270																			44	44		2.181
280																			47	47		2.169
290																			50	50		2.151
300																			52	52		2.164
310																			55	55		2.138
320																			58	58		2.110
330																			60	60		2.111
340																			63	63		2.076
350																			65	65		2.071
360																			67	67		2.063

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}		
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6
21	msw																					
105																			0	0	N	2.385
110																			5	5	N	2.361
120																			13	13		2.366
130																			21	21		2.352
140																			29	29		2.321
150																			36	36		2.308
160																			42	42		2.315
170																			49	49		2.275
180																			55	55		2.258
190																			60	60		2.263
200																			66	66		2.225
210																			71	71		2.211
220																			76	76		2.189
24	msw																					
77																			0	0	O	2.673
80																			3	3		2.393
85																			10	10		2.361
90																			15	15		2.388
95																			21	21		2.373
100																			27	27		2.351
110																			37	37		2.354
120																			47	47		2.331
130																			56	56		2.319
140																			65	65		2.287
150																			73	73		2.271
160																			81	81		2.239
170																			88	88		2.225
180																			95	95		2.198
190																			101	101		2.192

C-4

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}		
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6
27	msw																					
50																			0	0	L	2.576
55																			1	1	M	2.530
60																			1	1	N	2.853
65																			6	6	O	2.380
70																			14	14		2.372
75																			21	21		2.386
80																			29	29		2.354
85																			36	36		2.345
90																			42	42		2.361
95																			49	49		2.332
100																			55	55		2.330
110																			67	67		2.300
120																			78	78		2.275
130																			88	88		2.259
140																			97	97		2.254
150																			106	106		2.229
160																			115	115		2.192

C-5

C-6

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}			
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6	
30	msw																						
34																				0	0	J	2.349
35																				1	1	K	2.016
40																				2	2	L	2.155
45																				2	2	M	2.630
50																				3	3	N	2.698
55																				8	8	O	2.393
60																				18	18		2.375
65																				27	27		2.374
70																				36	36		2.357
75																				44	44		2.360
80																				52	52		2.349
85																				60	60		2.326
90																				67	67		2.326
95																				74	74		2.315
100																				81	81		2.294
110																				93	93		2.293
120																				105	105		2.262
130																				116	116		2.244
140																				127	127		2.217

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}		
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6
33	msw																					
26																			0	0	I	2.236
30																			1	1	K	2.452
35																			3	3	L	2.298
40																			4	4	M	2.534
45																			5	5	O	2.742
50																			16	16		2.386
55																			27	27		2.386
60																			37	37		2.397
65																		1	46	47		2.386
70																		1	56	57		2.357
75																		1	65	66		2.346
80																		2	73	75		2.315
85																		2	81	83		2.309
90																		2	89	91		2.290
95																		2	96	98		2.293
100																		3	103	106		2.256
110																		3	116	119		2.256
120																		3	129	132		2.241
130																		3	141	144		2.249
140																		3	152	155		2.279

C-7

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}		
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6
36	msw																					
22																			0	0	I	2.387
25																			2	2	J	2.101
30																			3	3	L	2.642
35																			5	5	M	2.622
40																			6	6	O	2.961
45																		1	19	20	2.434	
50																		2	31	33	2.409	
55																		2	43	45	2.403	
60																		3	53	56	2.393	
65																		4	63	67	2.368	
70																	1	3	73	77	2.358	
75																	1	4	82	87	2.333	
80																	2	3	91	96	2.318	
85																	2	3	100	105	2.291	
90																	2	4	108	114	2.258	
95																	2	4	116	122	2.245	
100																	2	4	123	129	2.263	
110																	3	3	138	144	2.260	
120																	3	3	151	157	2.306	

C-8

C-9

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}		
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6
39	msw																					
18																			0	0	H	2.154
20																			1	1	I	2.276
25																			4	4	K	2.199
30																			6	6	M	2.462
35																			7	7	O	2.994
40																		2	19	21		2.477
45																		3	33	36		2.455
50																	1	4	45	50		2.421
55																	2	3	58	63		2.393
60																	3	3	69	75		2.367
65																	3	4	79	86		2.366
70																1	3	4	90	98		2.309
75																1	3	4	100	108		2.292
80																1	4	3	109	117		2.295
85																2	3	4	118	127		2.260
90																2	3	4	126	135		2.283
95																2	4	4	134	144		2.281
100																2	4	4	142	152		2.296
110																3	3	5	157	168		2.319
120																3	3	6	171	183		2.354

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}		
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6
42	msw																					
16																			0	0	H	2.281
20																			3	3	J	2.210
25																			6	6	L	2.345
30																		1	7	8	N	2.866
35																		3	16	19	N	2.511
40																	1	4	31	36	N	2.498
45																	2	4	45	51		2.498
50																	4	3	59	66		2.444
55																1	4	3	72	80		2.408
60																2	4	4	83	93		2.377
65																3	3	6	94	106		2.326
70																3	4	7	103	117		2.329
75														1	3	4	8	113	129		2.279	
80														1	4	3	9	122	139		2.280	
85														1	4	4	9	131	149		2.278	
90														2	3	4	10	140	159		2.261	
95														2	4	3	11	148	168		2.281	
100														2	4	4	11	156	177		2.294	

C-10

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}		
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6
45	msw																					
13																			0	0	H	1.738
15																			2	2	H	1.658
20																			6	6	K	1.816
25																		2	7	9	M	2.295
30																		4	9	13	O	2.541
35																	2	3	27		2.573	
40																	3	4	43	50	2.549	
45																2	3	4	58	67	2.490	
50																3	4	5	71	83	2.443	
55															1	3	4	8	83	99	2.387	
60														2	3	4	10	94	113		2.347	
65														2	4	5	10	105	126		2.325	
70														3	4	6	10	116	139		2.284	
75														4	3	8	10	126	151		2.265	
80														1	3	4	8	11	135	162		2.269
85														1	4	3	10	10	144	172		2.301
90														2	3	4	10	10	154	183		2.288

C-11

C-12

BT (min)	DECOMPRESSION STOPS (msw)																		TST (min)	RG	P _{DCS}		
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9				6	
48	msw																						
12																			0	0	H	1.918	
15																			4	4	I	1.509	
20																		1	7	8	K	1.995	
25																	1	3	8	12	N	2.363	
30																	3	4	19	26	N	2.537	
35																1	4	4	37	46		2.564	
40																3	3	5	54	65		2.536	
45															1	4	3	9	68	85		2.457	
50															2	4	5	10	81	102		2.420	
55															4	3	7	11	93	118		2.382	
60														1	4	3	10	10	106	134		2.318	
65														2	4	4	10	11	117	148		2.287	
70														3	3	6	10	11	128	161		2.277	
75														3	4	7	10	11	138	173		2.299	
80													1	3	4	8	10	11	149	186		2.277	
85													1	4	3	9	11	10	159	197		2.304	
90													1	4	4	9	11	10	169	208		2.320	
51	msw																						
10																			0	0	G	1.423	
15																			6	6	J	1.434	
20																		3	7	10	L	2.098	
25																	3	4	9	16	O	2.495	
30																3	3	4	29	39		2.528	
35															1	4	3	5	48	61		2.526	
40															2	4	3	10	63	82		2.515	
45															4	3	7	11	77	102		2.474	
50															2	3	4	10	11	91	121	2.416	
55															3	4	6	10	11	105	139	2.345	
60															1	3	4	8	11	10	118	155	2.317
65															2	3	4	10	11	10	130	170	2.293
70															2	4	5	10	11	11	141	184	2.288
75															3	4	6	11	10	11	152	197	2.313
80															4	3	8	10	11	10	164	210	2.320

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}						
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6				
54	msw																									
9																			0	0	G	1.353				
10																			1	1	G	1.498				
15																		1	7	8	J	1.498				
20																	2	4	7	13	M	2.085				
25																3	3	4	17	27	N	2.511				
30															2	4	3	4	40	53		2.491				
35														1	3	4	3	9	57	77		2.494				
40														2	4	3	7	11	73	100		2.461				
45														3	4	5	10	11	88	121		2.437				
50														1	4	3	9	11	103	141		2.399				
55														2	4	5	11	10	117	160		2.335				
60														4	3	8	10	11	131	177		2.313				
65														1	4	3	10	11	143	193		2.304				
70														2	4	4	11	10	156	208		2.314				
57	msw																									
8																			0	0	G	1.199				
10																			3	3	H	1.192				
15																		3	7	10	K	1.512				
20																	2	3	4	7	16	N	2.255			
25																2	4	3	4	27	40	N	2.471			
30																2	3	4	3	6	49	67	2.479			
35																4	3	4	5	11	66	93	2.471			
40																2	3	4	5	10	11	83	118	2.442		
45																3	3	4	10	11	10	99	140	2.437		
50																1	3	4	7	11	10	11	115	162	2.364	
55																2	4	3	11	10	11	11	129	181	2.344	
60																3	4	6	11	10	11	10	144	199	2.349	
65																1	4	3	9	10	11	10	11	157	216	2.346
70																2	3	4	11	10	11	10	11	170	232	2.352

C-13

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}			
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6	
60 msw																							
8																			0	0	G	1.663	
10																			4	4	H	1.293	
15																	2	3	7	12	L	1.630	
20															1	3	4	3	10	21	O	2.441	
25														2	3	4	3	4	37	53		2.442	
30													1	4	3	4	3	10	57	82		2.463	
35													3	4	3	4	10	10	76	110		2.451	
40												2	3	4	3	10	10	11	94	137		2.407	
45												3	3	4	8	10	11	11	111	161		2.377	
50												3	4	6	11	10	11	10	127	182		2.398	
55											1	4	4	9	11	10	11	10	143	203		2.378	
60											3	3	6	10	11	10	11	11	157	222		2.369	
63 msw																							
7																			0	0	G	1.358	
10																			6	6	I	1.109	
15																		4	3	7	14	L	1.768
20															3	4	3	4	18	32	N	2.430	
25													1	3	4	3	4	5	45	65		2.468	
30												1	3	4	3	4	6	11	66	98		2.439	
35												3	4	3	4	7	10	11	87	129		2.389	
40												1	4	3	4	7	10	11	105	156		2.389	
45												3	3	4	5	11	11	10	11	124	182		2.334
50												3	4	4	11	10	11	10	140	204		2.382	
55												1	3	4	9	10	11	10	157	226		2.405	
60												2	4	4	11	11	10	11	172	246		2.407	

C-14

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}		
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6
66	msw																					
6																			0	0	F	0.994
10																			7	7	I	1.246
15																2	4	3	7	16	M	1.976
20												2	4	3	4	3	4	3	27	43	N	2.425
25											3	4	3	4	4	4	7	54	79		2.439	
30										3	4	4	3	4	10	10	10	76	114		2.419	
35										3	3	4	3	4	11	10	11	97	146		2.379	
40									1	4	3	4	4	11	10	11	10	118	176		2.340	
45									2	4	3	4	11	10	11	10	11	136	202		2.360	
50									3	4	3	10	10	11	10	11	10	154	226		2.410	
55								1	3	4	7	10	11	11	10	11	10	172	250		2.409	
69	msw																					
6																			0	0	G	1.363
10																		2	7	9	J	1.213
15															1	4	3	4	7	19	N	2.177
20												1	4	3	4	3	4	35	54		2.433	
25											3	3	4	3	4	4	10	62	93		2.423	
30											3	4	3	4	3	7	10	86	131		2.380	
35											2	4	3	4	3	9	10	109	165		2.341	
40										1	3	4	4	3	9	10	11	130	196		2.332	
45										2	4	3	4	8	11	11	10	150	224		2.359	
50										3	4	3	8	10	11	10	11	168	249		2.427	
55									1	3	4	5	11	10	11	10	11	174	275		2.397	

C-15

C-16

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	RG	P _{DCS}										
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12				9	6								
72	msw																													
5																			0	0	F	0.877								
10																		4	7	11	J	1.211								
15															3	4	3	4	9	23	N	2.347								
20													3	4	3	4	4	3	44	65		2.435								
25										2	4	3	4	3	4	7	11	71	109			2.382								
30									2	4	4	3	4	3	10	11	11	96	148			2.350								
35									2	3	4	4	3	5	11	11	10	11	120	184		2.320								
40								1	3	4	3	4	6	11	10	11	10	11	142	216		2.344								
45								2	4	3	4	6	11	10	11	10	11	10	164	246		2.373								
50								3	4	3	6	10	11	10	11	11	10	21	174	274		2.399								
75	msw																													
5																			0	0	G	1.206								
10																	2	3	8	13	K	1.332								
15														2	3	4	3	4	14	30	N	2.424								
20											2	4	4	3	4	3	6	52	78			2.412								
25										1	4	3	4	4	3	4	10	11	80	124		2.365								
30										2	4	3	4	3	4	7	10	11	10	107	165	2.338								
35										2	3	4	3	4	3	10	10	11	10	11	132	203	2.304							
40										4	3	4	3	4	11	10	11	10	11	10	155	236	2.371							
45										2	3	4	3	5	10	11	10	11	11	10	14	174	268	2.412						
50										3	3	4	4	10	11	10	11	11	10	11	37	174	299	2.392						
78	msw																													
5																			0	0	G	1.575								
10																		3	4	7	14	K	1.494							
15														1	3	4	3	4	3	22	40	N	2.420							
20												2	3	4	3	4	3	4	9	59	91		2.394							
25															1	3	4	3	4	7	10	11	89	139	2.359					
30															1	4	4	3	4	3	4	10	11	11	10	118	183	2.297		
35															1	4	3	4	3	4	6	11	11	10	11	10	144	222	2.328	
40															3	4	3	4	3	9	10	11	11	10	11	10	168	257	2.406	
45															2	3	4	3	4	9	10	11	11	10	11	10	31	174	293	2.370

C-17

BT (min)	DECOMPRESSION STOPS (msw)																		TST (min)	RG	P _{DCS}	
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9				6
81 msw																						
5																			2	2	G	1.079
10																2	3	4	7	16	L	1.635
15													2	4	4	3	4	3	30	50	N	2.408
20									1	3	4	3	4	3	4	4	4	11	67	104		2.372
25								3	4	3	4	3	4	3	4	3	10	11	98	154		2.341
30							1	4	3	4	3	4	3	4	3	8	10	11	129	201		2.288
35							1	3	4	3	4	4	3	11	10	11	10	11	155	241		2.361
40							3	4	3	4	3	6	11	10	11	10	11	10	174	280		2.386
45					1	4	4	3	4	4	7	10	11	10	11	10	11	11	174	317		2.39
84 msw																						
5																			3	3	G	1.048
10																3	4	3	7	17	M	1.814
15												1	4	3	4	3	4	3	38	60	M	2.391
20										3	3	4	3	4	4	3	7	11	75	117		2.362
25								2	4	4	3	4	3	4	6	10	11	11	108	170		2.326
30								4	3	4	3	4	3	4	11	11	10	11	140	218		2.304
35								4	3	4	3	4	3	8	11	10	11	10	168	261		2.377
40						3	3	4	3	4	3	11	10	11	11	10	11	10	174	303		2.380
45				1	4	3	4	3	5	11	10	11	10	11	10	11	10	11	174	341		2.406
87 msw																						
5																			4	4	H	1.028
10															2	3	4	3	7	19	M	1.985
15													3	4	3	4	3	4	46	70	M	2.386
20									2	3	4	4	3	4	3	4	9	11	83	130		2.367
25								2	3	4	3	4	3	4	4	9	10	11	119	186		2.291
30								3	4	3	4	3	4	3	8	11	10	11	151	236		2.325
35							3	4	3	4	3	4	5	10	11	11	10	11	174	283		2.356
40					3	3	4	3	4	3	8	11	10	11	10	11	10	11	174	327		2.365
45			1	4	3	4	3	4	3	4	9	11	11	10	11	10	11	10	174	367		2.396

C-18

BT (min)	DECOMPRESSION STOPS (msw)																		TST (min)	RG	P _{Dcs}	
	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9				6
90 msw																						
5																			5	5	H	1.025
10															3	4	3	4	7	21	N	2.161
15										2	3	4	3	4	4	3	5	52	80			2.404
20							1	4	3	4	3	4	3	4	5	11	11	92	145			2.319
25						1	4	3	4	3	4	3	4	5	11	11	10	11	129	203		2.273
30					3	3	4	3	4	3	4	4	11	10	11	11	10	11	163	255		2.330
35				3	3	4	4	3	4	3	9	11	10	11	10	11	11	34	174	305		2.352
40			2	4	3	4	3	4	5	11	10	11	11	10	11	10	11	66	174	350		2.396
93 msw																						
6																		3	7	10		1.044
10													2	3	4	3	4	8	24			2.323
15										1	3	4	3	4	3	4	3	7	59	91		2.390
20								3	4	3	4	3	4	3	4	8	11	10	101	158		2.301
25						4	3	4	3	4	3	4	3	9	11	10	11	10	139	218		2.307
30				2	4	3	4	3	4	3	4	8	10	11	11	10	11	12	174	274		2.352
35			3	3	4	3	4	3	4	6	10	11	11	10	11	10	11	49	174	327		2.354
40		2	4	3	4	3	4	3	10	11	10	11	10	11	10	11	18	76	174	375		2.380
96 msw																						
6																		1	3	7	11	1.165
10														3	4	3	4	3	12	29		2.410
15										3	3	4	3	4	3	4	3	9	66	102		2.376
20							2	4	3	4	3	4	3	4	4	11	11	10	109	172		2.297
25						3	3	4	3	4	4	3	4	5	10	11	11	10	11	149	235	2.321
30			2	3	4	3	4	3	4	3	5	11	10	11	11	10	11	25	174	294		2.360
35		2	4	3	4	3	4	3	4	10	10	11	11	10	11	10	11	63	174	348		2.382
40	2	3	4	3	4	3	4	7	11	10	11	10	11	11	10	11	35	76	174	400		2.380

APPENDIX D XVAL-HE-9_040 1.3 ATM PO₂ HE-O₂ DECOMPRESSION TABLES (FSW)

BT (min)	DECOMPRESSION STOPS (fsw)																TST (min)	P _{DCS}						
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70			60	50	40	30	20	
80	fsw																							
86																						0	0	3.354
90																						3	3	2.992
100																						10	10	3.155
110																						17	17	3.289
120																						23	23	3.433
130																						29	29	3.551
140																						34	34	3.687
150																						39	39	3.803
160																						45	45	3.856
170																						52	52	3.849
180																						59	59	3.824
190																						65	65	3.825
200																						71	71	3.814
210																						76	76	3.835
220																						82	82	3.806
230																						87	87	3.810
240																						92	92	3.807

D-1

D-2

BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	P _{DCS}					
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60			50	40	30	20	
90	fsw																							
46																						0	0	2.539
50																						1	1	2.436
60																						2	2	2.778
70																						4	4	2.924
80																						14	14	3.070
90																						23	23	3.247
100																						31	31	3.423
110																						38	38	3.602
120																						45	45	3.750
130																						52	52	3.867
140																						61	61	3.873
150																						70	70	3.853
160																						78	78	3.860
170																						86	86	3.854
180																						93	93	3.878
190																						100	100	3.890
200																						107	107	3.891
210																						114	114	3.881
220																						120	120	3.903
230																						126	126	3.914
240																						132	132	3.917

D-3

BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	P _{DCS}						
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60			50	40	30	20		
100	fsw																								
32																						0	0	2.355	
40																						2	2	2.412	
50																						4	4	2.651	
60																						8	8	2.886	
70																						20	20	3.112	
80																						31	31	3.315	
90																						40	40	3.544	
100																						49	49	3.726	
110																						58	58	3.863	
120																						69	69	3.880	
130																						80	80	3.873	
140																						90	90	3.890	
150																						99	99	3.933	
160																						109	109	3.918	
170																						118	118	3.931	
180																						126	126	3.971	
190																						135	135	3.956	
200																						143	143	3.970	
210																						151	151	3.972	
220																						1	157	158	4.007
230																						1	165	166	3.988
240																						1	172	173	3.999

