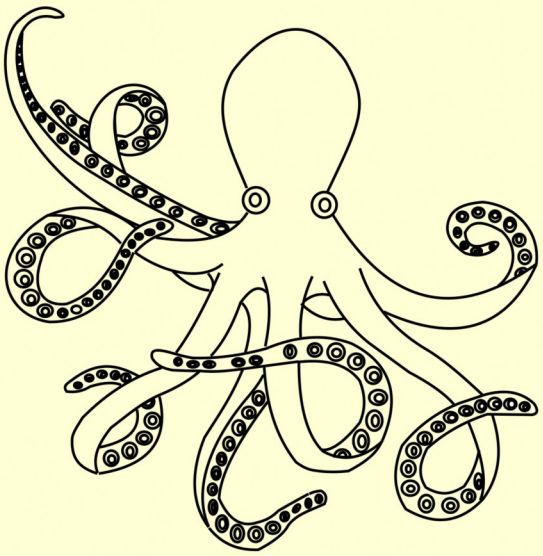

Diving & ROV specialists

Surface-Supplied Diving Handbook Series

Book #7

Implement the MT 92 tables

June 2025

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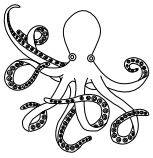

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This document is the seventh of eight books in the "Surface-Supplied Diving Handbooks Series", described below.

Book 1: Overview of surface-supplied diving operations and scope of this series
Book 2: Description and prevention of accidents associated to diving operations
Book 3: Legal aspects of project preparation
Book 4: Description and maintenance of surface supplied diving systems
Book 5: Managing Weather, Communications, Surface Supports & Underwater Vehicles
Book 6: Prepare and manage the dives
Book 7: Implement the MT 92 tables
Book 8: Implement the DCIEM tables

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Table #5 - Air in-water oxygen decompression at 12 m is intentionally not included in the table set

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1 - Structure and Enhancements of the MT 92 Diving Tables

1.1 - What MT92 Stands for?

The French government officially published MT92 tables on 15th May 1992 in replacement of the MT74 tables. They are part of a series of decrees that rule the underwater works in French waters. "MT" is the abbreviation of "Ministere du Travail", which means "Ministry of Labour", and "92" is the year of publication.
Note that the publication of these tables through decrees resulted in them being parts of the laws. Their implementation was thus mandatory when working within French territories. Thus, not only inland and in the territorial waters, but, as indicated in point #2 of chapter "B", "Parts of the sea under the authority of states" on the bottom of the "exclusive economic zone" and structures built in these parts of the sea. However, note that since May 1992, the French ministry of labour has emitted two other decrees modifying some of the initial procedures: The decree of 13th December 2012 and the decree of 14th May 2019 that has made more flexible the conditions of use of another table. Nevertheless, that must be done according to a strict process indicated in Article #8 of Chapter 3 of this latest decree, which says the following:

1. *The reference decompression tables are those annexed to this decree.*
   When situations or methods of intervention are not provided in the tables or the physiological parameters retained for these tables do not correspond to those of the intervention, the employer uses any national or international table presenting the same guarantees for the operator intervening in a hyperbaric environment.
2. *The employer cannot modify or extrapolate the decompression tables.*
3. *When the employer implements another decompression table than the one included in this decree, he logs the following in the hyperbaric safety manual provided for in article R. 4461-7 of the labour code:*
   - *The specific conditions of use he previously established with the support of the hyperbaric advisor, mentioned in article R. 4461-4 of the Labour Code;*
   - *The elements allowing him to select the particular decompression table.*

   Operators intervening in a hyperbaric environment use the reference decompression tables or any other table defined in this article and corresponding to the dive to perform or a computerized system implementing decompression algorithms that conform with these tables.