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}				
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20		
110	fsw																								
25																						0	0	2.305	
30																						2	2	2.262	
40																						4	4	2.824	
50																						7	7	2.978	
60																					1	21	22	3.118	
70																					2	33	35	3.360	
80																					2	45	47	3.573	
90																					3	55	58	3.769	
100																					3	66	69	3.905	
110																					3	80	83	3.878	
120																					3	92	95	3.912	
130																					3	104	107	3.924	
140																					4	114	118	3.965	
150																					4	125	129	3.981	
160																					4	136	140	3.981	
170																					4	146	150	4.011	
180																					4	156	160	4.026	
190																					4	165	169	4.068	
200																					4	175	179	4.056	
210																					5	183	188	4.071	
220																					14	183	197	4.064	
230																					1	22	182	205	4.089
240																					1	30	183	214	4.056

D-4

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}			
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20	
120	fsw																							
21																						0	0	2.392
30																						4	4	2.493
40																						7	7	2.937
50																		2	18			20	3.052	
60																		3	33			36	3.325	
70																		1	4	45		50	3.585	
80																		2	4	58		64	3.764	
90																		3	3	71		77	3.912	
100																		3	3	87		93	3.891	
110																		3	4	100		107	3.935	
120																		3	4	114		121	3.947	
130																		3	4	127		134	3.980	
140																		4	3	140		147	4.003	
150																		4	3	152		159	4.041	
160																		4	3	164		171	4.062	
170																		4	3	176		183	4.067	
180																		4	7	183		194	4.092	
190																		4	18	183		205	4.091	
200																		4	28	183		215	4.115	
210																		4	38	183		225	4.126	
220																		4	48	183		235	4.122	
230																		1	3	58	183	245	4.117	
240																		1	3	67	183	254	4.124	

D-5

D-6

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}			
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20	
130	fsw																							
18																					0	0	2.429	
20																					1	1	2.569	
30																					6	6	2.774	
40																				2	10	12	2.962	
50																			1	4	27	32	3.271	
60																			3	4	43	50	3.511	
70																		1	4	3	58	66	3.742	
80																		2	3	4	72	81	3.916	
90																		2	4	5	88	99	3.934	
100																		3	3	6	104	116	3.944	
110																		3	4	6	119	132	3.969	
120																		3	4	7	133	147	3.998	
130																		3	4	7	147	161	4.051	
140																		4	3	7	162	176	4.056	
150																		4	3	8	174	189	4.111	
160																		4	3	13	183	203	4.104	
170																		4	3	26	183	216	4.106	
180																		4	3	38	183	228	4.132	
190																		4	3	50	183	240	4.139	
200																		4	3	62	183	252	4.129	
210																		4	3	73	183	263	4.142	
220																		4	3	84	183	274	4.141	
230																		1	3	13	85	183	285	4.138
240																		1	3	23	85	183	295	4.143

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20
140	fsw																						
15																					0	0	2.127
20																					4	4	2.039
30																				1	8	9	2.843
40																			2	3	18	23	3.139
50																		1	3	4	37	45	3.434
60																		3	3	6	52	64	3.707
70																1	3	4	8	66	82	3.932	
80															2	3	4	10	84	103	103	3.929	
90															2	4	4	11	101	122	122	3.961	
100															3	3	6	10	118	140	140	4.004	
110															3	4	6	10	135	158	158	4.003	
120															3	4	6	11	150	174	174	4.046	
130															3	4	7	11	165	190	190	4.078	
140															3	4	7	11	180	205	205	4.122	
150															4	3	8	22	183	220	220	4.144	
160															4	3	8	37	183	235	235	4.136	
170															4	3	8	51	183	249	249	4.147	
180															4	3	8	64	183	262	262	4.177	
190															4	3	8	78	183	276	276	4.151	
200															4	3	13	86	182	288	288	4.181	
210															4	3	25	86	183	301	301	4.159	
220															4	3	37	86	183	313	313	4.154	
230															4	3	49	86	182	324	324	4.168	
240															1	3	4	60	85	183	336	4.148	

D-7

D-9

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}									
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20							
160	fsw																													
11																					0	0	1.616							
20																					2	7	9	1.945						
30																					4	3	14	21	2.882					
40																					3	4	6	32	45	3.494				
50																					3	3	6	11	48	71	3.846			
60																					2	3	4	10	11	68	98	3.977		
70																					3	4	7	10	11	90	125	3.993		
80																					1	4	3	10	10	11	111	150	3.986	
90																					2	3	4	11	11	10	131	172	4.028	
100																					2	4	5	11	10	11	149	192	4.104	
110																					3	3	6	11	11	10	168	212	4.130	
120																					3	4	6	11	11	14	182	231	4.144	
130																					3	4	7	10	11	31	183	249	4.166	
140																					3	4	7	11	11	48	183	267	4.167	
150																					4	3	8	10	11	66	182	284	4.190	
160																					4	3	8	10	11	82	183	301	4.176	
170																					4	3	8	11	23	85	183	317	4.188	
180																					4	3	8	11	38	86	183	333	4.175	
190																					4	3	8	11	54	85	183	348	4.176	
200																					4	3	8	11	68	86	183	363	4.159	
210																					4	3	8	11	83	85	183	377	4.166	
220																					4	3	8	22	86	85	183	391	4.159	
230																					4	3	8	36	86	85	183	405	4.134	
240																					1	3	4	8	49	86	85	183	419	4.107

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}			
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20	
170	fsw																							
10																					0	0	1.636	
20																			1	3	8	12	1.946	
30																		3	4	3	17	27	3.141	
40																	3	4	3	11	37	58	3.632	
50																2	4	4	11	11	54	86	4.032	
60															1	4	3	10	11	11	80	120	3.969	
70															3	4	6	10	11	11	103	148	4.024	
80														1	3	4	9	11	10	11	125	174	4.066	
90														2	3	4	10	11	11	11	146	198	4.062	
100														2	4	5	10	11	11	11	166	220	4.117	
110														3	3	6	11	10	11	14	183	241	4.159	
120														3	4	6	11	10	11	34	182	261	4.185	
130														3	4	7	10	11	11	52	183	281	4.169	
140														3	4	7	11	11	10	71	183	300	4.168	
150														4	3	7	11	11	13	86	183	318	4.175	
160														4	3	8	10	11	31	85	183	335	4.205	
170														4	3	8	11	10	48	86	182	352	4.204	
180														4	3	8	11	10	65	85	183	369	4.177	
190														4	3	8	11	11	80	85	183	385	4.173	
200														4	3	8	11	21	85	86	183	401	4.158	
210														4	3	8	11	36	86	85	183	416	4.155	
220														4	3	8	11	51	86	85	183	431	4.133	
230														4	3	8	11	66	85	86	183	446	4.099	
240														1	3	4	8	10	81	85	86	182	460	4.099

D-10

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20
180	fsw																						
9																					0	0	1.559
10																					2	2	1.286
20																			3	4	7	14	2.139
30																3	3	4	4	24	38	3.232	
40															3	3	4	8	11	42	71	3.816	
50														2	3	4	10	11	11	66	107	4.008	
60													1	3	4	9	10	11	11	93	142	4.008	
70													3	3	6	10	11	11	11	117	172	4.042	
80												1	3	4	8	11	11	10	11	141	200	4.105	
90												2	3	4	10	11	10	11	11	163	225	4.156	
100												2	4	4	11	11	10	13	183	249	4.153		
110												3	3	6	10	11	11	11	33	183	271	4.170	
120												3	4	6	11	10	11	11	54	183	293	4.172	
130												3	4	7	10	11	11	10	74	183	313	4.200	
140												3	4	7	11	10	11	18	86	183	333	4.181	
150												3	4	7	11	11	11	36	86	182	351	4.219	
160												4	3	8	10	11	11	55	86	182	370	4.201	
170												4	3	8	11	10	11	73	86	182	388	4.191	
180												4	3	8	11	10	16	85	86	183	406	4.166	
190												4	3	8	11	11	32	86	85	183	423	4.155	
200												4	3	8	11	11	49	85	86	183	440	4.120	
210												4	3	8	11	11	65	85	86	183	456	4.105	
220												4	3	8	11	11	80	86	85	183	471	4.111	
230												4	3	8	11	22	85	86	85	183	487	4.071	
240												4	3	8	11	37	85	86	85	183	502	4.047	

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D-12

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}			
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20	
190	fsw																							
8																					0	0	1.392	
10																					3	3	1.397	
20																		2	4	3	8	17	2.363	
30															2	4	3	4	7	29	49	3.365		
40															2	4	4	5	11	11	48	85	3.978	
50															1	4	3	9	11	11	10	78	127	4.055
60															4	3	8	11	10	11	11	106	164	4.062
70														2	4	5	10	11	11	11	10	133	197	4.105
80														4	3	8	11	11	10	11	11	157	226	4.154
90												1	4	4	9	11	11	11	10	11	11	181	253	4.232
100												2	4	4	11	10	11	11	11	32	183	279	4.151	
110												3	3	5	11	11	11	10	11	54	183	302	4.202	
120												3	4	6	10	11	11	11	10	76	183	325	4.191	
130												3	4	6	11	11	11	10	22	85	183	346	4.204	
140												3	4	7	11	10	11	11	41	86	183	367	4.188	
150												3	4	7	11	11	11	10	61	86	183	387	4.176	
160												4	3	8	10	11	11	11	80	85	183	406	4.186	
170												4	3	8	11	10	11	24	86	85	183	425	4.175	
180												4	3	8	11	10	11	43	85	86	183	444	4.133	
190												4	3	8	11	11	10	61	85	86	182	461	4.137	
200												4	3	8	11	11	10	78	85	86	183	479	4.100	
210												4	3	8	11	11	19	86	85	86	183	496	4.077	
220												4	3	8	11	11	36	86	85	86	182	512	4.067	
230												4	3	8	11	11	52	86	85	86	182	528	4.046	
240												4	3	8	11	11	68	85	86	85	183	544	4.017	

D-13

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20
200	fsw																						
7																					0	0	1.133
10																					5	5	1.172
20																	1	4	3	4	11	23	2.532
30														2	3	4	4	3	11	33	60	3.522	
40													2	4	3	4	10	11	11	57	102	4.043	
50												1	3	4	7	11	11	10	11	90	148	4.074	
60												3	4	7	10	11	11	10	11	120	187	4.143	
70											2	4	4	10	11	11	11	10	11	148	222	4.183	
80											3	4	7	11	11	11	10	11	11	175	254	4.187	
90										1	4	3	10	11	10	11	11	11	28	183	283	4.163	
100										2	4	4	10	11	11	11	10	11	52	183	309	4.217	
110										3	3	5	11	11	10	11	11	11	75	183	334	4.201	
120										3	3	6	11	11	11	10	11	23	85	183	357	4.224	
130										3	4	6	11	11	10	11	11	45	85	183	380	4.204	
140										3	4	7	11	10	11	11	11	65	86	183	402	4.181	
150										3	4	7	11	11	10	11	11	86	85	183	422	4.196	
160										4	3	8	10	11	11	11	31	86	85	183	443	4.171	
170										4	3	8	10	11	11	11	51	85	86	183	463	4.131	
180										4	3	8	11	10	11	11	70	85	86	183	482	4.119	
190										4	3	8	11	10	11	14	86	85	86	182	500	4.114	
200										4	3	8	11	11	10	33	85	86	85	183	519	4.068	
210										4	3	8	11	11	10	50	86	85	86	183	537	4.032	
220										4	3	8	11	11	10	67	86	85	86	183	554	4.017	
230										4	3	8	11	11	10	84	86	85	86	183	571	3.985	
240										4	3	8	11	11	25	86	85	86	85	183	587	3.971	

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20
210	fsw																						
7																					0	0	1.563
10																					6	6	1.305
20																	4	3	4	3	14	28	2.734
30														1	4	4	3	4	7	11	38	72	3.685
40													2	4	3	4	8	10	11	11	69	122	4.012
50												1	3	4	5	11	11	10	11	11	103	170	4.070
60												3	3	6	11	11	10	11	11	11	135	212	4.105
70											2	3	4	10	11	11	11	10	11	11	165	249	4.194
80											3	4	7	10	11	11	11	10	11	22	182	282	4.216
90										1	4	3	9	11	11	11	10	11	11	48	183	313	4.204
100										2	3	4	11	11	10	11	11	11	10	74	183	341	4.208
110										2	4	5	11	10	11	11	11	10	23	86	183	367	4.202
120										3	3	6	11	11	10	11	11	11	46	85	183	391	4.209
130										3	4	6	11	11	10	11	11	11	69	85	183	415	4.184
140										3	4	7	10	11	11	11	10	16	86	85	183	437	4.191
150										3	4	7	11	11	10	11	11	37	86	85	183	459	4.165
160										4	3	8	10	11	11	10	11	59	85	86	182	480	4.150
170										4	3	8	10	11	11	11	10	79	85	86	183	501	4.109
180										4	3	8	11	10	11	11	24	85	86	85	183	521	4.086
190										4	3	8	11	10	11	11	43	85	86	85	183	540	4.067
200										4	3	8	11	11	10	11	62	85	86	85	183	559	4.044
210										4	3	8	11	11	10	11	80	86	85	86	183	578	3.999
220										4	3	8	11	11	10	24	86	85	86	85	183	596	3.969
230										4	3	8	11	11	10	42	85	86	85	86	182	613	3.958
240										4	3	8	11	11	10	59	85	86	85	86	183	631	3.910

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BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}	
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20
220	fsw																						
6																					0	0	1.168
10																				1	7	8	1.258
20															3	3	4	3	4	16	33	2.964	
30												1	3	4	4	3	4	11	10	44	84	3.837	
40										2	3	4	4	5	11	10	11	11	11	81	142	3.997	
50								1	3	4	3	11	11	10	11	11	11	11	116	192	4.109		
60								2	4	5	10	11	11	11	10	11	11	11	150	236	4.206		
70								1	4	4	9	11	11	11	10	11	11	11	183	277	4.198		
80								3	4	6	11	10	11	11	11	10	11	41	183	312	4.221		
90								1	4	3	9	11	10	11	11	10	11	69	183	344	4.231		
100								2	3	4	11	10	11	11	11	10	11	21	85	183	373	4.216	
110								2	4	5	10	11	11	11	10	11	11	46	85	183	400	4.211	
120								3	3	6	11	11	10	11	11	10	11	71	85	183	426	4.194	
130								3	4	6	11	10	11	11	11	10	19	86	85	183	450	4.193	
140								3	4	7	10	11	11	11	10	11	42	86	85	183	474	4.153	
150								3	4	7	11	11	10	11	11	11	63	86	85	183	496	4.144	
160								4	3	7	11	11	10	11	11	11	85	86	85	183	518	4.118	
170								4	3	8	10	11	11	11	10	32	86	85	86	183	540	4.071	
180								4	3	8	11	10	11	11	11	52	86	85	86	182	560	4.063	
190								4	3	8	11	10	11	11	11	72	86	85	86	182	580	4.036	
200								4	3	8	11	11	10	11	18	85	86	85	86	182	600	4.000	
210								4	3	8	11	11	10	11	37	85	86	85	86	183	620	3.948	
220								4	3	8	11	11	10	11	55	86	85	86	85	183	638	3.939	
230								4	3	8	11	11	10	11	74	85	86	85	86	183	657	3.889	
240								4	3	8	11	11	10	17	86	85	86	85	86	183	675	3.853	

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BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}				
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20		
240	fsw																								
5																					0	0	1.038		
10																			1	3	8	12	1.280		
20														1	3	4	4	3	4	4	26	49	3.263		
30												3	4	3	4	3	5	10	11	11	60	114	3.968		
40									1	4	3	4	4	7	11	10	11	11	11	11	105	182	4.041		
50									4	3	4	6	11	11	11	10	11	11	11	11	146	239	4.143		
60									2	3	4	10	10	11	11	10	11	11	11	11	12	183	289	4.243	
70									1	3	4	8	11	11	11	10	11	11	10	11	49	183	334	4.258	
80									3	3	5	11	11	11	10	11	11	10	11	82	183	373	4.242		
90									1	3	4	8	11	10	11	11	10	11	11	38	85	183	408	4.236	
100									2	3	4	10	11	10	11	11	11	10	11	67	85	183	440	4.206	
110									2	4	4	11	11	10	11	11	10	11	19	86	85	183	469	4.204	
120									3	3	6	10	11	11	11	10	11	11	45	86	85	183	497	4.167	
130									3	4	6	10	11	11	11	10	11	11	71	85	86	182	523	4.145	
140									3	4	6	11	11	11	10	11	11	20	86	85	86	183	549	4.089	
150									3	4	7	11	10	11	11	11	10	11	45	85	86	85	183	573	4.062
160									3	4	7	11	11	11	10	11	11	67	85	86	85	183	596	4.044	
170									4	3	8	10	11	11	11	10	11	16	85	86	85	86	182	619	4.008
180									4	3	8	11	10	11	11	11	10	38	85	86	85	86	183	642	3.954
190									4	3	8	11	10	11	11	11	10	59	86	85	86	85	183	663	3.934
200									4	3	8	11	11	10	11	11	10	80	86	85	86	85	183	684	3.902
210									4	3	8	11	11	10	11	11	25	86	85	86	85	86	183	705	3.859
220									4	3	8	11	11	10	11	11	45	86	85	86	85	86	183	725	3.833
230									4	3	8	11	11	10	11	11	65	86	85	86	85	86	183	745	3.791
240									4	3	8	11	11	10	11	11	84	86	85	86	85	86	183	764	3.763

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BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20	
250	fsw																							
5																					0	0	1.399	
10																			2	4	7	13	1.432	
20														3	4	3	4	3	4	7	30	58	3.380	
30											3	3	4	3	4	4	8	10	11	11	71	132	3.948	
40									1	4	3	4	3	5	11	11	10	11	11	11	118	203	4.052	
50										3	4	4	4	11	11	11	10	11	11	11	10	162	263	4.215
60									1	4	4	8	11	11	10	11	11	10	11	11	31	183	317	4.246
70										4	3	8	11	10	11	11	10	11	11	11	68	183	363	4.264
80										2	4	5	10	11	11	10	11	11	10	29	86	182	404	4.267
90										4	3	8	11	10	11	10	11	11	10	61	85	183	441	4.221
100							1	4	4	4	9	11	11	10	11	11	10	17	85	86	182	474	4.214	
110							2	4	4	11	10	11	11	10	11	11	11	44	86	85	183	505	4.170	
120							3	3	5	11	11	11	10	11	11	10	11	72	85	86	183	534	4.127	
130							3	4	6	10	11	11	11	10	11	11	23	86	85	86	182	561	4.109	
140							3	4	6	11	11	11	10	11	11	10	49	85	86	85	183	587	4.067	
150							3	4	7	11	10	11	11	10	11	11	73	85	86	85	183	612	4.032	
160							3	4	7	11	11	11	10	11	10	23	85	86	85	86	182	636	3.998	
170							4	3	8	10	11	11	11	10	11	11	45	86	85	86	85	183	660	3.957
180							4	3	8	11	10	11	11	10	11	11	68	85	86	85	86	183	683	3.916
190							4	3	8	11	10	11	11	10	16	85	86	85	86	85	183	705	3.883	
200							4	3	8	11	11	10	11	10	37	86	85	86	85	86	183	727	3.85	
210							4	3	8	11	11	10	11	11	58	85	86	85	86	85	183	748	3.821	
220							4	3	8	11	11	10	11	11	78	86	85	86	85	86	183	769	3.778	
230							4	3	8	11	11	10	11	11	24	86	85	86	85	85	86	183	789	3.758
240							4	3	8	11	11	10	11	11	44	86	85	86	85	86	85	183	809	3.725

BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}	
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20
260	fsw																						
10																		1	3	4	7	15	1.575
20												2	4	3	4	3	4	4	4	9	35	68	3.486
30										2	4	3	4	3	4	5	10	11	11	11	81	149	3.959
40								1	3	4	3	4	4	9	11	11	10	11	11	10	132	224	4.104
50								3	4	4	3	10	11	11	10	11	11	11	11	10	179	289	4.213
60								1	4	4	7	10	11	11	11	10	11	11	11	10	183	345	4.278
70								3	4	7	11	10	11	11	11	10	11	11	11	14	183	394	4.257
80						2	4	4	4	11	10	11	11	11	10	11	11	10	52	85	183	437	4.242
90						4	3	8	10	11	11	10	11	11	11	10	11	11	85	85	183	475	4.214
100					1	4	3	10	11	11	10	11	11	11	10	11	11	41	86	85	183	510	4.173
110					2	4	4	10	11	11	11	10	11	11	11	10	11	71	85	86	183	542	4.133
120					3	3	5	11	11	11	10	11	11	10	11	11	24	86	85	86	182	571	4.114
130					3	3	6	11	11	11	10	11	11	11	10	11	51	85	86	85	183	599	4.073
140					3	4	6	11	11	10	11	11	11	10	11	11	77	85	86	85	183	626	4.030
150					3	4	7	11	10	11	11	11	10	11	11	27	86	85	86	85	183	652	3.989
160					3	4	7	11	11	10	11	11	11	10	11	52	85	86	85	86	183	677	3.945
170					4	3	8	10	11	11	11	10	11	11	10	76	86	85	86	85	183	701	3.919
180					4	3	8	11	10	11	11	10	11	11	24	86	85	86	85	86	183	725	3.869
190					4	3	8	11	10	11	11	11	10	11	47	86	85	86	85	86	183	748	3.835
200					4	3	8	11	10	11	11	11	10	11	70	85	86	85	86	85	183	770	3.803
210					4	3	8	11	11	10	11	11	11	16	85	86	85	86	85	86	183	792	3.772
220					4	3	8	11	11	10	11	11	11	37	86	85	86	85	86	85	183	813	3.750
230					4	3	8	11	11	10	11	11	11	58	86	85	86	85	86	85	183	834	3.714
240					4	3	8	11	11	10	11	11	11	78	86	85	86	85	86	85	183	854	3.695

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BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}	
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20
270	fsw																						
10																		2	4	4	7	17	1.729
20												1	4	3	4	4	3	4	5	10	40	78	3.619
30									2	3	4	3	4	4	3	8	11	11	11	10	92	166	4.000
40								4	3	4	3	4	7	11	10	11	11	11	10	11	146	246	4.115
50							3	4	3	4	8	11	11	10	11	11	11	10	11	24	183	315	4.221
60						1	4	4	5	11	11	10	11	11	11	10	11	11	11	69	183	374	4.266
70							3	4	6	11	10	11	11	11	10	11	11	11	10	37	85	183	4.277
80					2	3	4	11	11	10	11	11	11	10	11	11	11	10	75	85	183	470	4.229
90						3	4	7	11	10	11	11	11	10	11	11	10	35	85	86	183	510	4.188
100				1	4	3	10	10	11	11	11	10	11	11	11	10	11	67	85	86	183	546	4.143
110				2	4	3	11	11	11	10	11	11	11	10	11	11	22	86	85	86	183	579	4.099
120				2	4	5	11	11	10	11	11	11	10	11	11	11	51	85	86	85	183	609	4.077
130				3	3	6	11	11	11	10	11	11	11	10	11	11	79	86	85	86	182	638	4.033
140				3	4	6	11	11	10	11	11	11	10	11	11	31	86	85	86	85	183	666	3.977
150				3	4	7	11	10	11	11	10	11	11	11	10	57	86	85	86	85	183	692	3.953
160				3	4	7	11	11	10	11	11	11	10	11	11	82	86	85	86	85	183	718	3.896
170				4	3	8	10	11	11	10	11	11	11	10	11	10	32	86	85	86	183	743	3.863
180				4	3	8	10	11	11	11	10	11	11	11	56	85	86	85	86	85	183	767	3.828
190				4	3	8	11	10	11	11	11	10	11	11	79	86	85	86	85	86	183	791	3.783
200				4	3	8	11	10	11	11	11	10	11	28	85	86	85	86	85	86	182	813	3.773
210				4	3	8	11	11	10	11	11	11	10	50	86	85	86	85	86	85	183	836	3.732
220				4	3	8	11	11	10	11	11	11	10	72	86	85	86	85	86	85	183	858	3.696
230				4	3	8	11	11	10	11	11	11	18	86	85	86	85	86	85	86	182	879	3.680
240				4	3	8	11	11	10	11	11	11	39	86	85	86	85	86	85	86	182	900	3.651

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BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}	
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20
280	fsw																						
10																	1	3	4	3	8	19	1.884
20												3	4	4	3	4	3	4	8	11	44	88	3.749
30								1	4	3	4	3	4	4	4	11	11	10	11	11	103	184	3.994
40							3	4	4	3	4	4	11	11	10	11	11	10	11	11	160	268	4.169
50						3	4	3	4	6	11	11	10	11	11	10	11	11	11	41	183	341	4.252
60					1	4	3	5	10	11	11	11	10	11	11	11	10	11	15	85	183	403	4.287
70					3	3	6	11	10	11	11	10	11	11	11	10	11	11	58	86	183	457	4.249
80				2	3	4	10	11	11	10	11	11	11	10	11	11	11	23	85	86	183	504	4.212
90				3	4	6	11	11	11	10	11	11	11	10	11	11	11	59	86	85	183	545	4.164
100			1	4	3	9	11	11	11	10	11	11	11	10	11	11	18	86	85	86	183	583	4.106
110			2	3	4	11	11	10	11	11	11	10	11	11	11	10	50	86	85	86	182	616	4.077
120			2	4	5	11	10	11	11	11	10	11	11	11	10	11	80	85	86	85	183	648	4.023
130			3	3	6	11	11	10	11	11	11	10	11	11	11	33	85	86	85	86	183	678	3.969
140			3	4	6	11	11	10	11	11	11	10	11	11	10	61	86	85	86	85	183	706	3.945
150			3	4	7	10	11	11	11	10	11	11	11	10	13	85	86	85	86	85	183	733	3.897
160			3	4	7	11	11	10	11	11	11	10	11	11	38	85	86	85	86	85	183	759	3.871
170			4	3	7	11	11	11	10	11	11	11	10	11	11	64	85	86	85	86	183	785	3.817
180			4	3	8	10	11	11	11	10	11	11	11	13	85	86	85	86	85	86	183	810	3.776
190			4	3	8	11	10	11	11	11	10	11	11	37	86	85	86	85	86	85	183	834	3.752
200			4	3	8	11	10	11	11	11	10	11	11	61	85	86	85	86	85	86	183	858	3.704
210			4	3	8	11	11	10	11	11	11	10	11	84	85	86	85	86	85	86	183	881	3.680
220			4	3	8	11	11	10	11	11	11	10	32	86	85	86	85	86	85	85	183	903	3.660
230			4	3	8	11	11	10	11	11	11	10	54	85	86	85	86	85	86	85	183	925	3.630
240			4	3	8	11	11	10	11	11	11	10	75	86	85	86	85	86	85	86	183	947	3.598

D-21

BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}	
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20
290	fsw																						
10																	2	4	3	4	7	20	2.091
20											2	4	4	3	4	3	4	4	10	11	49	98	3.882
30								1	3	4	3	4	4	3	4	8	11	11	10	11	11	203	4.007
40						3	4	3	4	4	3	9	11	10	11	11	11	10	11	11	176	292	4.172
50					3	4	3	4	4	11	10	11	11	11	10	11	11	11	10	60	183	368	4.262
60				1	4	3	4	10	11	10	11	11	11	10	11	11	11	10	36	85	183	433	4.300
70				2	4	5	10	11	11	11	10	11	11	11	10	11	11	11	80	86	183	489	4.253
80			1	4	4	9	11	11	11	10	11	11	11	10	11	11	11	47	86	85	183	538	4.205
90			3	4	6	11	10	11	11	11	10	11	11	11	10	11	11	85	86	85	183	581	4.145
100		1	4	3	9	11	10	11	11	11	10	11	11	11	10	11	46	85	86	85	183	620	4.075
110		2	3	4	11	10	11	11	11	10	11	11	11	10	11	11	77	86	85	86	183	655	4.029
120		2	4	5	10	11	11	11	10	11	11	11	10	11	11	33	86	85	86	85	183	687	3.987
130		3	3	6	11	11	10	11	11	10	11	11	11	10	11	63	85	86	85	86	183	718	3.935
140		3	4	6	11	10	11	11	11	10	11	11	11	10	17	85	86	85	86	85	183	747	3.889
150		3	4	7	10	11	11	11	10	11	11	11	10	11	43	86	85	86	85	86	183	775	3.853
160		3	4	7	11	11	10	11	11	11	10	11	11	11	69	86	85	86	85	86	183	802	3.807
170		4	3	7	11	11	11	10	11	11	11	10	11	21	85	86	85	86	85	86	183	828	3.773
180		4	3	8	10	11	11	11	10	11	11	11	10	46	86	85	86	85	86	85	183	853	3.747
190		4	3	8	11	10	11	11	11	10	11	11	11	70	86	85	86	85	86	85	183	878	3.709
200		4	3	8	11	10	11	11	11	10	11	11	20	85	86	85	86	85	86	85	183	902	3.680
210		4	3	8	11	11	10	11	11	10	11	11	44	85	86	85	86	85	86	85	183	926	3.642
220		4	3	8	11	11	10	11	11	11	10	11	67	85	86	85	86	85	86	85	183	949	3.617
230		4	3	8	11	11	10	11	11	11	10	15	85	86	85	86	85	86	85	86	183	972	3.583
240		4	3	8	11	11	10	11	11	11	10	37	85	86	85	86	85	86	85	86	183	994	3.557

D-22

D-23

BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20	
300	fsw																							
10																	1	3	4	3	4	7	22	2.287
20										2	3	4	3	4	3	4	4	6	11	11	56	111	3.934	
30								3	4	3	4	4	3	4	5	11	11	10	11	11	11	126	221	4.054
40					3	3	4	4	3	4	6	11	11	10	11	11	11	10	11	20	182	315	4.225	
50				3	3	4	4	3	10	10	11	11	11	10	11	11	11	10	11	79	183	396	4.258	
60			1	4	3	4	8	11	11	11	10	11	11	11	10	11	11	11	57	85	183	464	4.274	
70			2	4	4	10	11	11	11	10	11	11	11	10	11	11	11	29	86	85	183	522	4.251	
80		1	4	3	10	10	11	11	11	10	11	11	11	10	11	11	11	72	86	85	183	573	4.181	
90		3	3	6	11	11	11	10	11	11	11	10	11	11	11	10	37	86	85	86	183	618	4.097	
100	1	3	4	9	10	11	11	11	10	11	11	10	11	11	11	10	73	86	85	86	183	658	4.034	
110	2	3	4	10	11	11	11	10	11	11	11	10	11	11	10	32	85	86	85	86	183	694	3.98	
120	2	4	5	10	11	11	10	11	11	11	10	11	11	11	10	63	85	86	85	86	183	727	3.938	
130	3	3	6	11	10	11	11	11	10	11	11	11	10	11	18	86	85	86	85	86	183	759	3.876	
140	3	4	6	11	10	11	11	11	10	11	11	11	10	11	47	86	85	86	85	86	182	788	3.860	
150	3	4	7	10	11	11	11	10	11	11	11	10	11	11	75	85	86	85	86	85	183	817	3.804	
160	3	4	7	11	11	10	11	11	11	10	11	11	10	27	86	85	86	85	86	85	183	844	3.779	
170	4	3	7	11	11	11	10	11	11	11	10	11	11	53	86	85	86	85	86	85	183	871	3.733	
180	4	3	8	10	11	11	11	10	11	11	11	10	11	79	86	85	86	85	86	85	183	897	3.698	
190	4	3	8	11	10	11	11	11	10	11	11	10	30	86	85	86	85	86	85	86	183	923	3.656	
200	4	3	8	11	10	11	11	11	10	11	11	11	54	85	86	85	86	85	86	85	183	947	3.633	
210	4	3	8	11	11	10	11	11	10	11	11	11	78	85	86	85	86	85	86	85	183	971	3.613	
220	4	3	8	11	11	10	11	11	11	10	11	27	86	85	86	85	86	85	86	85	183	995	3.580	
230	4	3	8	11	11	10	11	11	11	10	11	50	86	85	86	85	86	85	86	85	183	1018	3.555	
240	4	3	8	11	11	10	11	11	11	10	11	73	85	86	85	86	85	86	85	86	183	1041	3.526	

APPENDIX E XVAL-HE-9_040 1.3 ATM PO₂ HE-O₂ DECOMPRESSION TABLES (MSW)

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
24	msw																							
90																						0	0	3.248
100																						8	8	3.040
110																						14	14	3.200
120																						20	20	3.332
130																						26	26	3.44
140																						31	31	3.566
150																						35	35	3.713
160																						40	40	3.800
170																						47	47	3.785
180																						53	53	3.795
190																						59	59	3.789
200																						65	65	3.769
210																						71	71	3.740
220																						76	76	3.744
230																						81	81	3.741
240																						86	86	3.730

E-1

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
27	msw																							
50																						0	0	2.576
60																						1	1	2.853
70																						2	2	3.131
80																						11	11	3.005
90																						20	20	3.167
100																						28	28	3.329
110																						35	35	3.497
120																						42	42	3.632
130																						48	48	3.781
140																						56	56	3.819
150																						65	65	3.789
160																						73	73	3.785
170																						80	80	3.810
180																						88	88	3.781
190																						94	94	3.825
200																						101	101	3.816
210																						108	108	3.797
220																						114	114	3.809
230																						120	120	3.812
240																						126	126	3.806

E-2

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
30	msw																							
34																						0	0	2.349
40																						2	2	2.155
50																						3	3	2.698
60																						5	5	2.935
70																						17	17	3.046
80																						28	28	3.231
90																						37	37	3.444
100																						46	46	3.612
110																						55	55	3.737
120																						64	64	3.826
130																						75	75	3.805
140																						85	85	3.808
150																						94	94	3.838
160																						103	103	3.853
170																						112	112	3.854
180																						120	120	3.882
190																						128	128	3.897
200																						136	136	3.900
210																						144	144	3.892
220																						151	151	3.914
230																						158	158	3.925
240																						165	165	3.926

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6	
33	msw																							
26																						0	0	2.236
30																						1	1	2.452
40																						4	4	2.534
50																						6	6	2.950
60																						19	19	3.048
70																				1	31	32	3.277	
80																				2	42	44	3.471	
90																				2	53	55	3.647	
100																				3	62	65	3.819	
110																				3	75	78	3.819	
120																				3	87	90	3.837	
130																				3	98	101	3.877	
140																				3	109	112	3.898	
150																				3	120	123	3.902	
160																				3	131	134	3.890	
170																				3	141	144	3.906	
180																				3	150	153	3.950	
190																				3	160	163	3.940	
200																				3	169	172	3.957	
210																				3	178	181	3.962	
220																				10	179	189	3.985	
230																				18	179	197	3.994	
240																				26	179	205	3.991	

E-4

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6	
36	msw																							
22																						0	0	2.387
30																						3	3	2.642
40																						6	6	2.961
50																				2	15	17	2.984	
60																				3	30	33	3.236	
70																				1	3	43	47	3.479
80																				2	3	55	60	3.681
90																				2	4	67	73	3.820
100																				2	4	81	87	3.865
110																				3	3	96	102	3.852
120																				3	3	109	115	3.891
130																				3	4	121	128	3.911
140																				3	4	134	141	3.908
150																				3	4	146	153	3.933
160																				3	4	157	164	3.981
170																				3	4	169	176	3.974
180																				3	4	180	187	3.991
190																				3	15	179	197	4.019
200																				3	25	179	207	4.031
210																				3	35	179	217	4.031
220																				3	45	179	227	4.017
230																				3	54	179	236	4.028
240																				3	63	179	245	4.027

E-5

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6
39	msw																						
18																					0	0	2.154
20																					1	1	2.276
30																					6	6	2.462
40																				2	8	10	2.96
50																			1	4	25	30	3.147
60																			3	3	41	47	3.404
70																		1	3	4	55	63	3.625
80																		1	4	3	69	77	3.821
90																		2	3	4	85	94	3.846
100																		2	4	4	100	110	3.89
110																		3	3	5	115	126	3.897
120																		3	3	6	129	141	3.913
130																		3	3	6	143	155	3.951
140																		3	4	6	156	169	3.979
150																		3	4	6	169	182	4.019
160																		3	4	9	179	195	4.039
170																		3	4	22	179	208	4.028
180																		3	4	34	179	220	4.040
190																		3	4	45	180	232	4.037
200																		3	4	57	179	243	4.054
210																		3	4	68	179	254	4.057
220																		3	4	79	179	265	4.045
230																		3	9	84	180	276	4.020
240																		3	19	84	180	286	4.017

E-6

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6
42	msw																						
16																					0	0	2.281
20																					3	3	2.210
30																				1	7	8	2.866
40																			1	4	16	21	3.035
50																			4	3	34	41	3.364
60																		2	4	4	51	61	3.577
70																		3	4	7	63	77	3.856
80																	1	4	3	9	81	98	3.843
90																	2	3	4	10	97	116	3.892
100																	2	4	4	11	113	134	3.910
110																	3	3	5	11	129	151	3.932
120																	3	3	6	10	145	167	3.974
130																	3	3	6	11	159	182	4.026
140																	3	4	6	10	175	198	4.031
150																	3	4	6	20	180	213	4.030
160																	3	4	6	34	180	227	4.047
170																	3	4	6	48	180	241	4.045
180																	3	4	6	62	179	254	4.061
190																	3	4	6	75	179	267	4.060
200																	3	4	9	84	180	280	4.045
210																	3	4	21	84	180	292	4.047
220																	3	4	33	84	179	303	4.068
230																	3	4	44	84	180	315	4.040
240																	3	4	55	85	179	326	4.030

E-7

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}				
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6		
45	msw																								
13																						0	0	1.738	
20																						6	6	1.816	
30																						4	8	12	2.636
40																			3	4	24	31	3.236		
50																		3	4	5	42	54	3.523		
60																	2	3	4	10	56	75	3.789		
70																	3	4	6	10	74	97	3.887		
80																1	3	4	8	11	93	120	3.863		
90																2	3	4	10	10	111	140	3.906		
100																2	4	4	10	11	128	159	3.931		
110																2	4	5	10	11	145	177	3.971		
120																3	3	5	11	11	161	194	4.022		
130																3	3	6	11	10	178	211	4.050		
140																3	4	5	11	25	180	228	4.037		
150																3	4	6	10	41	179	243	4.087		
160																3	4	6	11	55	180	259	4.068		
170																3	4	6	11	70	180	274	4.066		
180																3	4	6	12	84	179	288	4.082		
190																3	4	6	26	84	179	302	4.083		
200																3	4	6	39	84	180	316	4.065		
210																3	4	6	53	84	179	329	4.062		
220																3	4	6	65	85	179	342	4.044		
230																3	4	6	78	84	179	354	4.046		
240																3	4	12	84	84	179	366	4.037		

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6
48	msw																						
12																					0	0	1.918
20																				1	7	8	1.995
30																			3	4	12	19	2.782
40																	3	3	5	31	42	3.378	
50																2	4	5	10	47	68	3.696	
60															1	4	3	10	10	65	93	3.879	
70														3	3	6	10	11	86	119	3.873		
80									1	3	4	8	10	11	106	143	3.897						
90								1	4	4	9	11	10	125	164	3.957							
100								2	4	3	11	10	11	144	185	3.961							
110								2	4	4	11	11	10	162	204	4.015							
120								3	3	5	11	10	12	179	223	4.038							
130								3	3	6	11	10	29	179	241	4.056							
140								3	3	6	11	11	45	179	258	4.076							
150								3	4	6	10	11	62	179	275	4.088							
160								3	4	6	10	11	78	180	292	4.063							
170								3	4	6	11	20	84	179	307	4.100							
180								3	4	6	11	35	84	180	323	4.079							
190								3	4	6	11	50	85	179	338	4.070							
200								3	4	6	11	65	84	180	353	4.045							
210								3	4	6	11	79	84	180	367	4.041							
220								3	4	6	20	84	84	180	381	4.024							
230								3	4	6	33	85	84	179	394	4.021							
240								3	4	6	46	85	84	179	407	4.003							

E-9

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6
51	msw																						
10																					0	0	1.423
20																				3	7	10	2.098
30																		3	3	4	16	26	2.992
40																2	4	3	10	35	54	3.550	
50															2	3	4	10	11	52	82	3.898	
60														1	3	4	8	11	10	76	113	3.917	
70														2	4	5	10	11	11	98	141	3.915	
80														4	3	8	10	11	10	120	166	3.963	
90													1	4	3	10	10	11	10	141	190	3.975	
100													2	3	4	10	11	11	10	161	212	3.995	
110													2	4	4	11	10	11	11	180	233	4.028	
120													3	3	5	11	10	11	30	179	252	4.082	
130													3	3	6	10	11	11	48	179	271	4.096	
140													3	3	6	11	10	11	66	180	290	4.078	
150													3	4	6	10	11	10	85	179	308	4.085	
160													3	4	6	10	11	27	85	179	325	4.096	
170													3	4	6	11	10	45	84	179	342	4.086	
180													3	4	6	11	10	61	84	179	358	4.084	
190													3	4	6	11	10	77	84	179	374	4.069	
200													3	4	6	11	18	84	84	180	390	4.046	
210													3	4	6	11	33	84	85	179	405	4.034	
220													3	4	6	11	48	84	84	180	420	4.006	
230													3	4	6	11	62	85	84	179	434	3.993	
240													3	4	6	11	76	84	85	179	448	3.970	