It must be noted that even though the last decree of 14th May 2019 modified some operating procedures and certification processes of the previous editions, tables MT92 remained untouched since their 1st publication, which means that their efficiency is still considered highly satisfactory.
For convenience and to indicate that the French administration follows these tables, we name them MT92/2019.
However, MT92 and MT92/2019 stand for the same set of tables which provides air, nitrox, and heliox decompression procedures for surface-supplied diving, saturation diving, tunneling operations, and hyperbaric medical treatments.
Note that, as usual, these documents are available in the database of the website "Diving and ROV Specialists".:

- An English translation of the decree of 15th May 1992 is in the section "Historical diving" and can be downloaded through this link: history-3-french-legislation-1992
- The decree of 30 October 2012, related to hyperbaric works, is also available in the section "Historical diving" and can be downloaded through this link: history-27-french-decree-30-october-2012
- The tables associated with the decree of 30 October 2012, published 13 December 2012, also available in "historical diving", can be downloaded through this link: /history-28-annex-french-decree-of-30-october-2012
- The decree of 14 May 2019, related to hyperbaric works, is available in the section "Diving and ROV procedures" and can be downloaded through this link: docs-61-arrete-14-mai-travaux-hyperbares
- The tables associated to the decree of 14 May 2019, published 24 May 2019, also available in "Diving and ROV procedures", can be downloaded through this link: docs-16-tables-mt2019

1.2 - The decompression model

The decompression theory of Tables MT92/2012 is not explained in the French ministry of labour decrees. Nevertheless, the document *"A method for introducing new decompression procedures"*, published by Jean Pierre Imbert and Michel Bontoux, who led the study of these tables, explains their creation process. It is integrally displayed on the next page, before a quick comparison with the Norwegian and DCIEM tables.
Two complementary documents are also available on the website "Diving and ROV Specialists.com" that can be downloaded by clicking on their titles:

- *"Safety analysis of French tables 1974 air decompression tables"*, also written by Jean Pierre Imbert and Michel Bontoux, describes the process of evaluations of the MT74 tables made prior to starting the study of the MT92.
- "*Decompression safety*", published by Jean Pierre Imbert, explains the creation of a decompression model and the use of a database. This paper takes the study process of the MT92 tables in reference.

Note that MT92 and DCIEM tables (See our handbook *"Surface supplied diving using DCIEM tables"*) were published roughly simultaneously. Their no-stop limits are similar and more stringent than those of the US Navy table. Also, the comparison of their decompression times, displayed in the following pages of this chapter, shows that they are pretty identical. However, despite these similitudes, MT92 and DCIEM are built on two different decompression models.

A METHOD FOR INTRODUCING NEW DECOMPRESSION PROCEDURES

Jean-Pierre IMBERT and Michel BONTOUX

UMS Workshop on Validation of Decompression Schedules
Bethesda, Maryland, 13-14 February 1987

In France, in 1984, Comex was awarded a 3 years contract from the F.S.H. (Fonds de Soutien aux Hydrocarbures) to improve the safety performances of the French 1974 official air decompression tables.

Because a large number of parameters are involved in the safety performances of decompression tables, it was clear from the beginning that no :
- mathematical model,
- animal model,
- onshore laboratory manned study,

could be used to test the procedures and that the only way to validate the new tables was to dive with them in actual worksite conditions.

It was also apparent that decompression sickness (DCS) incidence of the air tables presently used for commmercial diving are still relatively low (around 1%-2% overall DCS incidence) and that a large number of man exposures would be required to statistically document any improvement of the new tables over the old ones.

The Comex programme was thus organized into 5 steps (Figure n° 1) :
- evaluation of the existing tables,
- calculation of new tables,
- test of the new tables on selected worksites,
- modifications if required,
- presentation of the proposed procedures to French authorities for integration into the new diving regulations.

This paper presents this original method used to introduce the decompression procedures.