E-10

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
54	msw																							
9																						0	0	1.353
10																						1	1	1.498
20																			2	4	7	13	2.085	
30																2	4	3	4	21	34	3.178		
40															2	4	3	7	11	40	67	3.695		
50														1	4	3	9	11	10	62	100	3.962		
60														4	3	8	10	11	10	88	134	3.947		
70													2	4	4	11	10	11	10	112	164	3.966		
80													3	4	7	11	10	11	10	135	191	3.996		
90												1	4	3	9	11	10	11	10	157	216	4.042		
100												2	3	4	10	11	10	11	10	179	240	4.044		
110												2	4	4	11	10	11	10	31	179	262	4.062		
120												3	3	5	11	10	11	10	51	179	283	4.081		
130												3	3	6	10	11	10	11	70	179	303	4.085		
140												3	3	6	11	10	11	15	84	179	322	4.101		
150												3	4	6	10	11	10	34	84	179	341	4.108		
160												3	4	6	10	11	11	51	84	180	360	4.067		
170												3	4	6	11	10	11	69	84	179	377	4.080		
180												3	4	6	11	10	13	84	84	179	394	4.078		
190												3	4	6	11	10	30	84	84	179	411	4.056		
200												3	4	6	11	10	46	84	84	180	428	4.015		
210												3	4	6	11	10	62	84	84	180	444	3.991		
220												3	4	6	11	10	77	84	85	179	459	3.988		
230												3	4	6	11	19	84	84	84	179	474	3.972		
240												3	4	6	11	33	85	84	84	179	489	3.941		

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E-12

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6
57	msw																						
8																					0	0	1.199
10																					3	3	1.192
20																		2	3	4	7	16	2.255
30														2	3	4	3	6	27	45	3.282		
40												2	3	4	5	10	11	46	81	3.840			
50											1	3	4	7	11	10	11	73	120	3.962			
60											3	4	6	11	10	11	10	101	156	3.974			
70										2	3	4	11	10	11	10	11	126	188	3.986			
80										3	4	6	11	10	11	11	10	151	217	4.026			
90									1	4	3	9	10	11	10	11	10	175	244	4.069			
100									2	3	4	10	10	11	10	11	28	180	269	4.053			
110									2	4	4	10	11	10	11	11	49	180	292	4.078			
120									2	4	5	10	11	11	10	11	71	179	314	4.091			
130									3	3	6	10	11	10	11	18	84	179	335	4.107			
140									3	3	6	11	10	11	10	38	84	180	356	4.081			
150									3	4	5	11	11	10	11	57	84	180	376	4.064			
160									3	4	6	10	11	10	11	76	84	180	395	4.056			
170									3	4	6	11	10	11	21	84	84	179	413	4.070			
180									3	4	6	11	10	11	39	84	84	179	431	4.052			
190									3	4	6	11	10	11	56	84	85	179	449	4.013			
200									3	4	6	11	10	11	73	84	85	179	466	3.998			
210									3	4	6	11	10	17	84	84	85	179	483	3.967			
220									3	4	6	11	10	33	85	84	84	179	499	3.951			
230									3	4	6	11	10	49	84	85	84	179	515	3.923			
240									3	4	6	11	11	64	84	84	84	180	531	3.888			

E-13

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6		
60	msw																								
8																					0	0	1.663		
10																					4	4	1.293		
20																	1	3	4	3	10	21	2.441		
30														1	4	3	4	3	10	31	56	3.422			
40													2	3	4	3	10	10	11	53	96	3.971			
50													3	4	6	11	10	11	10	85	140	3.996			
60														3	6	10	11	10	11	114	179	3.981			
70												2	3	4	10	10	11	10	11	10	143	214	4.001		
80													3	4	6	10	11	10	11	168	244	4.066			
90													1	3	4	8	11	10	11	24	180	273	4.050		
100													2	3	4	9	11	10	11	48	180	299	4.076		
110													2	4	3	11	11	10	11	71	179	323	4.095		
120													2	4	5	10	11	10	11	84	179	346	4.107		
130													3	3	5	11	11	10	11	41	84	179	368	4.115	
140													3	3	6	11	10	11	10	61	84	180	390	4.080	
150													3	4	5	11	11	10	11	82	84	179	410	4.091	
160													3	4	6	10	11	10	11	28	84	84	179	430	4.077
170													3	4	6	10	11	11	10	47	84	85	179	450	4.032
180													3	4	6	11	10	11	10	66	84	84	180	469	4.011
190													3	4	6	11	10	11	10	85	84	84	179	487	3.997
200													3	4	6	11	10	11	28	85	84	84	179	505	3.970
210													3	4	6	11	10	11	46	84	84	84	180	523	3.928
220													3	4	6	11	10	11	63	84	84	84	180	540	3.905
230													3	4	6	11	10	11	80	84	84	84	180	557	3.866
240													3	4	6	11	11	22	84	84	84	180	573	3.847	

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}	
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6
63	msw																						
7																					0	0	1.358
10																					6	6	1.109
20																	3	4	3	4	12	26	2.639
30													1	3	4	3	4	6	11	36	68	3.557	
40												1	4	3	4	7	10	11	11	64	115	3.952	
50												3	4	4	11	10	11	10	11	97	161	4.010	
60											2	4	4	11	11	10	11	10	11	129	203	3.997	
70									1	4	3	10	10	11	10	11	10	11	10	11	158	239	4.067
80									3	3	6	10	11	11	10	11	10	11	10	18	179	272	4.076
90									1	3	4	8	10	11	10	11	10	11	43	180	302	4.090	
100									1	4	3	10	11	10	11	10	11	10	69	179	329	4.105	
110									2	4	3	11	10	11	10	11	11	18	84	180	355	4.093	
120									2	4	4	11	11	10	11	10	11	42	84	179	379	4.103	
130									3	3	5	11	10	11	11	10	11	64	84	179	402	4.094	
140									3	3	6	10	11	11	10	11	12	84	84	179	424	4.090	
150									3	3	6	11	11	10	11	10	33	85	84	179	446	4.060	
160									3	4	6	10	11	10	11	11	53	85	84	179	467	4.029	
170									3	4	6	10	11	11	10	11	73	85	84	179	487	4.014	
180									3	4	6	11	10	11	10	20	84	85	84	179	507	3.981	
190									3	4	6	11	10	11	10	39	85	84	84	179	526	3.953	
200									3	4	6	11	10	11	11	57	84	84	84	180	545	3.920	
210									3	4	6	11	10	11	11	75	84	85	84	179	563	3.895	
220									3	4	6	11	10	11	20	84	84	85	84	179	581	3.859	
230									3	4	6	11	10	11	37	85	84	84	84	179	598	3.842	
240									3	4	6	11	11	10	54	84	85	84	84	179	615	3.814	

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E-15

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
66	msw																							
6																						0	0	0.994
10																						7	7	1.246
20																2	4	3	4	3	16	32	2.814	
30													3	4	4	4	3	4	10	10	41	79	3.737	
40												1	4	3	4	4	11	10	11	10	76	134	3.937	
50												3	4	3	10	10	11	10	11	10	111	183	4.025	
60											2	3	4	11	10	11	10	11	10	11	144	227	4.056	
70									1	3	4	9	10	11	10	11	10	11	10	11	11	175	266	4.090
80									3	3	5	11	10	11	10	11	10	11	11	10	36	180	301	4.079
90									4	3	8	10	11	10	11	11	10	11	10	11	63	180	332	4.094
100									1	4	3	10	10	11	10	11	11	10	16	84	180	361	4.098	
110									2	3	4	11	10	11	10	11	10	11	11	41	84	180	388	4.083
120									2	4	4	11	10	11	11	10	11	10	65	85	179	413	4.076	
130									3	3	5	11	10	11	10	11	11	14	84	84	180	437	4.070	
140									3	3	6	10	11	11	10	11	10	38	84	84	179	460	4.059	
150									3	3	6	11	10	11	11	10	11	59	84	84	179	482	4.036	
160									3	4	6	10	11	10	11	10	11	81	84	84	179	504	4.007	
170									3	4	6	10	11	11	10	11	28	84	84	84	179	525	3.980	
180									3	4	6	11	10	11	10	11	48	84	84	84	180	546	3.935	
190									3	4	6	11	10	11	10	11	68	84	84	84	180	566	3.901	
200									3	4	6	11	10	11	10	14	84	85	84	84	179	585	3.877	
210									3	4	6	11	10	11	11	32	84	84	85	84	179	604	3.845	
220									3	4	6	11	10	11	11	50	85	84	84	84	179	622	3.831	
230									3	4	6	11	10	11	11	69	84	84	84	84	180	641	3.776	
240									3	4	6	11	11	10	13	85	84	84	84	84	180	659	3.736	

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BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6		
69	msw																								
6																						0	0	1.363	
10																					2	7	9	1.213	
20															1	4	3	4	3	4	3	4	18	37	3.046
30													3	4	3	4	3	7	10	11	11	47	92	3.862	
40											1	3	4	4	3	9	10	11	11	10	10	87	153	3.966	
50											3	4	3	8	10	11	10	11	11	10	10	125	206	4.024	
60										1	4	4	9	11	10	11	10	11	11	10	10	160	252	4.103	
70									1	3	4	8	10	11	10	11	10	11	10	10	25	180	294	4.097	
80									2	4	4	11	11	10	11	10	11	10	11	10	11	55	180	330	4.110
90									4	3	7	11	10	11	11	10	11	10	11	10	11	84	180	363	4.105
100								1	4	3	9	11	10	11	11	10	11	10	10	38	85	179	393	4.107	
110								2	3	4	10	11	10	11	11	10	11	10	10	65	84	179	421	4.086	
120								2	4	4	11	10	11	10	11	10	11	15	85	84	179	447	4.084		
130								3	3	5	11	10	11	10	11	10	11	40	84	84	180	473	4.037		
140								3	3	6	10	11	10	11	11	10	11	63	84	84	179	496	4.038		
150								3	3	6	11	10	11	11	10	11	12	84	84	84	180	520	3.986		
160								3	4	6	10	11	10	11	10	11	34	85	84	84	179	542	3.970		
170								3	4	6	10	11	11	10	11	10	56	84	84	85	179	564	3.933		
180								3	4	6	11	10	11	10	11	10	77	85	84	84	179	585	3.905		
190								3	4	6	11	10	11	10	11	24	84	84	84	84	180	606	3.860		
200								3	4	6	11	10	11	10	11	44	84	84	84	84	180	626	3.832		
210								3	4	6	11	10	11	11	10	64	84	84	84	84	180	646	3.790		
220								3	4	6	11	10	11	11	10	83	84	84	84	84	180	665	3.759		
230								3	4	6	11	10	11	11	27	84	85	84	84	84	179	683	3.748		
240								3	4	6	11	11	10	11	46	84	84	84	84	85	179	702	3.708		

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BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
72	msw																							
5																					0	0	0.877	
10																				4	7	11	1.211	
20															3	4	3	4	4	3	24	45	3.162	
30												2	4	4	3	4	3	10	11	11	55	107	3.911	
40									1	3	4	3	4	6	11	10	11	10	11	10	99	173	3.972	
50									3	4	3	6	10	11	10	11	11	10	11	10	139	229	4.055	
60									1	4	3	9	10	11	10	11	11	10	11	10	177	278	4.142	
70									4	3	7	11	10	11	10	11	11	10	11	43	179	321	4.149	
80								2	4	4	10	11	10	11	11	10	11	10	11	76	179	360	4.127	
90								3	4	4	7	10	11	10	11	11	10	11	10	33	84	179	394	4.135
100							1	4	3	9	11	10	11	10	11	10	11	11	61	84	179	426	4.103	
110							2	3	4	10	11	10	11	10	11	10	11	14	85	84	179	455	4.083	
120							2	4	4	10	11	11	10	11	10	11	10	41	84	84	180	483	4.038	
130							2	4	5	10	11	11	10	11	10	11	10	66	84	84	179	508	4.033	
140							3	3	6	10	11	10	11	11	10	11	16	84	84	84	179	533	4.009	
150							3	3	6	11	10	11	10	11	11	10	39	85	84	84	179	557	3.963	
160							3	4	6	10	11	10	11	10	11	11	62	84	84	84	180	581	3.918	
170							3	4	6	10	11	11	10	11	10	11	84	85	84	84	179	603	3.894	
180							3	4	6	11	10	11	10	11	10	33	84	84	85	84	179	625	3.856	
190							3	4	6	11	10	11	10	11	11	53	84	85	84	84	179	646	3.831	
200							3	4	6	11	10	11	10	11	11	74	84	85	84	84	179	667	3.787	
210							3	4	6	11	10	11	11	10	21	85	84	84	84	84	180	688	3.738	
220							3	4	6	11	10	11	11	10	41	84	84	85	84	84	179	707	3.729	
230							3	4	6	11	10	11	11	10	61	84	84	84	84	84	180	727	3.682	
240							3	4	6	11	10	11	11	10	80	84	84	84	84	84	180	746	3.647	

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BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}																	
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6																
75	msw																																						
5																						0	0	1.206															
10																			2	3	8	13	1.332																
20														2	4	4	3	4	3	6	28	54	3.291																
30													2	4	3	4	3	4	7	10	11	10	66	124	3.904														
40																						11	10	11	10	11	10	112	193	3.986									
50																						3	3	4	4	10	11	10	11	10	11	10	155	253	4.078				
60																						1	3	4	7	11	10	11	11	10	11	10	11	25	180	305	4.145		
70																						3	4	6	11	10	11	10	11	10	11	10	11	63	179	350	4.165		
80																						2	3	4	10	11	11	10	11	10	11	10	11	23	84	180	391	4.122	
90																						3	4	6	11	10	11	10	11	10	11	10	55	85	179	427	4.104		
100																						1	4	3	9	10	11	10	11	10	11	10	11	84	85	179	460	4.085	
110																						2	3	4	10	10	11	10	11	10	11	10	40	84	84	179	490	4.058	
120																						2	4	4	10	11	10	11	10	11	10	11	66	84	84	179	518	4.037	
130																						2	4	5	10	11	11	10	11	10	11	18	85	84	84	179	545	4.000	
140																						3	3	6	10	11	10	11	10	11	11	10	43	84	85	84	179	571	3.951
150																						3	3	6	11	10	11	10	11	11	10	11	67	84	84	84	180	596	3.910
160																						3	4	5	11	11	10	11	10	11	10	18	84	84	84	84	180	620	3.870
170																						3	4	6	10	11	10	11	11	10	11	40	84	84	84	84	180	643	3.843
180																						3	4	6	11	10	11	10	11	10	11	63	84	84	84	84	180	666	3.799
190																						3	4	6	11	10	11	10	11	11	10	85	84	84	84	84	180	688	3.757
200																						3	4	6	11	10	11	10	11	11	32	84	84	84	84	84	180	709	3.738
210																						3	4	6	11	10	11	11	10	11	53	84	84	84	85	84	179	730	3.706
220																						3	4	6	11	10	11	11	10	11	73	85	84	84	84	84	180	751	3.655
230																						3	4	6	11	10	11	11	10	20	84	84	84	85	84	84	179	770	3.651
240																						3	4	6	11	10	11	11	10	40	84	84	84	84	84	85	179	790	3.614

E-19

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
78	msw																							
5																					0	0	1.575	
10																			3	4	7	14	1.494	
20												2	3	4	3	4	3	4	3	4	9	32	64	3.392
30									1	4	4	3	4	3	4	10	11	11	10	76	141	3.894		
40								3	4	3	4	3	9	10	11	11	10	11	10	11	10	125	214	4.004
50							3	3	4	3	9	11	10	11	11	10	11	10	11	10	11	170	277	4.129
60						1	3	4	6	10	11	11	10	11	10	11	10	11	10	11	44	179	332	4.177
70						3	3	6	11	10	11	10	11	11	10	11	10	11	10	11	83	179	380	4.163
80					2	3	4	10	10	11	10	11	11	10	11	10	11	10	11	45	84	180	423	4.114
90					3	4	6	10	11	10	11	11	10	11	10	11	10	11	10	79	84	179	460	4.103
100			1	3	4	8	11	10	11	11	10	11	10	11	10	11	10	36	84	84	180	495	4.051	
110			2	3	4	9	11	11	10	11	10	11	10	11	10	11	11	64	84	84	180	526	4.017	
120			2	4	4	10	11	10	11	10	11	11	10	11	10	11	18	84	85	84	179	555	3.999	
130			2	4	5	10	11	10	11	11	10	11	10	11	10	11	45	84	84	84	180	583	3.948	
140			3	3	5	11	11	10	11	10	11	10	11	10	11	70	84	84	85	179	609	3.920		
150			3	3	6	11	10	11	10	11	10	11	11	22	84	84	84	84	84	180	635	3.865		
160			3	4	5	11	11	10	11	10	11	10	11	46	84	85	84	84	84	179	659	3.849		
170			3	4	6	10	11	10	11	11	10	11	10	70	84	85	84	84	84	179	683	3.807		
180			3	4	6	10	11	11	10	11	10	11	19	85	84	84	84	84	84	179	706	3.772		
190			3	4	6	11	10	11	10	11	10	11	42	84	84	84	85	84	84	179	729	3.734		
200			3	4	6	11	10	11	10	11	11	10	64	84	84	85	84	84	179	751	3.697			
210			3	4	6	11	10	11	11	10	11	12	84	84	84	84	84	84	85	179	773	3.657		
220			3	4	6	11	10	11	11	10	11	33	84	84	84	84	84	84	85	179	794	3.630		
230			3	4	6	11	10	11	11	10	11	53	85	84	84	84	84	84	84	180	815	3.587		
240			3	4	6	11	10	11	11	10	11	73	85	84	84	84	84	84	84	180	835	3.561		

E-20

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6		
81	msw																								
10																			2	3	4	7	16	1.635	
20												1	3	4	3	4	3	4	4	11	36	73	3.527		
30										1	4	3	4	3	4	3	8	10	11	10	11	86	158	3.922	
40									3	4	3	4	3	6	11	10	11	10	11	10	11	138	235	4.045	
50								3	3	4	3	7	11	10	11	11	10	11	10	11	18	180	303	4.118	
60						1	3	4	4	11	11	10	11	10	11	10	11	10	11	10	63	179	360	4.188	
70						3	3	5	11	10	11	10	11	11	10	11	10	11	10	11	30	84	179	410	4.185
80					1	4	3	10	11	10	11	10	11	10	11	10	11	10	11	67	84	180	455	4.114	
90					3	3	6	11	10	11	10	11	10	11	10	11	10	11	28	84	84	180	494	4.082	
100				1	3	4	8	10	11	11	10	11	10	11	10	11	10	11	60	84	84	180	530	4.024	
110				1	4	4	9	11	10	11	11	10	11	10	11	10	11	17	84	84	85	179	562	3.999	
120				2	4	3	11	10	11	11	10	11	10	11	10	11	45	84	84	85	179	592	3.955		
130				2	4	5	10	11	10	11	10	11	11	10	11	10	73	84	84	84	180	621	3.910		
140				3	3	5	11	11	10	11	10	11	10	11	11	25	84	84	84	85	179	648	3.872		
150				3	3	6	11	10	11	10	11	10	11	11	10	51	84	84	84	85	179	674	3.840		
160				3	3	6	11	11	10	11	10	11	10	11	11	75	85	84	84	84	179	699	3.802		
170				3	4	6	10	11	10	11	11	10	11	10	27	84	84	84	85	84	179	724	3.758		
180				3	4	6	10	11	11	10	11	10	11	10	51	84	84	84	84	85	179	748	3.719		
190				3	4	6	11	10	11	10	11	10	11	11	73	84	85	84	84	84	179	771	3.684		
200				3	4	6	11	10	11	10	11	11	10	23	84	84	84	84	84	84	180	794	3.647		
210				3	4	6	11	10	11	11	10	11	10	45	84	84	85	84	84	84	179	816	3.622		
220				3	4	6	11	10	11	11	10	11	10	67	84	84	84	84	84	85	179	838	3.581		
230				3	4	6	11	10	11	11	10	11	14	84	84	84	84	84	85	84	179	859	3.559		
240				3	4	6	11	10	11	11	10	11	35	84	84	84	84	84	84	85	179	880	3.524		

E-21

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
84	msw																							
10																			3	4	3	7	17	1.814
20												3	3	4	3	4	4	3	7	11	41	83	3.639	
30									4	3	4	3	4	3	4	11	11	10	11	10	97	175	3.931	
40							3	3	4	3	4	3	11	10	11	11	10	11	10	11	152	257	4.070	
50						2	4	4	3	5	11	10	11	11	10	11	10	11	10	36	179	328	4.163	
60					1	3	4	3	11	10	11	10	11	10	11	11	10	11	10	83	179	389	4.186	
70					2	4	4	11	10	11	10	11	10	11	11	10	11	10	52	84	179	441	4.175	
80				1	4	3	9	11	10	11	11	10	11	10	11	10	11	17	84	84	180	488	4.102	
90				3	3	6	10	11	10	11	11	10	11	10	11	10	11	53	84	84	180	529	4.043	
100			1	3	4	7	11	11	10	11	10	11	10	11	11	10	12	85	84	84	179	565	4.016	
110			1	4	3	10	11	10	11	10	11	10	11	11	10	11	43	84	84	84	180	599	3.953	
120			2	3	4	11	10	11	10	11	11	10	11	10	11	10	73	84	84	84	180	630	3.908	
130			2	4	4	11	11	10	11	10	11	10	11	11	10	27	84	85	84	84	179	659	3.874	
140			3	3	5	11	10	11	11	10	11	10	11	10	11	54	84	85	84	84	179	687	3.835	
150			3	3	6	10	11	11	10	11	10	11	10	11	11	80	84	84	85	84	179	714	3.785	
160			3	3	6	11	10	11	11	10	11	10	11	10	33	84	84	84	84	84	180	740	3.746	
170			3	4	6	10	11	10	11	11	10	11	10	11	58	84	84	84	84	84	180	766	3.698	
180			3	4	6	10	11	11	10	11	10	11	10	11	82	84	84	84	84	85	179	790	3.666	
190			3	4	6	11	10	11	10	11	10	11	11	32	84	84	84	84	84	84	180	814	3.633	
200			3	4	6	11	10	11	10	11	11	10	11	55	84	84	84	85	84	84	179	837	3.605	
210			3	4	6	11	10	11	11	10	11	10	11	78	84	84	84	84	84	85	179	860	3.572	
220			3	4	6	11	10	11	11	10	11	10	27	84	84	84	85	84	84	84	179	882	3.547	
230			3	4	6	11	10	11	11	10	11	10	49	84	84	84	84	84	85	84	179	904	3.512	
240			3	4	6	11	10	11	11	10	11	10	70	84	84	84	84	85	84	84	179	925	3.494	

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
87	msw																							
10																		2	3	4	3	7	19	1.985
20											2	3	4	4	3	4	3	4	9	11	46	93	3.769	
30										3	4	3	4	3	8	11	10	11	10	11	108	193	3.942	
40						3	3	4	3	4	3	8	11	10	11	10	11	10	11	11	167	280	4.087	
50					2	4	3	4	3	11	10	11	10	11	11	10	11	10	11	53	179	354	4.175	
60				1	3	4	3	9	11	10	11	10	11	10	11	11	10	11	29	84	179	418	4.196	
70				2	3	4	11	10	11	10	11	10	11	11	10	11	10	11	74	84	179	473	4.154	
80			1	3	4	9	10	11	10	11	10	11	11	10	11	10	11	41	84	84	180	522	4.078	
90			3	3	5	11	10	11	10	11	11	10	11	10	11	10	11	78	84	84	180	564	4.017	
100			4	3	8	10	11	10	11	11	10	11	10	11	10	11	38	85	84	84	179	601	3.980	
110		1	4	3	10	10	11	10	11	11	10	11	10	11	10	11	70	84	85	84	179	636	3.930	
120		2	3	4	11	10	11	10	11	10	11	11	10	11	10	27	84	85	84	84	179	668	3.880	
130		2	4	4	11	10	11	11	10	11	10	11	10	11	11	55	84	85	84	84	179	698	3.841	
140		3	3	5	11	10	11	10	11	11	10	11	10	11	10	84	84	85	84	84	179	727	3.785	
150		3	3	6	10	11	11	10	11	10	11	10	11	11	36	85	84	84	84	84	180	755	3.740	
160		3	3	6	11	10	11	11	10	11	10	11	10	11	63	84	85	84	84	84	179	781	3.708	
170		3	4	6	10	11	10	11	10	11	11	10	11	15	84	84	84	85	84	84	179	807	3.671	
180		3	4	6	10	11	11	10	11	10	11	10	11	40	84	85	84	84	84	84	180	833	3.617	
190		3	4	6	11	10	11	10	11	10	11	11	10	65	84	84	84	84	84	85	179	857	3.590	
200		3	4	6	11	10	11	10	11	11	10	11	14	85	84	84	84	84	84	84	180	881	3.559	
210		3	4	6	11	10	11	10	11	11	10	11	38	84	84	84	84	85	84	84	179	904	3.533	
220		3	4	6	11	10	11	11	10	11	10	11	61	84	84	84	84	84	85	84	179	927	3.504	
230		3	4	6	11	10	11	11	10	11	10	11	83	84	84	84	85	84	84	84	179	949	3.485	
240		3	4	6	11	10	11	11	10	11	10	32	84	84	84	84	85	84	84	84	179	971	3.454	

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BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
90	msw																							
10																		3	4	3	4	7	21	2.161
20										1	4	3	4	3	4	3	4	5	11	11	51	104	3.882	
30								3	3	4	3	4	3	4	4	11	10	11	11	10	11	211	3.971	
40					2	4	3	4	3	4	3	4	5	11	10	11	11	10	11	10	11	303	4.114	
50				2	4	3	4	3	9	10	11	10	11	11	10	11	10	11	10	11	72	381	4.181	
60			1	3	4	3	8	10	11	10	11	10	11	11	10	11	10	11	10	11	50	448	4.188	
70			2	3	4	10	10	11	10	11	10	11	11	10	11	10	11	23	84	84	179	505	4.159	
80		1	3	4	8	10	11	11	10	11	10	11	10	11	11	10	11	65	84	84	180	556	4.057	
90		2	4	5	10	11	10	11	10	11	10	11	10	11	10	11	30	85	84	84	179	599	4.005	
100		4	3	7	11	11	10	11	10	11	10	11	10	11	10	11	65	85	84	84	179	638	3.949	
110	1	4	3	9	11	11	10	11	10	11	10	11	10	11	10	11	24	84	84	85	84	674	3.885	
120	2	3	4	10	11	10	11	11	10	11	10	11	10	11	11	55	84	84	84	84	180	707	3.829	
130	2	4	4	11	10	11	10	11	11	10	11	10	11	10	12	84	84	84	85	84	179	738	3.782	
140	3	3	5	11	10	11	10	11	11	10	11	10	11	10	40	85	84	84	84	84	180	768	3.735	
150	3	3	6	10	11	10	11	11	10	11	10	11	10	11	68	84	84	84	84	84	180	796	3.689	
160	3	3	6	11	10	11	11	10	11	10	11	10	11	21	84	84	84	84	84	85	179	823	3.660	
170	3	4	6	10	11	10	11	10	11	11	10	11	10	48	84	84	84	84	84	84	180	850	3.613	
180	3	4	6	10	11	11	10	11	10	11	10	11	11	72	84	84	85	84	84	84	179	875	3.592	
190	3	4	6	11	10	11	10	11	10	11	11	10	24	84	84	85	84	84	84	84	179	900	3.561	
200	3	4	6	11	10	11	10	11	11	10	11	10	49	84	84	84	84	84	85	84	179	925	3.518	
210	3	4	6	11	10	11	10	11	11	10	11	10	72	84	85	84	84	84	84	84	180	949	3.486	
220	3	4	6	11	10	11	11	10	11	10	11	22	84	84	84	84	85	84	84	84	179	972	3.470	
230	3	4	6	11	10	11	11	10	11	10	11	45	84	84	84	84	84	84	85	84	179	995	3.440	
240	3	4	6	11	10	11	11	10	11	10	11	67	84	84	84	84	85	84	84	84	179	1017	3.425	

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APPENDIX F XVAL-HE-9_050 1.3 ATM PO₂ HE-O₂ DECOMPRESSION TABLES (FSW)

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}			
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20	
80	fsw																							
86																						0	0	3.354
90																						3	3	2.992
100																						10	10	3.155
110																						17	17	3.289
120																						23	23	3.433
130																						29	29	3.551
140																						34	34	3.687
150																						39	39	3.803
160																						43	43	3.941
170																						47	47	4.061
180																						51	51	4.165
190																						55	55	4.253
200																						58	58	4.374
210																						62	62	4.441
220																						65	65	4.544
230																						69	69	4.594
240																						73	73	4.634

F-1

F-2

BT (min)	DECOMPRESSION STOPS (fsw)																TST (min)	P _{DCS}						
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70			60	50	40	30	20	
90	fsw																							
46																						0	0	2.539
50																						1	1	2.436
60																						2	2	2.778
70																						4	4	2.924
80																						14	14	3.070
90																						23	23	3.247
100																						31	31	3.423
110																						38	38	3.602
120																						45	45	3.750
130																						51	51	3.909
140																						57	57	4.042
150																						63	63	4.151
160																						69	69	4.245
170																						74	74	4.370
180																						79	79	4.483
190																						83	83	4.629
200																						89	89	4.673
210																						95	95	4.704
220																						101	101	4.723
230																						107	107	4.732
240																						113	113	4.730

F-3

BT (min)	DECOMPRESSION STOPS (fsw)																	TST (min)	P _{DCS}						
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60			50	40	30	20		
100	fsw																								
32																						0	0	2.355	
40																						2	2	2.412	
50																						4	4	2.651	
60																						8	8	2.886	
70																						20	20	3.112	
80																						31	31	3.315	
90																						40	40	3.544	
100																						49	49	3.726	
110																						58	58	3.863	
120																						66	66	4.007	
130																						74	74	4.127	
140																						81	81	4.274	
150																						88	88	4.405	
160																						95	95	4.520	
170																						101	101	4.663	
180																						108	108	4.746	
190																						116	116	4.769	
200																						124	124	4.777	
210																						132	132	4.773	
220																						1	138	139	4.805
230																						1	145	146	4.819
240																						1	152	153	4.822

F-5

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}			
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20	
120	fsw																							
21																						0	0	2.392
30																						4	4	2.493
40																						7	7	2.937
50																			2	18	20	3.052		
60																			3	33	36	3.325		
70																			1	4	45	50	3.585	
80																			2	4	58	64	3.764	
90																			3	3	70	76	3.954	
100																			3	3	82	88	4.102	
110																			3	4	92	99	4.276	
120																			3	4	103	110	4.416	
130																			3	4	113	120	4.577	
140																			4	3	122	129	4.770	
150																			4	3	134	141	4.801	
160																			4	3	145	152	4.855	
170																			4	3	157	164	4.847	
180																			4	3	168	175	4.864	
190																			4	3	178	185	4.908	
200																			4	5	186	195	4.935	
210																			4	15	186	205	4.940	
220																			4	25	185	214	4.969	
230																			1	3	34	186	224	4.957
240																			1	3	43	186	233	4.956

F-6

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}			
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20	
130	fsw																							
18																					0	0	2.429	
20																					1	1	2.569	
30																					6	6	2.774	
40																				2	10	12	2.962	
50																			1	4	27	32	3.271	
60																			3	4	43	50	3.511	
70																		1	4	3	58	66	3.742	
80																		2	3	4	72	81	3.916	
90																		2	4	5	84	95	4.104	
100																		3	3	6	96	108	4.286	
110																		3	4	6	107	120	4.481	
120																		3	4	7	118	132	4.637	
130																		3	4	7	129	143	4.815	
140																		4	3	7	143	157	4.849	
150																		4	3	8	156	171	4.851	
160																		4	3	8	169	184	4.875	
170																		4	3	8	181	196	4.922	
180																		4	3	15	186	208	4.946	
190																		4	3	27	186	220	4.945	
200																		4	3	38	186	231	4.966	
210																		4	3	49	186	242	4.969	
220																		4	3	60	185	252	4.995	
230																		1	3	4	69	186	263	4.986
240																		1	3	4	79	186	273	4.986

BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20
140	fsw																						
15																					0	0	2.127
20																					4	4	2.039
30																				1	8	9	2.843
40																		2	3	18	23	3.139	
50																	1	3	4	37	45	3.434	
60																	3	3	6	52	64	3.707	
70																1	3	4	8	66	82	3.932	
80																2	3	4	10	79	98	4.142	
90																2	4	4	11	92	113	4.347	
100																3	3	6	10	106	128	4.518	
110																3	4	6	10	118	141	4.729	
120																3	4	6	11	131	155	4.850	
130																3	4	7	11	146	171	4.868	
140																3	4	7	11	161	186	4.897	
150																4	3	8	10	176	201	4.918	
160																4	3	8	14	186	215	4.951	
170																4	3	8	28	186	229	4.952	
180																4	3	8	41	186	242	4.972	
190																4	3	8	54	186	255	4.972	
200																4	3	8	66	186	267	4.993	
210																4	3	8	78	186	279	5.000	
220																4	3	8	90	186	291	4.992	
230																4	3	20	89	186	302	5.001	
240																1	3	4	30	89	186	313	5.009

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BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20
160	fsw																						
11																					0	0	1.616
20																				2	7	9	1.945
30																			4	3	14	21	2.882
40																		3	4	6	32	45	3.494
50																	3	3	6	11	48	71	3.846
60																2	3	4	10	11	65	95	4.103
70																3	4	7	10	11	81	116	4.378
80										1	4	3	10	10	11	11	10	11	11	96	135	153	4.633
90										2	3	4	11	11	10	11	10	11	112	153	174	193	4.844
100										2	4	5	11	10	11	10	11	131	174	174	193	212	4.867
110										3	3	6	11	11	10	11	10	149	193	193	212	229	4.919
120										3	4	6	11	11	10	10	167	212	212	229	247	295	4.931
130										3	4	7	10	11	11	183	229	229	247	264	295	311	4.986
140										3	4	7	11	11	25	186	247	247	264	295	311	326	4.975
150										4	3	8	10	11	42	186	264	264	295	311	326	340	4.986
160										4	3	8	10	11	58	186	280	280	311	326	340	354	4.993
170										4	3	8	11	10	74	185	295	295	311	326	340	368	5.031
180										4	3	8	11	10	89	186	311	311	326	340	354	381	5.012
190										4	3	8	11	24	90	186	326	326	340	354	368	394	5.003
200										4	3	8	11	39	89	186	340	340	354	368	381	394	5.010
210										4	3	8	11	53	89	186	354	354	368	381	394	4.984	
220										4	3	8	11	66	90	186	368	368	381	394	4.984		
230										4	3	8	11	79	90	186	381	381	394	4.983			
240										1	3	4	8	13	90	89	186	394	4.982				

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BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20
180	fsw																						
9																					0	0	1.559
10																					2	2	1.286
20																			3	4	7	14	2.139
30																3	3	4	4	24	38	3.232	
40															3	3	4	8	11	42	71	3.816	
50															2	3	4	10	11	11	61	102	4.219
60														1	3	4	9	10	11	11	80	129	4.567
70														3	3	6	10	11	11	11	99	154	4.823
80													1	3	4	8	11	11	10	11	122	181	4.916
90													2	3	4	10	11	10	11	11	144	206	4.950
100													2	4	4	11	11	10	11	10	165	229	4.988
110													3	3	6	10	11	11	11	10	186	251	5.028
120													3	4	6	11	10	11	11	30	186	272	5.017
130													3	4	7	10	11	11	10	50	186	292	5.027
140													3	4	7	11	10	11	11	68	186	311	5.028
150													3	4	7	11	11	11	10	87	185	329	5.060
160													4	3	8	10	11	11	25	90	186	348	5.030
170													4	3	8	11	10	11	43	89	186	365	5.042
180													4	3	8	11	10	11	60	89	186	382	5.033
190													4	3	8	11	11	10	76	90	186	399	5.007
200													4	3	8	11	11	13	89	90	186	415	4.995
210													4	3	8	11	11	28	90	89	186	430	5.003
220													4	3	8	11	11	44	89	90	186	446	4.963
230													4	3	8	11	11	59	89	90	186	461	4.939
240													4	3	8	11	11	73	90	89	186	475	4.932

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BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20
190	fsw																						
8																					0	0	1.392
10																					3	3	1.397
20																		2	4	3	8	17	2.363
30															2	4	3	4	7	29	49	3.365	
40														2	4	4	5	11	11	48	85	3.978	
50													1	4	3	9	11	11	10	69	118	4.439	
60													4	3	8	11	10	11	11	89	147	4.801	
70												2	4	5	10	11	11	11	10	114	178	4.922	
80												4	3	8	11	11	10	11	11	138	207	4.953	
90											1	4	4	9	11	11	11	10	11	162	234	5.006	
100											2	4	4	11	10	11	11	11	10	184	258	5.058	
110											3	3	5	11	11	11	10	11	30	186	281	5.047	
120											3	4	6	10	11	11	11	10	52	185	303	5.055	
130											3	4	6	11	11	11	10	11	71	186	324	5.053	
140											3	4	7	11	10	11	11	12	89	186	344	5.062	
150											3	4	7	11	11	11	10	31	90	186	364	5.035	
160											4	3	8	10	11	11	11	49	90	186	383	5.029	
170											4	3	8	11	10	11	11	68	89	186	401	5.035	
180											4	3	8	11	10	11	11	86	89	186	419	5.012	
190											4	3	8	11	11	10	24	90	89	186	436	5.007	
200											4	3	8	11	11	10	41	90	89	186	453	4.986	
210											4	3	8	11	11	10	58	89	90	186	470	4.946	
220											4	3	8	11	11	10	74	89	90	185	485	4.953	
230											4	3	8	11	11	10	89	90	89	186	501	4.920	
240											4	3	8	11	11	25	90	89	90	185	516	4.905	

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BT (min)	DECOMPRESSION STOPS (fsw)																			TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40			30	20
200	fsw																						
7																					0	0	1.133
10																					5	5	1.172
20																	1	4	3	4	11	23	2.532
30														2	3	4	4	3	11	33	60	3.522	
40													2	4	3	4	10	11	11	55	100	4.127	
50												1	3	4	7	11	11	10	11	77	135	4.634	
60												3	4	7	10	11	11	10	11	102	169	4.922	
70										2	4	4	10	11	11	11	10	11	11	129	203	4.990	
80										3	4	7	11	11	11	10	11	11	11	155	234	5.009	
90									1	4	3	10	11	10	11	11	11	10	180	262	5.081		
100									2	4	4	10	11	11	11	10	11	29	185	288	5.064		
110									3	3	5	11	11	10	11	11	11	51	185	312	5.066		
120									3	3	6	11	11	11	10	11	11	72	186	335	5.073		
130									3	4	6	11	11	10	11	11	15	89	186	357	5.077		
140									3	4	7	11	10	11	11	11	35	90	185	378	5.072		
150									3	4	7	11	11	10	11	11	55	90	185	398	5.069		
160									4	3	8	10	11	11	11	10	75	90	186	419	5.025		
170									4	3	8	10	11	11	11	15	89	90	185	437	5.039		
180									4	3	8	11	10	11	11	33	90	89	186	456	5.013		
190									4	3	8	11	10	11	11	51	90	90	185	474	4.992		
200									4	3	8	11	11	10	11	69	90	89	186	492	4.958		
210									4	3	8	11	11	10	11	86	90	89	186	509	4.937		
220									4	3	8	11	11	10	25	89	90	89	186	526	4.907		
230									4	3	8	11	11	10	41	89	90	89	186	542	4.890		
240									4	3	8	11	11	10	57	89	90	89	186	558	4.855		