METHOD

Decompression tables

The starting point of the development of the new tables was a study carried out on the safety performances of the French 1974 decompression tables based on a computer processing of worksites dive reports (2). As a complement, Doppler bubble detections were also carried out onshore on a set of selected tables (11, 12).
The conclusions, which apply to the in-water decompression technique only, were that :

- dives of moderate hyperbaric exposure, corresponding approximatively to the permitted bottom times of DOE memo no 7/86, were associated to very safe decompressions (0.1 % DCS incidence).
- deep and/or long dive exposures, corresponding to dives beyond the DOEn border line, were associated to a higher rate of DCS incidence (1 to 2% DCS incidence).
- divers using a safety margin in the selection of the table time had performed significant safer decompression when diving in the critical depth and time range.

These foundings were the basis of the calculation of the new tables which were designed to :

- remain identical to the original French 1974 tables in the range where safe results have been demonstrated,
- become equivalent to longer bottom times of the French 1974 tables elsewhere.

Effectively, the tables displayed deeper and/or longer decompression stops in the critical range. It was therefore possible to claim that the new tables were at any moment more conservative than the former ones, because :

- most decompression theories and models consider that deeper and longer decompression stops yield safer decompression,
- it is current practice among diving supervisors to use longer table times as a safety precaution in case of difficult dive conditions. This procedure is clearly described in the US Navy manual which states that "if the diver was exceptionally cold, or if his work load was relatively strenuous, the next longer decompression schedule than the one he would normally follow should be selected".

With references such as the famous US Navy diving manual, this statment became the corner stone of our approach to decompression tables validation. It provides :

- an ethical basis to the problem of sending new decompression procedures to worksites,
- a simple explanation for applying to government authorities for the permission to use the modified decompression procedures.

Instructions

Practically, the new tables were presented in a small manual edited as special instructions by the company methods department. The instructions were said to be designed for worksites associated with difficult dive conditions, i.e. cold, hard work, current, intensive diving operations, etc...

This procedure was aiming at avoiding questions of divers being exposed to different decompression instructions on different worksites.

Worksites

For obvious reasons, the new decompression procedures were sent only to pilot worksites. The following criteria were used for selection :

- favourable legal environment and good relations with the client permitting the introduction of special instructions without arduous discussions,
- proximity of the worksite or specially well organized operation base allowing a good feed back of information,
- high standard of professionalism among the LST's, diving supervisors and diving superintendents insuring that the new procedures were correctly understood and strictly followed,
- intense diving operations in the depths and times related to the new tables, providing a large volume of dive records.

As far as possible, the operational personnel (diving supervisor, LST's,..) were briefed prior being sent on the barges and interviewed upon their return onshore. Weekly contacts were made by telephone or radio. However, the main source of information was the dive reports.

Dive reports

The dive reports are part of the Comex internal reporting system and include three sorts of document :

- the diving report which contains the basic information on the dive parameters. It is primarily a working document used to keep a good record of all operations. It is also a contractual document between the diving contractor and the client, that serves to control the work performed. It is finally a legal requirement, the report being used as the only reference in case of emergency or accident.
- the chamber log which is filled in whenever a deck chamber is operated. It contains all the information relevant to ambient parameters control, during normal dives, but also all the details of the treatment in case of DCS.
- the accident report which is filled in for DCS cases.

Comex diving report, Chamber monitoring report and Accident report sheets are shown in appendices.

The Comex Data Bank

Whenever a dive is carried out on Comex worksites, a copy of the dive report is sent to the method department in Marseille (the reports have carbon copying sheets which are used for the dispatch, one for the worksite, one for the base and one for method department).

All the dive reports received are fed into a computer. This computer system is called the Comex data bank.

When typing the reports in, the computer runs automatic tests on the consistency of the data. Tests include, for instance, comparison of actual dive depth and time with table depth and time, check of the actual decompression time against correct decompression time, correspondance of dive depth with diving method and breathing gas, etc.. The reports are typed in by operational personnel , who are qualified to check any abnormalities eventually detected.