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BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}	
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20
210	fsw																						
7																					0	0	1.563
10																					6	6	1.305
20																	4	3	4	3	14	28	2.734
30														1	4	4	3	4	7	11	38	72	3.685
40													2	4	3	4	8	10	11	11	62	115	4.310
50												1	3	4	5	11	11	10	11	11	86	153	4.810
60												3	3	6	11	11	10	11	11	11	116	193	4.919
70											2	3	4	10	11	11	11	10	11	11	145	229	5.028
80											3	4	7	10	11	11	11	10	11	11	173	262	5.057
90										1	4	3	9	11	11	11	10	11	11	24	186	292	5.053
100										2	3	4	11	11	10	11	11	11	10	49	186	319	5.074
110										2	4	5	11	10	11	11	11	10	11	72	186	344	5.098
120										3	3	6	11	11	10	11	11	11	16	89	186	368	5.082
130										3	4	6	11	11	10	11	11	11	38	89	186	391	5.074
140										3	4	7	10	11	11	11	10	11	60	89	186	413	5.061
150										3	4	7	11	11	10	11	11	11	80	89	186	434	5.050
160										4	3	8	10	11	11	10	11	22	90	89	186	455	5.022
170										4	3	8	10	11	11	11	10	42	89	90	186	475	4.996
180										4	3	8	11	10	11	11	11	60	90	89	186	494	4.986
190										4	3	8	11	10	11	11	11	79	89	90	186	513	4.948
200										4	3	8	11	11	10	11	19	90	89	90	185	531	4.939
210										4	3	8	11	11	10	11	37	90	89	90	185	549	4.905
220										4	3	8	11	11	10	11	54	90	89	90	186	567	4.856
230										4	3	8	11	11	10	11	71	90	89	90	186	584	4.827
240										4	3	8	11	11	10	11	88	89	90	90	185	600	4.816

BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}	
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20
220	fsw																						
6																					0	0	1.168
10																				1	7	8	1.258
20															3	3	4	3	4	16	33	2.964	
30												1	3	4	4	3	4	11	10	44	84	3.837	
40										2	3	4	4	5	11	10	11	11	11	70	131	4.469	
50									1	3	4	3	11	11	10	11	11	11	11	98	174	4.892	
60									2	4	5	10	11	11	11	10	11	11	11	131	217	5.012	
70									1	4	4	9	11	11	11	10	11	11	11	162	256	5.053	
80									3	4	6	11	10	11	11	11	10	11	11	17	186	291	5.076
90									1	4	3	9	11	10	11	11	11	10	11	45	185	322	5.102
100									2	3	4	11	10	11	11	11	10	11	11	70	185	350	5.107
110									2	4	5	10	11	11	11	10	11	11	16	89	186	377	5.084
120									3	3	6	11	11	10	11	11	10	11	40	89	186	402	5.083
130									3	4	6	11	10	11	11	11	10	11	63	89	186	426	5.061
140									3	4	7	10	11	11	11	10	11	11	84	90	186	449	5.034
150									3	4	7	11	11	10	11	11	11	27	89	90	185	470	5.044
160									4	3	7	11	11	11	10	11	11	48	90	89	186	492	4.999
170									4	3	8	10	11	11	11	10	11	69	89	90	186	513	4.961
180									4	3	8	11	10	11	11	11	10	89	89	90	186	533	4.938
190									4	3	8	11	10	11	11	11	29	89	90	89	186	552	4.925
200									4	3	8	11	11	10	11	11	48	90	89	90	185	571	4.895
210									4	3	8	11	11	10	11	11	67	89	90	89	186	590	4.848
220									4	3	8	11	11	10	11	11	85	89	90	89	186	608	4.822
230									4	3	8	11	11	10	11	24	89	90	89	90	186	626	4.782
240									4	3	8	11	11	10	11	41	89	90	89	90	186	643	4.755

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BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20	
230	fsw																							
6																					0	0	1.568	
10																				3	7	10	1.198	
20														2	3	4	3	4	4	4	4	20	40	3.139
30												4	3	4	3	4	8	10	11	11	50	97	3.983	
40								1	4	4	3	4	10	10	11	11	11	11	11	77	146	4.688		
50							4	3	4	8	11	11	11	11	10	11	11	11	112	196	4.943			
60								2	3	4	11	11	10	11	11	11	11	10	11	147	242	5.093		
70								1	4	3	9	11	11	11	10	11	11	11	11	10	181	284	5.110	
80								3	3	6	11	11	10	11	11	11	10	11	37	185	320	5.118		
90							1	3	4	8	11	11	11	10	11	11	11	10	65	186	353	5.116		
100							2	3	4	10	11	11	10	11	11	11	10	14	89	186	383	5.101		
110							2	4	4	11	11	11	10	11	11	11	10	39	90	185	410	5.106		
120							3	3	6	11	10	11	11	10	11	11	11	63	90	186	437	5.060		
130							3	4	6	11	10	11	11	10	11	11	11	87	90	185	461	5.068		
140							3	4	7	10	11	11	11	10	11	11	31	90	89	186	485	5.032		
150							3	4	7	11	11	10	11	11	10	11	54	89	90	186	508	4.995		
160							4	3	7	11	11	11	10	11	11	11	75	89	90	186	530	4.962		
170							4	3	8	10	11	11	11	10	11	18	89	90	89	186	551	4.949		
180							4	3	8	11	10	11	11	11	10	39	89	90	89	186	572	4.911		
190							4	3	8	11	10	11	11	11	10	59	89	90	89	186	592	4.874		
200							4	3	8	11	11	10	11	11	10	79	89	90	89	186	612	4.839		
210							4	3	8	11	11	10	11	11	18	90	89	90	89	186	631	4.813		
220							4	3	8	11	11	10	11	11	37	89	90	89	90	186	650	4.770		
230							4	3	8	11	11	10	11	11	55	90	89	90	89	186	668	4.746		
240							4	3	8	11	11	10	11	11	73	90	89	90	89	186	686	4.711		

BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}			
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20		
240	fsw																								
5																					0	0	1.038		
10																			1	3	8	12	1.280		
20													1	3	4	4	3	4	4	26	49	3.263			
30											3	4	3	4	3	5	10	11	11	56	110	4.136			
40									1	4	3	4	4	7	11	10	11	11	11	87	164	4.825			
50									4	3	4	6	11	11	11	10	11	11	11	126	219	4.994			
60									2	3	4	10	10	11	11	10	11	11	11	10	165	269	5.101		
70								1	3	4	8	11	11	11	10	11	11	10	11	25	186	313	5.107		
80									3	3	5	11	11	11	10	11	11	10	11	57	186	351	5.100		
90									1	3	4	8	11	10	11	11	10	11	11	86	186	385	5.117		
100									2	3	4	10	11	10	11	11	10	11	11	36	89	186	416	5.100	
110									2	4	4	11	11	10	11	11	10	11	11	62	90	186	445	5.072	
120									3	3	6	10	11	11	11	10	11	11	10	88	90	186	472	5.053	
130									3	4	6	10	11	11	11	10	11	11	33	90	89	186	497	5.043	
140									3	4	6	11	11	11	10	11	11	10	58	89	90	186	522	4.993	
150									3	4	7	11	10	11	11	10	11	11	80	90	89	186	545	4.974	
160									3	4	7	11	11	11	10	11	11	23	90	89	90	186	568	4.938	
170									4	3	8	10	11	11	11	10	11	11	46	89	90	89	186	590	4.909
180									4	3	8	11	10	11	11	11	10	11	67	90	89	90	186	612	4.855
190									4	3	8	11	10	11	11	11	10	11	88	90	89	90	185	632	4.841
200									4	3	8	11	11	10	11	11	10	30	89	90	90	89	186	653	4.791
210									4	3	8	11	11	10	11	11	11	49	89	90	89	90	186	673	4.752
220									4	3	8	11	11	10	11	11	11	68	90	89	90	89	186	692	4.728
230									4	3	8	11	11	10	11	11	11	87	90	89	90	89	186	711	4.691
240									4	3	8	11	11	10	11	11	27	90	89	90	89	90	185	729	4.670

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BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20	
250	fsw																							
5																					0	0	1.399	
10																			2	4	7	13	1.432	
20														3	4	3	4	3	4	7	30	58	3.380	
30											3	3	4	3	4	4	8	10	11	11	63	124	4.289	
40									1	4	3	4	3	5	11	11	10	11	11	11	99	184	4.877	
50										3	4	4	4	11	11	11	10	11	11	11	10	143	244	5.010
60									1	4	4	8	11	11	10	11	11	10	11	11	11	182	296	5.110
70									4	3	8	11	10	11	11	11	10	11	11	11	43	186	341	5.137
80									2	4	5	10	11	11	10	11	11	10	11	11	78	186	382	5.122
90									4	3	8	11	10	11	11	10	11	11	11	30	89	186	417	5.120
100								1	4	4	9	11	11	10	11	11	11	10	11	59	90	186	450	5.090
110								2	4	4	11	10	11	11	10	11	11	11	10	87	90	186	480	5.059
120								3	3	5	11	11	10	11	11	11	10	11	34	90	90	185	507	5.053
130								3	4	6	10	11	11	10	11	11	10	60	90	89	186	534	5.013	
140								3	4	6	11	11	10	11	11	10	11	84	90	89	186	559	4.975	
150								3	4	7	11	10	11	11	10	11	11	29	90	89	90	185	583	4.949
160								3	4	7	11	11	10	11	11	10	11	52	90	89	90	186	607	4.890
170								4	3	8	10	11	11	10	11	11	11	74	90	89	90	186	630	4.851
180								4	3	8	11	10	11	10	11	11	18	89	90	90	89	186	652	4.816
190								4	3	8	11	10	11	11	10	11	39	90	89	90	89	186	673	4.788
200								4	3	8	11	11	10	11	11	10	61	89	90	89	90	185	694	4.754
210								4	3	8	11	11	10	11	11	10	81	89	90	89	90	186	715	4.706
220								4	3	8	11	11	10	11	11	21	90	89	90	89	90	186	735	4.668
230								4	3	8	11	11	10	11	11	41	90	89	90	89	90	185	754	4.649
240								4	3	8	11	11	10	11	11	60	90	89	90	89	90	185	773	4.619

F-18

BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20	
260	fsw																							
10																		1	3	4	7	15	1.575	
20													2	4	3	4	3	4	4	9	35	68	3.486	
30											2	4	3	4	3	4	5	10	11	11	11	69	137	4.475
40								1	3	4	3	4	4	9	11	11	10	11	11	10	113	205	4.922	
50								3	4	4	3	10	11	11	10	11	11	11	11	10	11	159	269	5.031
60								1	4	4	7	10	11	11	11	10	11	11	11	10	26	186	324	5.126
70								3	4	7	11	10	11	11	11	10	11	11	11	10	64	186	371	5.158
80						2	4	4	4	11	10	11	11	11	10	11	11	10	21	90	185	413	5.147	
90						4	3	8	10	11	11	10	11	11	11	10	11	11	53	90	185	450	5.125	
100					1	4	3	10	11	11	10	11	11	11	10	11	11	10	84	89	186	484	5.104	
110					2	4	4	10	11	11	11	10	11	11	11	10	11	33	90	89	186	515	5.062	
120					3	3	5	11	11	11	10	11	11	10	11	11	11	60	90	89	186	544	5.017	
130					3	3	6	11	11	11	10	11	11	11	10	11	11	86	90	89	186	571	4.981	
140					3	4	6	11	11	10	11	11	11	10	11	11	33	89	90	89	186	597	4.946	
150					3	4	7	11	10	11	11	11	10	11	11	11	57	89	90	89	186	622	4.904	
160					3	4	7	11	11	10	11	11	11	10	11	11	81	89	90	89	186	646	4.860	
170					4	3	8	10	11	11	11	10	11	11	10	26	89	90	89	90	186	670	4.815	
180					4	3	8	11	10	11	11	10	11	11	11	48	89	90	89	90	185	692	4.789	
190					4	3	8	11	10	11	11	11	10	11	11	70	89	90	89	90	186	715	4.730	
200					4	3	8	11	10	11	11	11	10	11	13	89	90	89	90	89	186	736	4.702	
210					4	3	8	11	11	10	11	11	11	10	34	89	90	89	90	90	185	757	4.673	
220					4	3	8	11	11	10	11	11	11	10	55	89	90	89	90	89	186	778	4.628	
230					4	3	8	11	11	10	11	11	11	10	74	90	89	90	90	89	186	798	4.596	
240					4	3	8	11	11	10	11	11	11	15	89	90	89	90	89	90	186	818	4.561	

F-19

BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}	
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20
270	fsw																						
10																		2	4	4	7	17	1.729
20												1	4	3	4	4	3	4	5	10	40	78	3.619
30									2	3	4	3	4	4	3	8	11	11	11	10	78	152	4.606
40								4	3	4	3	4	7	11	10	11	11	11	10	11	126	226	4.966
50							3	4	3	4	8	11	11	10	11	11	11	10	11	11	175	294	5.076
60						1	4	4	5	11	11	10	11	11	11	10	11	11	11	44	186	352	5.138
70							3	4	6	11	10	11	11	11	10	11	11	11	10	11	186	402	5.157
80					2	3	4	11	11	10	11	11	11	10	11	11	11	10	43	90	185	445	5.151
90						3	4	7	11	10	11	11	11	10	11	11	10	11	77	89	186	484	5.113
100				1	4	3	10	10	11	11	11	10	11	11	11	10	11	29	90	89	186	519	5.075
110				2	4	3	11	11	11	10	11	11	11	10	11	11	11	58	90	89	186	551	5.034
120				2	4	5	11	11	10	11	11	11	10	11	11	11	10	87	89	90	186	581	4.986
130				3	3	6	11	11	11	10	11	11	11	10	11	11	35	89	90	89	186	609	4.948
140				3	4	6	11	11	10	11	11	11	10	11	11	11	60	90	89	90	186	636	4.888
150				3	4	7	11	10	11	11	10	11	11	11	10	11	86	90	89	90	185	661	4.863
160				3	4	7	11	11	10	11	11	11	10	11	11	31	90	89	90	89	186	686	4.812
170				4	3	8	10	11	11	10	11	11	11	10	11	10	55	90	89	90	186	710	4.774
180				4	3	8	10	11	11	11	10	11	11	11	10	79	89	90	89	90	186	734	4.715
190				4	3	8	11	10	11	11	11	10	11	11	22	89	90	89	90	90	185	756	4.697
200				4	3	8	11	10	11	11	11	10	11	11	44	90	89	90	89	90	186	779	4.639
210				4	3	8	11	11	10	11	11	11	10	11	66	89	90	89	90	89	186	800	4.622
220				4	3	8	11	11	10	11	11	11	10	11	87	89	90	90	89	90	185	821	4.590
230				4	3	8	11	11	10	11	11	11	10	29	90	89	90	89	90	89	186	842	4.552
240				4	3	8	11	11	10	11	11	11	10	49	90	89	90	89	90	89	186	862	4.525

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F-21

BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20	
280	fsw																							
10																		1	3	4	3	8	19	1.884
20												3	4	4	3	4	3	4	8	11	44	88	3.749	
30								1	4	3	4	3	4	4	4	11	11	10	11	11	85	166	4.779	
40							3	4	4	3	4	4	11	11	10	11	11	10	11	11	141	249	4.965	
50						3	4	3	4	6	11	11	10	11	11	10	11	11	11	17	186	320	5.107	
60					1	4	3	5	10	11	11	11	10	11	11	11	10	11	11	63	186	380	5.177	
70					3	3	6	11	10	11	11	10	11	11	11	10	11	11	27	90	186	433	5.148	
80				2	3	4	10	11	11	10	11	11	11	10	11	11	10	66	90	186	479	5.112		
90				3	4	6	11	11	11	10	11	11	11	10	11	11	11	22	89	90	185	518	5.103	
100			1	4	3	9	11	11	11	10	11	11	10	11	11	10	55	90	89	186	555	5.049		
110			2	3	4	11	11	10	11	11	11	10	11	11	11	10	85	89	90	186	588	4.989		
120			2	4	5	11	10	11	11	11	10	11	11	11	10	11	35	90	89	90	186	619	4.936	
130			3	3	6	11	11	10	11	11	11	10	11	11	11	10	63	89	90	89	186	647	4.906	
140			3	4	6	11	11	10	11	11	11	10	11	11	10	11	90	89	90	89	186	675	4.853	
150			3	4	7	10	11	11	11	10	11	11	11	10	11	36	90	89	90	89	186	701	4.807	
160			3	4	7	11	11	10	11	11	11	10	11	11	11	61	89	90	89	90	186	727	4.750	
170			4	3	7	11	11	11	10	11	11	11	10	11	11	85	90	89	90	89	186	751	4.722	
180			4	3	8	10	11	11	11	10	11	11	11	10	31	89	90	89	90	89	186	775	4.680	
190			4	3	8	11	10	11	11	11	10	11	11	11	53	90	89	90	89	90	186	799	4.632	
200			4	3	8	11	10	11	11	11	10	11	11	11	76	89	90	89	90	89	186	821	4.607	
210			4	3	8	11	11	10	11	11	11	10	11	20	89	90	89	90	89	90	186	844	4.563	
220			4	3	8	11	11	10	11	11	11	10	11	41	90	89	90	89	90	90	185	865	4.543	
230			4	3	8	11	11	10	11	11	11	10	11	63	89	90	89	90	89	90	185	886	4.513	
240			4	3	8	11	11	10	11	11	11	10	11	83	90	89	90	89	90	90	185	907	4.486	

F-22

BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}	
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20
290	fsw																						
10																	2	4	3	4	7	20	2.091
20										2	4	4	3	4	3	4	4	10	11	49	98	3.882	
30							1	3	4	3	4	4	3	4	8	11	11	10	11	11	96	184	4.833
40						3	4	3	4	4	3	9	11	10	11	11	11	10	11	11	155	271	5.036
50					3	4	3	4	4	11	10	11	11	11	10	11	11	11	10	35	186	346	5.143
60				1	4	3	4	10	11	10	11	11	11	10	11	11	11	10	11	84	186	410	5.178
70				2	4	5	10	11	11	11	10	11	11	11	10	11	11	11	49	89	186	464	5.169
80			1	4	4	9	11	11	11	10	11	11	11	10	11	11	11	10	90	89	186	512	5.121
90			3	4	6	11	10	11	11	11	10	11	11	11	10	11	11	47	90	89	186	554	5.062
100		1	4	3	9	11	10	11	11	11	10	11	11	11	10	11	11	80	90	89	186	591	5.020
110		2	3	4	11	10	11	11	11	10	11	11	11	10	11	11	33	90	89	90	185	625	4.973
120		2	4	5	10	11	11	11	10	11	11	11	10	11	11	11	62	90	89	90	185	656	4.924
130		3	3	6	11	11	10	11	11	10	11	11	11	10	11	13	89	90	89	90	185	686	4.868
140		3	4	6	11	10	11	11	11	10	11	11	11	10	11	39	90	89	90	90	185	714	4.821
150		3	4	7	10	11	11	11	10	11	11	11	10	11	11	66	89	90	89	90	186	742	4.753
160		3	4	7	11	11	10	11	11	11	10	11	11	11	12	90	89	90	89	90	185	767	4.731
170		4	3	7	11	11	11	10	11	11	11	10	11	11	37	90	89	90	90	89	186	793	4.669
180		4	3	8	10	11	11	11	10	11	11	11	10	11	62	89	90	89	90	90	185	817	4.643
190		4	3	8	11	10	11	11	11	10	11	11	10	86	89	90	90	89	90	185	841	4.604	
200		4	3	8	11	10	11	11	11	10	11	11	11	30	89	90	89	90	89	90	186	865	4.552
210		4	3	8	11	11	10	11	11	10	11	11	11	52	90	89	90	90	89	90	185	887	4.535
220		4	3	8	11	11	10	11	11	11	10	11	11	75	89	90	89	90	89	90	186	910	4.491
230		4	3	8	11	11	10	11	11	11	10	11	18	89	90	90	89	90	89	90	185	931	4.479
240		4	3	8	11	11	10	11	11	11	10	11	39	90	89	90	89	90	89	90	185	952	4.452

F-23

BT (min)	DECOMPRESSION STOPS (fsw)																				TST (min)	P _{DCS}		
	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30			20	
300	fsw																							
10																	1	3	4	3	4	7	22	2.287
20										2	3	4	3	4	3	4	4	6	11	11	54	109	4.018	
30								3	4	3	4	4	3	4	5	11	11	10	11	11	107	202	4.875	
40					3	3	4	4	3	4	6	11	11	10	11	11	11	10	11	11	171	295	5.041	
50				3	3	4	4	3	10	10	11	11	11	10	11	11	11	10	11	53	186	373	5.159	
60			1	4	3	4	8	11	11	11	10	11	11	11	10	11	11	11	25	90	186	440	5.176	
70			2	4	4	10	11	11	11	10	11	11	11	10	11	11	11	10	72	90	186	497	5.143	
80		1	4	3	10	10	11	11	11	10	11	11	11	10	11	11	11	34	90	89	186	546	5.110	
90		3	3	6	11	11	11	10	11	11	11	10	11	11	11	10	11	73	89	90	185	589	5.047	
100	1	3	4	9	10	11	11	11	10	11	11	10	11	11	11	10	29	89	90	89	186	628	4.984	
110	2	3	4	10	11	11	11	10	11	11	11	10	11	11	11	10	61	89	90	89	186	663	4.919	
120	2	4	5	10	11	11	10	11	11	11	10	11	11	11	10	12	90	90	89	90	185	695	4.871	
130	3	3	6	11	10	11	11	11	10	11	11	11	10	11	11	41	89	90	89	90	186	726	4.807	
140	3	4	6	11	10	11	11	11	10	11	11	11	10	11	11	69	90	89	90	89	186	755	4.757	
150	3	4	7	10	11	11	11	10	11	11	11	10	11	11	17	90	89	90	89	90	185	782	4.723	
160	3	4	7	11	11	10	11	11	11	10	11	11	10	11	44	89	90	89	90	89	186	809	4.669	
170	4	3	7	11	11	11	10	11	11	11	10	11	11	11	68	90	89	90	89	90	186	835	4.622	
180	4	3	8	10	11	11	11	10	11	11	11	10	11	15	90	89	90	89	90	89	186	860	4.586	
190	4	3	8	11	10	11	11	11	10	11	11	10	11	40	89	90	89	90	89	90	186	885	4.539	
200	4	3	8	11	10	11	11	11	10	11	11	11	10	63	90	89	90	89	90	89	186	908	4.517	
210	4	3	8	11	11	10	11	11	10	11	11	11	10	87	89	90	89	90	89	90	186	932	4.480	
220	4	3	8	11	11	10	11	11	11	10	11	11	30	89	90	89	90	89	90	89	186	954	4.464	
230	4	3	8	11	11	10	11	11	11	10	11	11	52	90	89	90	89	90	89	90	186	977	4.421	
240	4	3	8	11	11	10	11	11	11	10	11	11	74	89	90	89	90	89	90	90	185	998	4.414	

APPENDIX G XVAL-HE-9_050 1.3 ATM PO₂ HE-O₂ DECOMPRESSION TABLES (MSW)

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6	
24	msw																							
90																						0	0	3.248
100																						8	8	3.040
110																						14	14	3.200
120																						20	20	3.332
130																						26	26	3.440
140																						31	31	3.566
150																						35	35	3.713
160																						39	39	3.842
170																						44	44	3.912
180																						47	47	4.052
190																						51	51	4.133
200																						54	54	4.245
210																						58	58	4.303
220																						61	61	4.398
230																						64	64	4.484
240																						68	68	4.517

G-1

G-2

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
27	msw																							
50																						0	0	2.576
60																						1	1	2.853
70																						2	2	3.131
80																						11	11	3.005
90																						20	20	3.167
100																						28	28	3.329
110																						35	35	3.497
120																						42	42	3.632
130																						48	48	3.781
140																						54	54	3.903
150																						59	59	4.045
160																						65	65	4.128
170																						70	70	4.242
180																						75	75	4.344
190																						79	79	4.479
200																						83	83	4.603
210																						90	90	4.580
220																						95	95	4.635
230																						101	101	4.635
240																						107	107	4.624

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
30	msw																							
34																						0	0	2.349
40																						2	2	2.155
50																						3	3	2.698
60																						5	5	2.935
70																						17	17	3.046
80																						28	28	3.231
90																						37	37	3.444
100																						46	46	3.612
110																						55	55	3.737
120																						63	63	3.869
130																						70	70	4.018
140																						77	77	4.151
150																						84	84	4.269
160																						90	90	4.416
170																						96	96	4.547
180																						102	102	4.663
190																						110	110	4.674
200																						118	118	4.672
210																						125	125	4.701
220																						132	132	4.717
230																						139	139	4.721
240																						146	146	4.715

G-3

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6	
33	msw																							
26																						0	0	2.236
30																						1	1	2.452
40																						4	4	2.534
50																						6	6	2.950
60																						19	19	3.048
70																					1	31	32	3.277
80																					2	42	44	3.471
90																					2	53	55	3.647
100																					3	62	65	3.819
110																					3	72	75	3.946
120																					3	81	84	4.093
130																					3	90	93	4.221
140																					3	98	101	4.373
150																					3	105	108	4.549
160																					3	113	116	4.664
170																					3	122	125	4.718
180																					3	132	135	4.712
190																					3	141	144	4.735
200																					3	150	153	4.742
210																					3	158	161	4.780
220																					3	167	170	4.761
230																					3	174	177	4.815
240																					3	182	185	4.815

G-4

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6	
36	msw																							
22																						0	0	2.387
30																						3	3	2.642
40																						6	6	2.961
50																				2	15	17	2.984	
60																				3	30	33	3.236	
70																				1	3	43	47	3.479
80																				2	3	55	60	3.681
90																				2	4	67	73	3.820
100																				2	4	78	84	3.993
110																				3	3	89	95	4.151
120																				3	3	99	105	4.321
130																				3	4	108	115	4.470
140																				3	4	117	124	4.636
150																				3	4	128	135	4.698
160																				3	4	139	146	4.739
170																				3	4	150	157	4.761
180																				3	4	161	168	4.766
190																				3	4	171	178	4.798
200																				3	4	181	188	4.815
210																				3	12	182	197	4.852
220																				3	21	183	207	4.831
230																				3	30	183	216	4.835
240																				3	39	182	224	4.866

G-5

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}				
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6		
39	msw																								
18																						0	0	2.154	
20																						1	1	2.276	
30																						6	6	2.462	
40																					2	8	10	2.960	
50																				1	4	25	30	3.147	
60																				3	3	41	47	3.404	
70																				1	3	4	55	63	3.625
80																				1	4	3	69	77	3.821
90																				2	3	4	82	91	3.973
100																				2	4	4	93	103	4.190
110																				3	3	5	105	116	4.325
120																				3	3	6	115	127	4.511
130																				3	3	6	126	138	4.675
140																				3	4	6	138	151	4.737
150																				3	4	6	151	164	4.765
160																				3	4	6	164	177	4.774
170																				3	4	6	176	189	4.807
180																				3	4	11	183	201	4.821
190																				3	4	23	182	212	4.849
200																				3	4	34	182	223	4.859
210																				3	4	44	183	234	4.853
220																				3	4	55	182	244	4.869
230																				3	4	65	182	254	4.871
240																				3	4	74	183	264	4.864

G-6

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6	
42	msw																							
16																						0	0	2.281
20																						3	3	2.210
30																					1	7	8	2.866
40																				1	4	16	21	3.035
50																				4	3	34	41	3.364
60																			2	4	4	51	61	3.577
70																			3	4	7	63	77	3.856
80																	1	4	3	9	77	94	4.013	
90																	2	3	4	10	90	109	4.193	
100																	2	4	4	11	102	123	4.382	
110																	3	3	5	11	115	137	4.532	
120																	3	3	6	10	127	149	4.741	
130																	3	3	6	11	141	164	4.782	
140																	3	4	6	10	157	180	4.770	
150																	3	4	6	10	171	194	4.806	
160																	3	4	6	12	182	207	4.867	
170																	3	4	6	25	183	221	4.855	
180																	3	4	6	39	182	234	4.861	
190																	3	4	6	51	182	246	4.889	
200																	3	4	6	63	183	259	4.859	
210																	3	4	6	75	182	270	4.894	
220																	3	4	6	86	183	282	4.876	
230																	3	4	15	88	183	293	4.877	
240																	3	4	26	88	182	303	4.897	

G-7

G-8

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	P _{DCS}					
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18			15	12	9	6	
45	msw																							
13																						0	0	1.738
20																						6	6	1.816
30																					4	8	12	2.636
40																				3	4	24	31	3.236
50																			3	4	5	42	54	3.523
60																	2	3	4	10	56	75	3.789	
70																	3	4	6	10	71	94	4.014	
80																1	3	4	8	11	85	112	4.206	
90																2	3	4	10	10	99	128	4.424	
100																2	4	4	10	11	112	143	4.620	
110																2	4	5	10	11	127	159	4.737	
120																3	3	5	11	11	143	176	4.776	
130																3	3	6	11	10	160	193	4.786	
140																3	4	5	11	11	174	208	4.855	
150																3	4	6	10	18	183	224	4.864	
160																3	4	6	11	33	182	239	4.872	
170																3	4	6	11	47	182	253	4.896	
180																3	4	6	11	61	182	267	4.899	
190																3	4	6	11	75	182	281	4.891	
200																3	4	6	11	88	182	294	4.905	
210																3	4	6	24	88	182	307	4.894	
220																3	4	6	36	88	182	319	4.902	
230																3	4	6	48	88	182	331	4.894	
240																3	4	6	59	88	183	343	4.875	

BT (min)	DECOMPRESSION STOPS (msw)																	TST (min)	P _{DCS}				
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18			15	12	9	6
48	msw																						
12																					0	0	1.918
20																				1	7	8	1.995
30																			3	4	12	19	2.782
40																		3	3	5	31	42	3.378
50																	2	4	5	10	47	68	3.696
60																1	4	3	10	10	62	90	4.006
70																3	3	6	10	11	78	111	4.216
80															1	3	4	8	10	11	93	130	4.461
90															1	4	4	9	11	10	108	147	4.693
100															2	4	3	11	10	11	125	166	4.772
110															2	4	4	11	11	10	144	186	4.767
120															3	3	5	11	10	11	161	204	4.813
130															3	3	6	11	10	11	177	221	4.876
140															3	3	6	11	11	22	182	238	4.890
150															3	4	6	10	11	39	182	255	4.889
160															3	4	6	10	11	54	183	271	4.886
170															3	4	6	11	10	70	182	286	4.912
180															3	4	6	11	10	85	182	301	4.919
190															3	4	6	11	22	88	182	316	4.902
200															3	4	6	11	36	88	182	330	4.900
210															3	4	6	11	49	88	183	344	4.885
220															3	4	6	11	63	88	182	357	4.888
230															3	4	6	11	76	88	182	370	4.876
240															3	4	6	11	88	88	183	383	4.853

G-9

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6
51	msw																						
10																					0	0	1.423
20																				3	7	10	2.098
30																		3	3	4	16	26	2.992
40																2	4	3	10	35	54	3.550	
50															2	3	4	10	11	52	82	3.898	
60														1	3	4	8	11	10	70	107	4.174	
70														2	4	5	10	11	11	86	129	4.435	
80														4	3	8	10	11	10	103	149	4.701	
90													1	4	3	10	10	11	10	123	172	4.745	
100													2	3	4	10	11	11	10	142	193	4.791	
110													2	4	4	11	10	11	10	161	213	4.849	
120													3	3	5	11	10	11	10	180	233	4.864	
130													3	3	6	10	11	11	25	182	251	4.910	
140													3	3	6	11	10	11	43	182	269	4.913	
150													3	4	6	10	11	10	60	183	287	4.904	
160													3	4	6	10	11	11	76	183	304	4.904	
170													3	4	6	11	10	16	88	182	320	4.924	
180													3	4	6	11	10	31	89	182	336	4.910	
190													3	4	6	11	10	47	88	182	351	4.918	
200													3	4	6	11	10	62	88	183	367	4.877	
210													3	4	6	11	10	77	88	182	381	4.889	
220													3	4	6	11	13	88	88	182	395	4.884	
230													3	4	6	11	27	88	88	182	409	4.863	
240													3	4	6	11	40	88	88	183	423	4.83	

G-10

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6	
54	msw																							
9																					0	0	1.353	
10																					1	1	1.498	
20																				2	4	7	13	2.085
30																	2	4	3	4	21	34	3.178	
40															2	4	3	7	11	40	67	3.695		
50														1	4	3	9	11	10	59	97	4.089		
60														4	3	8	10	11	10	78	124	4.379		
70													2	4	4	11	10	11	10	95	147	4.709		
80													3	4	7	11	10	11	10	117	173	4.771		
90												1	4	3	9	11	10	11	10	139	198	4.800		
100												2	3	4	10	11	10	11	10	159	220	4.863		
110												2	4	4	11	10	11	10	11	179	242	4.884		
120												3	3	5	11	10	11	10	27	183	263	4.892		
130												3	3	6	10	11	10	11	46	182	282	4.919		
140												3	3	6	11	10	11	10	64	183	301	4.918		
150												3	4	6	10	11	10	11	82	183	320	4.915		
160												3	4	6	10	11	11	22	88	182	337	4.936		
170												3	4	6	11	10	11	39	88	182	354	4.937		
180												3	4	6	11	10	11	56	88	182	371	4.918		
190												3	4	6	11	10	11	72	88	183	388	4.881		
200												3	4	6	11	10	11	88	88	182	403	4.895		
210												3	4	6	11	10	26	88	88	183	419	4.861		
220												3	4	6	11	10	41	88	89	182	434	4.846		
230												3	4	6	11	10	56	88	88	183	449	4.817		
240												3	4	6	11	11	69	88	88	183	463	4.805		

G-11

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6
57	msw																						
8																					0	0	1.199
10																					3	3	1.192
20																		2	3	4	7	16	2.255
30															2	3	4	3	6	27	45	3.282	
40														2	3	4	5	10	11	46	81	3.840	
50													1	3	4	7	11	10	11	66	113	4.262	
60													3	4	6	11	10	11	10	86	141	4.628	
70												2	3	4	11	10	11	10	11	108	170	4.767	
80												3	4	6	11	10	11	11	10	132	198	4.833	
90											1	4	3	9	10	11	10	11	10	156	225	4.851	
100											2	3	4	10	10	11	10	11	11	177	249	4.872	
110											2	4	4	10	11	10	11	11	26	182	271	4.930	
120											2	4	5	10	11	11	10	11	47	182	293	4.924	
130											3	3	6	10	11	10	11	10	67	183	314	4.922	
140											3	3	6	11	10	11	10	11	86	183	334	4.923	
150											3	4	5	11	11	10	11	27	88	183	353	4.930	
160											3	4	6	10	11	10	11	46	88	182	371	4.940	
170											3	4	6	11	10	11	10	64	88	183	390	4.903	
180											3	4	6	11	10	11	10	82	88	182	407	4.905	
190											3	4	6	11	10	11	21	88	88	182	424	4.888	
200											3	4	6	11	10	11	37	88	89	182	441	4.860	
210											3	4	6	11	10	11	54	88	88	182	457	4.845	
220											3	4	6	11	10	11	69	88	88	183	473	4.816	
230											3	4	6	11	10	11	85	88	88	182	488	4.803	
240											3	4	6	11	11	22	88	88	88	182	503	4.784	

G-12

G-13

BT (min)	DECOMPRESSION STOPS (msw)																			TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12			9	6
60	msw																						
8																					0	0	1.663
10																					4	4	1.293
20																	1	3	4	3	10	21	2.441
30														1	4	3	4	3	10	31	56	3.422	
40													2	3	4	3	10	10	11	52	95	4.014	
50													3	4	6	11	10	11	10	74	129	4.472	
60													3	3	6	10	11	10	11	11	96	161	4.767
70												2	3	4	10	10	11	10	11	10	124	195	4.812
80												3	4	6	10	11	10	11	10	11	149	225	4.856
90											1	3	4	8	11	10	11	10	11	11	172	252	4.910
100											2	3	4	9	11	11	10	11	10	25	182	278	4.928
110											2	4	3	11	11	10	11	10	11	46	183	302	4.930
120											2	4	5	10	11	10	11	10	11	68	182	324	4.960
130											3	3	5	11	11	10	11	10	12	88	182	346	4.958
140											3	3	6	11	10	11	10	11	31	88	183	367	4.943
150											3	4	5	11	11	10	11	10	51	89	182	387	4.937
160											3	4	6	10	11	10	11	11	70	88	183	407	4.904
170											3	4	6	10	11	11	10	12	88	88	182	425	4.915
180											3	4	6	11	10	11	10	30	88	88	183	444	4.879
190											3	4	6	11	10	11	10	48	88	88	183	462	4.852
200											3	4	6	11	10	11	11	64	88	89	182	479	4.837
210											3	4	6	11	10	11	11	81	88	88	183	496	4.810
220											3	4	6	11	10	11	21	88	88	88	183	513	4.773
230											3	4	6	11	10	11	37	88	88	88	183	529	4.750
240											3	4	6	11	11	10	52	89	88	88	182	544	4.739

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
63	msw																							
7																						0	0	1.358
10																						6	6	1.109
20																	3	4	3	4	12	26	2.639	
30													1	3	4	3	4	3	4	6	11	36	68	3.557
40												1	4	3	4	7	10	11	11	11	58	109	4.208	
50												3	4	4	11	10	11	10	11	11	82	146	4.664	
60												2	4	4	11	11	10	11	10	11	110	184	4.818	
70									1	4	3	10	10	11	10	11	10	11	10	11	139	220	4.867	
80									3	3	6	10	11	11	10	11	10	11	10	11	166	252	4.895	
90									1	3	4	8	10	11	10	11	10	11	10	11	20	182	281	4.947
100									1	4	3	10	11	10	11	10	11	10	11	10	44	183	308	4.941
110									2	4	3	11	10	11	10	11	10	11	10	67	183	333	4.945	
120									2	4	4	11	11	10	11	10	11	10	11	12	88	183	357	4.946
130									3	3	5	11	10	11	11	10	11	10	11	34	88	182	379	4.956
140									3	3	6	10	11	11	10	11	10	10	55	88	183	401	4.933	
150									3	3	6	11	11	10	11	10	11	10	11	75	88	183	422	4.919
160									3	4	6	10	11	10	11	11	17	88	89	88	182	442	4.909	
170									3	4	6	10	11	11	10	11	37	88	88	88	183	462	4.879	
180									3	4	6	11	10	11	10	11	56	88	89	88	182	481	4.858	
190									3	4	6	11	10	11	10	11	75	88	88	88	182	499	4.843	
200									3	4	6	11	10	11	11	15	88	88	88	88	183	518	4.793	
210									3	4	6	11	10	11	11	33	88	88	88	88	182	535	4.784	
220									3	4	6	11	10	11	11	50	88	88	88	88	182	552	4.757	
230									3	4	6	11	10	11	11	66	89	88	88	88	182	569	4.719	
240									3	4	6	11	11	10	11	83	88	88	88	88	183	586	4.678	

G-14

G-15

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
66	msw																							
6																						0	0	0.994
10																						7	7	1.246
20																2	4	3	4	3	16	32	2.814	
30													3	4	4	3	4	10	10	41	79	3.737		
40											1	4	3	4	4	11	10	11	10	67	125	4.325		
50											3	4	3	10	10	11	10	11	10	93	165	4.812		
60										2	3	4	11	10	11	10	11	10	11	125	208	4.867		
70									1	3	4	9	10	11	10	11	10	11	11	155	246	4.914		
80									3	3	5	11	10	11	10	11	11	10	13	182	280	4.940		
90									4	3	8	10	11	10	11	11	10	11	39	183	311	4.933		
100								1	4	3	10	10	11	10	11	11	10	11	64	183	339	4.951		
110								2	3	4	11	10	11	10	11	10	11	11	89	182	365	4.961		
120								2	4	4	11	10	11	11	10	11	10	35	88	182	389	4.974		
130								3	3	5	11	10	11	10	11	11	10	57	89	182	413	4.943		
140								3	3	6	10	11	11	10	11	10	11	79	88	183	436	4.915		
150								3	3	6	11	10	11	11	10	11	22	88	89	182	457	4.912		
160								3	4	6	10	11	10	11	10	11	44	88	88	183	479	4.865		
170								3	4	6	10	11	11	10	11	10	64	88	88	183	499	4.851		
180								3	4	6	11	10	11	10	11	10	84	88	88	183	519	4.816		
190								3	4	6	11	10	11	10	11	25	88	89	88	182	538	4.794		
200								3	4	6	11	10	11	10	11	44	88	88	88	183	557	4.756		
210								3	4	6	11	10	11	11	10	62	88	88	88	183	575	4.731		
220								3	4	6	11	10	11	11	10	80	88	88	89	182	593	4.697		
230								3	4	6	11	10	11	11	20	88	88	88	88	182	610	4.679		
240								3	4	6	11	11	10	11	37	88	88	88	88	182	627	4.648		