In addition to the above precautions, the validity of the data is checked at worksite level. The local trends are compared to the general results to identify systematic errors of procedures or simply missing reports that would bias the statistics.

Objectives

Safety was the primary concern of the study.

Safety of the decompression tables was measured in term of number of DCS recorded. Any accident / incident / near misses not directly related to decompression procedures were rejected.

The accident reports were checked by the safety officer, the medical department and the method department. Complementary information was eventually obtained by inquiry, interview, post accident medical examination, etc...

Efficiency was a second objective. A special effort was made to produce a manual with clear and simple instructions. Back up procedures were detailed for decompression emergencies such as exceeding the planned bottom time, impossibility to carry out the 3m stop due to worsening sea conditions, oxygen supply failure during oxygen stops, etc. Efficiency was measured from the comments of the project managers, diving superintendents and supervisors who learned to use the possibilities of the tables and reported on their practical and commercial consequences.

RESULTS

Operations

The validation of the new procedures took place from 1985 to 1986.
The instructions were sent to selected worksites around the world : shallow long tables were tested in the Persian Gulf during welding operations not exceeding 24 msw ; deep tables were implemented in Burundi, for the installation of fresh water lines for Bujumbura city ; surface decompression tables were used in North Sea inspection operations,...

Table below summarises the results obtained in january 1987. An estimated number of 1,000 additional diving reports are still waiting to be treated by the computer.

TABLE N° 1

Dives recorded after two years of offshore evaluation of the new French Air decompression tables

tables	number of men x dives	number of tables used
Air std Standard	124	4
Air/oxy at 6m	814	55
Air/oxy at 12m	573	40
Air Surf D	627	52
TOTAL	2138	

DISCUSSION

The method used to introduce the decompression tables is not new. Even if the process is reluctantly admitted and rarely published, it is the simplest approach to improvement of decompression tables. Most of the diving contractors have used this empirical method to develop their own procedures from the original US Navy manual tables. Even at the worksite level, diving supervisors have for long developed similar recepies for the improvement of decompression safety. However, it is the first time that the method has been used systematically and presented as the only reasonable and practical way of developing new decompression tables.

Potential of the method

The primary limitation of the method is that it only provides improvement over former decompression tables and that there is no room for drastic change or new idea. Using this method, we are bound to "Haldanian" decompression procedures for ever ! However, it must be recognized that the method allows for some innovation and that the work done for the new French tables has at least documented the fact that deeper stops are associated with safer decompression.

The second limitation is that the method tends to produce non optimal decompression schedules. As the basic assumption is to promote longer decompression, it is impossible to consider shortening decompression stops for schedules judged too conservative. In that case, information should be obtained from a complementary source.

In fact, the problem arose with the 1974 French tables for the no-stop decompression limit which was considered too restrictive. To slightly extend the no-stop limit, reference was made to the data published by the DOE on UK North Sea operations (2), which clearly documents that the US Navy no-stop decompressions are very safe.

In any case, these short comings are well counter-balanced by the capacity of the method to produce a large volume of data and to allow statistical analysis of the results.

Time required

As Comex has an international activity, the possibilities to use the new tables were numerous. However, it took two years before sufficient information was gathered. The difficulties did not arise from legal or commercial constraints but rather out of the criteria for selection of the worksites. The list of worksites operating in the "interesting range", providing good feed back of information and control of procedures, appeared relatively short. It must be admitted that even for a large diving company, the process is slow.

Divers acceptance

Divers acceptance was good. The reason being that they are used to such modifications in case of difficult dive conditions and that they merely considered them as "Jesus factors". They even treated our new tables, which we considered as "la crème de la crème", as modified US tables !

Quality of the information

The Comex system of computer processing of diving reports was set up in 1974. Similar systems are known to be run by the US Navy (5), the Canadian forces (6), and the University of Pennsylvania, but until 1983 it was the only example of a data bank covering commercial diving operations The only recent equivalent is the system presently commissioned by the DOE to Dr. SHIELDS for North Sea diving operations.