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BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6		
69	msw																								
6																						0	0	1.363	
10																					2	7	9	1.213	
20															1	4	3	4	3	4	3	4	18	37	3.046
30													3	4	3	4	3	7	10	11	11	47	92	3.862	
40										1	3	4	4	3	9	10	11	11	11	10	10	74	140	4.531	
50										3	4	3	8	10	11	10	11	10	11	11	10	106	187	4.848	
60										1	4	4	9	11	10	11	10	11	11	10	10	141	233	4.900	
70									1	3	4	8	10	11	10	11	10	11	10	11	10	173	273	4.958	
80									2	4	4	11	11	10	11	10	11	10	11	10	31	183	309	4.958	
90									4	3	7	11	10	11	10	11	10	11	10	11	59	183	341	4.962	
100								1	4	3	9	11	10	11	11	10	11	10	11	10	86	182	370	4.989	
110								2	3	4	10	11	10	11	11	10	11	10	10	34	88	182	397	4.986	
120								2	4	4	11	10	11	10	11	10	11	11	58	88	182	423	4.959		
130								3	3	5	11	10	11	10	11	10	11	11	81	88	183	448	4.924		
140								3	3	6	10	11	10	11	10	11	26	88	88	88	183	471	4.912		
150								3	3	6	11	10	11	11	10	11	10	49	88	88	182	493	4.902		
160								3	4	6	10	11	10	11	10	11	11	70	88	88	182	515	4.866		
170								3	4	6	10	11	11	10	11	10	14	88	88	88	182	536	4.840		
180								3	4	6	11	10	11	10	11	10	34	88	89	88	182	557	4.793		
190								3	4	6	11	10	11	10	11	11	53	88	88	88	183	577	4.754		
200								3	4	6	11	10	11	10	11	11	73	88	88	88	182	596	4.730		
210								3	4	6	11	10	11	11	10	15	88	88	88	88	182	615	4.698		
220								3	4	6	11	10	11	11	10	33	88	88	88	88	183	634	4.651		
230								3	4	6	11	10	11	11	10	51	88	88	88	89	182	652	4.620		
240								3	4	6	11	11	10	11	10	69	88	88	88	88	183	670	4.585		

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BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6		
72	msw																								
5																						0	0	0.877	
10																					4	7	11	1.211	
20															3	4	3	4	4	4	3	24	45	3.162	
30												2	4	4	3	4	3	10	11	11	11	52	104	4.038	
40										1	3	4	3	4	6	11	10	11	10	11	11	82	156	4.716	
50										3	4	3	6	10	11	10	11	11	10	11	10	11	120	210	4.870
60									1	4	3	9	10	11	10	11	11	10	11	10	11	10	157	258	4.964
70									4	3	7	11	10	11	10	11	11	10	11	19	183	301	4.967		
80								2	4	4	10	11	10	11	10	11	10	11	10	11	51	182	338	4.997	
90								3	4	3	7	10	11	10	11	10	11	10	11	10	11	80	183	372	4.982
100							1	4	3	9	11	10	11	10	11	10	11	11	10	11	30	88	183	403	4.970
110							2	3	4	10	11	10	11	10	11	10	11	11	11	56	89	182	431	4.959	
120							2	4	4	10	11	11	10	11	10	11	10	11	82	88	183	458	4.925		
130							2	4	5	10	11	11	10	11	10	11	10	29	88	88	182	482	4.938		
140							3	3	6	10	11	10	11	11	10	11	10	52	89	88	182	507	4.890		
150							3	3	6	11	10	11	10	11	10	11	11	74	88	88	183	530	4.856		
160							3	4	6	10	11	10	11	10	11	11	19	88	88	88	183	553	4.820		
170							3	4	6	10	11	11	10	11	10	11	41	88	88	88	183	575	4.778		
180							3	4	6	11	10	11	10	11	10	11	62	88	88	88	183	596	4.742		
190							3	4	6	11	10	11	10	11	11	10	83	88	88	88	183	617	4.696		
200							3	4	6	11	10	11	10	11	11	25	88	88	88	88	183	637	4.662		
210							3	4	6	11	10	11	11	10	11	44	88	88	89	88	182	656	4.641		
220							3	4	6	11	10	11	11	10	11	64	88	88	88	88	182	675	4.611		
230							3	4	6	11	10	11	11	10	11	82	88	88	88	89	182	694	4.572		
240							3	4	6	11	10	11	11	10	23	88	88	89	88	88	182	712	4.542		

BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
75	msw																							
5																						0	0	1.206
10																				2	3	8	13	1.332
20														2	4	4	3	4	3	6	28	54	3.291	
30											2	4	3	4	3	4	7	10	11	10	60	118	4.160	
40										4	3	4	3	4	11	10	11	10	11	10	94	175	4.772	
50									3	3	4	4	10	11	10	11	11	10	11	10	135	233	4.924	
60								1	3	4	7	11	10	11	10	11	10	11	10	11	10	174	284	5.006
70								3	4	6	11	10	11	10	11	11	10	11	10	39	182	329	5.007	
80							2	3	4	10	11	11	10	11	10	11	10	11	11	71	182	368	5.008	
90							3	4	6	11	10	11	10	11	10	11	10	11	25	88	182	403	5.011	
100						1	4	3	9	10	11	10	11	10	11	10	11	10	11	53	88	183	436	4.966
110						2	3	4	10	10	11	10	11	11	10	11	10	11	10	81	88	182	465	4.947
120						2	4	4	10	11	10	11	11	10	11	10	11	29	88	88	182	492	4.942	
130						2	4	5	10	11	11	10	11	10	11	10	11	54	88	88	183	519	4.881	
140						3	3	6	10	11	10	11	10	11	11	10	11	78	88	88	182	543	4.871	
150						3	3	6	11	10	11	10	11	11	10	11	24	88	88	88	183	568	4.808	
160						3	4	5	11	11	10	11	10	11	10	11	47	88	88	88	183	591	4.773	
170						3	4	6	10	11	10	11	11	10	11	10	69	89	88	88	182	613	4.745	
180						3	4	6	11	10	11	10	11	10	11	13	89	88	88	88	182	635	4.709	
190						3	4	6	11	10	11	10	11	11	10	34	89	88	88	88	182	656	4.673	
200						3	4	6	11	10	11	10	11	11	10	55	88	89	88	88	182	677	4.628	
210						3	4	6	11	10	11	11	10	11	10	76	88	88	88	88	183	698	4.577	
220						3	4	6	11	10	11	11	10	11	17	88	88	88	88	89	182	717	4.559	
230						3	4	6	11	10	11	11	10	11	37	88	88	88	88	88	183	737	4.509	
240						3	4	6	11	10	11	11	10	11	55	88	89	88	88	88	182	755	4.496	

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BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6		
78	msw																								
5																						0	0	1.575	
10																			3	4	7	14	1.494		
20													2	3	4	3	4	3	4	3	4	9	32	64	3.392
30										1	4	4	3	4	3	4	10	11	11	10	66	131	4.324		
40									3	4	3	4	3	9	10	11	11	10	11	10	106	195	4.828		
50								3	3	4	3	9	11	10	11	11	10	11	10	11	151	258	4.916		
60							1	3	4	6	10	11	11	10	11	10	11	10	11	10	11	20	182	311	5.034
70							3	3	6	11	10	11	10	11	11	10	11	10	11	11	58	182	358	5.023	
80						2	3	4	10	10	11	10	11	11	10	11	10	11	11	15	88	182	399	5.027	
90						3	4	6	10	11	10	11	11	10	11	10	11	10	11	47	88	183	436	4.990	
100			1	3	4	8	11	10	11	11	10	11	10	11	10	11	10	11	77	88	182	469	4.976		
110			2	3	4	9	11	11	10	11	10	11	10	11	10	11	11	27	88	88	183	500	4.922		
120			2	4	4	10	11	10	11	10	11	10	11	11	10	11	10	55	88	88	182	528	4.912		
130			2	4	5	10	11	10	11	11	10	11	10	11	10	11	10	80	88	89	182	555	4.864		
140			3	3	5	11	11	10	11	10	11	10	11	10	11	11	27	88	88	88	183	581	4.817		
150			3	3	6	11	10	11	10	11	10	11	10	11	11	10	51	89	88	88	182	605	4.790		
160			3	4	5	11	11	10	11	10	11	10	11	10	11	11	75	88	88	88	182	629	4.749		
170			3	4	6	10	11	10	11	11	10	11	10	11	10	21	88	88	88	88	183	653	4.687		
180			3	4	6	10	11	11	10	11	10	11	10	11	10	43	88	88	88	88	183	675	4.656		
190			3	4	6	11	10	11	10	11	10	11	10	11	11	64	88	88	88	89	182	697	4.616		
200			3	4	6	11	10	11	10	11	10	11	11	10	11	85	88	88	89	88	182	718	4.584		
210			3	4	6	11	10	11	11	10	11	10	11	10	29	88	88	89	88	88	182	739	4.546		
220			3	4	6	11	10	11	11	10	11	10	11	10	50	88	88	88	88	88	183	760	4.497		
230			3	4	6	11	10	11	11	10	11	10	11	10	69	88	88	89	88	88	182	779	4.482		
240			3	4	6	11	10	11	11	10	11	10	11	11	88	88	88	88	88	88	183	799	4.441		

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BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6		
81	msw																								
10																			2	3	4	7	16	1.635	
20												1	3	4	3	4	3	4	4	11	36	73	3.527		
30									1	4	3	4	3	4	3	8	10	11	10	11	73	145	4.487		
40								3	4	3	4	3	6	11	10	11	10	11	10	11	119	216	4.863		
50							3	3	4	3	7	11	10	11	11	10	11	10	11	10	167	282	4.978		
60						1	3	4	4	11	11	10	11	10	11	10	11	10	11	10	38	183	339	5.031	
70						3	3	5	11	10	11	10	11	11	10	11	10	11	10	11	78	183	388	5.034	
80				1	4	3	10	11	10	11	10	11	10	11	10	11	10	11	10	11	36	88	183	431	5.009
90				3	3	6	11	10	11	10	11	10	11	10	11	10	11	10	11	70	89	182	469	4.978	
100			1	3	4	8	10	11	11	10	11	10	11	10	11	10	11	11	23	88	88	182	503	4.965	
110			1	4	4	9	11	10	11	11	10	11	10	11	10	11	10	11	52	89	88	182	535	4.913	
120			2	4	3	11	10	11	11	10	11	10	11	10	11	10	11	11	79	89	88	182	564	4.872	
130			2	4	5	10	11	10	11	10	11	10	11	10	11	10	29	89	88	88	182	592	4.832		
140			3	3	5	11	11	10	11	10	11	10	11	10	11	10	55	88	88	88	182	618	4.795		
150			3	3	6	11	10	11	10	11	10	11	10	11	10	11	79	88	88	88	183	644	4.736		
160			3	3	6	11	11	10	11	10	11	10	11	10	11	25	89	88	88	88	182	668	4.703		
170			3	4	6	10	11	10	11	11	10	11	10	11	10	49	89	88	88	88	182	692	4.657		
180			3	4	6	10	11	11	10	11	10	11	10	11	10	73	88	88	88	88	182	715	4.616		
190			3	4	6	11	10	11	10	11	10	11	10	11	17	88	88	88	88	88	183	738	4.565		
200			3	4	6	11	10	11	10	11	10	11	10	11	39	88	88	88	88	88	183	760	4.527		
210			3	4	6	11	10	11	11	10	11	10	11	10	60	88	89	88	88	88	182	781	4.502		
220			3	4	6	11	10	11	11	10	11	10	11	10	81	88	88	88	89	88	182	802	4.466		
230			3	4	6	11	10	11	11	10	11	10	11	10	25	88	88	88	88	88	183	823	4.424		
240			3	4	6	11	10	11	11	10	11	10	11	10	44	88	89	88	88	88	182	842	4.412		

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BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}	
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6
84	msw																						
10																		3	4	3	7	17	1.814
20												3	3	4	3	4	4	3	7	11	41	83	3.639
30								4	3	4	3	4	3	4	11	11	10	11	10	81	159	4.629	
40						3	3	4	3	4	3	11	10	11	11	10	11	10	11	133	238	4.875	
50						2	4	4	3	5	11	10	11	11	10	11	10	11	10	12	182	307	5.028
60					1	3	4	3	11	10	11	10	11	10	11	11	10	11	10	57	183	367	5.048
70					2	4	4	11	10	11	10	11	10	11	11	10	11	10	21	89	182	418	5.048
80			1	4	3	9	11	10	11	11	10	11	10	11	10	11	11	11	58	89	182	463	5.009
90			3	3	6	10	11	10	11	11	10	11	10	11	10	11	16	88	88	183	503	4.956	
100		1	3	4	7	11	11	10	11	10	11	10	11	11	10	11	48	88	88	182	538	4.937	
110		1	4	3	10	11	10	11	10	11	10	11	11	10	11	10	78	88	88	183	571	4.873	
120		2	3	4	11	10	11	10	11	11	10	11	10	11	10	29	88	88	89	182	601	4.831	
130		2	4	4	11	11	10	11	10	11	10	11	11	10	11	56	88	88	88	182	629	4.797	
140		3	3	5	11	10	11	11	10	11	10	11	10	11	11	82	88	88	88	183	657	4.730	
150		3	3	6	10	11	11	10	11	10	11	10	11	11	30	88	88	88	183	683	4.682		
160		3	3	6	11	10	11	11	10	11	10	11	10	11	55	88	88	88	183	708	4.640		
170		3	4	6	10	11	10	11	11	10	11	10	11	10	80	88	88	88	183	733	4.591		
180		3	4	6	10	11	11	10	11	10	11	10	11	25	88	88	88	89	182	756	4.561		
190		3	4	6	11	10	11	10	11	10	11	11	10	48	88	89	88	88	182	779	4.525		
200		3	4	6	11	10	11	10	11	11	10	11	10	71	88	88	88	88	183	802	4.477		
210		3	4	6	11	10	11	11	10	11	10	11	15	88	88	88	88	88	183	824	4.447		
220		3	4	6	11	10	11	11	10	11	10	11	36	88	88	89	88	88	182	845	4.422		
230		3	4	6	11	10	11	11	10	11	10	11	57	88	88	88	88	89	182	866	4.390		
240		3	4	6	11	10	11	11	10	11	10	11	78	88	88	88	88	88	183	887	4.354		

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BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}			
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6		
87	msw																								
10																		2	3	4	3	7	19	1.985	
20											2	3	4	4	3	4	3	4	9	11	46	93	3.769		
30								3	4	3	4	3	4	3	8	11	10	11	10	11	90	175	4.729		
40						3	3	4	3	4	3	8	11	10	11	10	11	10	11	11	147	260	4.92		
50					2	4	3	4	3	11	10	11	10	11	11	10	11	10	11	11	28	183	333	5.026	
60				1	3	4	3	9	11	10	11	10	11	10	11	11	10	11	10	11	77	182	395	5.083	
70				2	3	4	11	10	11	10	11	10	11	11	10	11	10	11	11	42	88	183	449	5.046	
80			1	3	4	9	10	11	10	11	10	11	11	10	11	10	11	10	11	10	82	89	182	496	4.999
90			3	3	5	11	10	11	10	11	11	10	11	10	11	10	11	11	40	88	89	182	537	4.942	
100			4	3	8	10	11	10	11	11	10	11	10	11	10	11	11	73	88	88	88	182	573	4.905	
110	1	4	3	10	10	11	10	11	11	10	11	10	11	10	11	10	11	27	88	88	88	182	607	4.858	
120	2	3	4	11	10	11	10	11	10	11	11	10	11	10	11	10	11	56	88	88	88	182	638	4.803	
130	2	4	4	11	10	11	11	10	11	10	11	10	11	10	11	10	84	88	88	88	183	668	4.735		
140	3	3	5	11	10	11	10	11	11	10	11	10	11	10	34	88	88	88	88	88	182	695	4.707		
150	3	3	6	10	11	11	10	11	10	11	10	11	11	10	59	89	88	88	88	88	182	722	4.653		
160	3	3	6	11	10	11	11	10	11	10	11	10	11	11	84	88	88	88	88	88	183	748	4.600		
170	3	4	6	10	11	10	11	10	11	11	10	11	10	32	88	88	88	89	88	88	182	773	4.559		
180	3	4	6	10	11	11	10	11	10	11	10	11	11	55	89	88	88	88	88	88	182	797	4.525		
190	3	4	6	11	10	11	10	11	10	11	11	10	11	79	88	88	88	88	88	88	183	821	4.478		
200	3	4	6	11	10	11	10	11	11	10	11	10	25	88	88	88	89	88	88	88	182	844	4.446		
210	3	4	6	11	10	11	10	11	11	10	11	10	47	88	89	88	88	88	88	88	182	866	4.418		
220	3	4	6	11	10	11	11	10	11	10	11	10	70	88	88	88	88	88	88	88	183	889	4.371		
230	3	4	6	11	10	11	11	10	11	10	11	13	88	88	88	88	89	88	88	88	182	910	4.358		
240	3	4	6	11	10	11	11	10	11	10	11	34	88	88	88	88	88	88	88	89	182	931	4.329		

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BT (min)	DECOMPRESSION STOPS (msw)																				TST (min)	P _{DCS}		
	66	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9			6	
90	msw																							
10																		3	4	3	4	7	21	2.161
20										1	4	3	4	3	4	3	4	5	11	11	51	104	3.882	
30							3	3	4	3	4	3	4	4	11	10	11	11	10	11	101	193	4.755	
40					2	4	3	4	3	4	5	11	10	11	11	10	11	10	11	10	163	283	4.933	
50				2	4	3	4	3	9	10	11	10	11	11	10	11	10	11	10	47	182	359	5.055	
60			1	3	4	3	8	10	11	10	11	10	11	11	10	11	10	11	19	89	182	425	5.063	
70			2	3	4	10	10	11	10	11	10	11	11	10	11	10	11	10	65	88	183	481	5.028	
80		1	3	4	8	10	11	11	10	11	10	11	10	11	11	10	11	28	88	88	182	529	4.994	
90		2	4	5	10	11	10	11	10	11	11	10	11	10	11	10	11	65	88	88	183	572	4.907	
100		4	3	7	11	11	10	11	10	11	10	11	11	10	11	10	22	88	88	88	183	610	4.853	
110	1	4	3	9	11	11	10	11	10	11	10	11	11	10	11	10	53	89	88	88	182	644	4.810	
120	2	3	4	10	11	10	11	11	10	11	10	11	10	11	11	10	83	88	89	88	182	676	4.748	
130	2	4	4	11	10	11	10	11	11	10	11	10	11	10	11	34	88	89	88	88	182	706	4.701	
140	3	3	5	11	10	11	10	11	11	10	11	10	11	10	11	62	88	88	89	88	182	735	4.645	
150	3	3	6	10	11	10	11	11	10	11	10	11	10	11	11	88	88	88	88	89	182	762	4.600	
160	3	3	6	11	10	11	11	10	11	10	11	10	11	11	37	88	88	88	88	88	183	789	4.542	
170	3	4	6	10	11	10	11	10	11	11	10	11	10	11	62	88	89	88	88	88	182	814	4.515	
180	3	4	6	10	11	11	10	11	10	11	10	11	11	10	87	88	88	88	89	88	182	839	4.475	
190	3	4	6	11	10	11	10	11	10	11	11	10	11	33	88	88	89	88	88	88	182	863	4.439	
200	3	4	6	11	10	11	10	11	11	10	11	10	11	57	88	88	88	88	88	88	183	887	4.395	
210	3	4	6	11	10	11	10	11	11	10	11	10	11	80	88	88	88	88	88	88	183	910	4.367	
220	3	4	6	11	10	11	11	10	11	10	11	10	25	88	88	89	88	88	88	88	182	932	4.350	
230	3	4	6	11	10	11	11	10	11	10	11	10	47	88	88	89	88	88	88	88	182	954	4.320	
240	3	4	6	11	10	11	11	10	11	10	11	10	69	88	88	88	88	88	88	89	182	976	4.292	