Besides the volume of the information, the nature of the operations (military,scientific or commercial), what really caracterizes a given data bank is the accuracy of its data. A lot of time and effort must be put in checking the quality of the information but the success depends on two conditions.

The first condition is to have the authority to impose the diving report system. Operational personnel just hate paper work and a lot of incentive is required to get good feed back of information. Governements have legal means of pressure, a diving company pays its personnel, but a university, for instance, seems helpless. At Comex, we used a combination of negative actions (angry notes to worksites, warnings, ...) and positive actions (personal listing of dive records, safety records,..) until the system was recognized as useful for everybody.

The second condition is a simple and efficient diving report form. The first diving reports designed by Comex looked like news papers and were far too complex to be efficient. In fact a lot of information judged irrelevant or time consuming on the worksite was just not filled in. Several modifications of the report were proposed until we came to an acceptable compromise between what we would like to get and what diving supervisors would accept to fill in.

Started in 1974, the Comex data bank has been considered as reliable and fully operational since 1976. Results published (2) have shown to be in good accordance with other published statistics (1, 4, 5) and we believe that the system is a good and reliable tool.

Statistical analysis of the results

A large number of parameters are involved in the final safety performances of a set of decompression tables. The currently accepted independent parameters are listed in table n° 2. Because it is impossible to control all these parameters during a given dive, the outcome of the decompression table has been considered as a probabilistic event. Validation of a new set of decompression procedures thus requires recording many dives, performed by many divers, on many different worksites. This for at least two reasons.

Firstly, considering present commercial diving practice, the list of controlled parameters reduces to :
- dive technique (in-water or surface decompression),
- breathing mix,
- pre-dive surface interval,
- dive depth and time.

This means that the decompression tables must fit all the divers, for all the dive conditions and all the worksites procedures. Good training, adequate equipment and sound procedures may reduce the influence of the other uncontrolled factors but not eliminate them. It is therefore expected that any variations of these uncontrolled factors will remain within the safety margin of the decompression tables.

Statistically, this assumption is equivalent to considering the uncontrolled factors as random events of low incidence. Then, the overall combination of all these secondary variables has a random effect on the final result. Such an assumption requires that the number of dives studied is large enough for the secondary variables to be considered as centered, normal variables of small standard deviation (7). This is not always the case and we can recall a diver who twice got a DCS with the new tables and who certainly introduced some bias in the evaluation of the new procedures.

Secondly, because of the random nature of DCS occurrence, it is necessary, when comparing the performances of different schedules, to implement statistical techniques (7, 8,9, 10).
However, DCS incidence in commercial diving is low. Present state of the art in air decompression procedures ranges from 0.5 % to 2 % DCS occurrence depending on dive exposure (1, 2, 4, 5) and the classic statistic tools appear very unefficient in separating tables performances. Using standard comparison technique for observed percentages, it requires about 100 dives without any accident to show any improvement over a former schedule which was used 25 times with 1 DCS occurrence ! It might be even more drastic if one DCS is recorded during the evaluation of the new table.

The practical implication is that, nowadays, the number of dives required to document any significant improvement of new tables over former ones is large.

Considering the 2,100 dive reports collected and the 1,000 dive reports waiting for processing, we can rely on an approximated of 3,100 dives for this study. It might appear small when compared to the 60,000 dives recorded with the French 1974 tables, but it must be noted that :

- exposures recorded are located in the critical depth and time range,

- a given worksite generally operated at constant depth for almost always the same bottom time and the dives recorded are concentrated on small number of decompression schedules.

However, even though the process of data acquisition has lasted for two years, we must admit that in 90 % of the cases, the information gathered was insufficient to allow conclusive comparison of table by table. As a consequence, when decompressions were insufficiently documented, the results of several schedules were grouped together into categories to allow statistical comparison.

CONCLUSION

Even if the method developed is relatively limited and very slow, it appears to be a reasonable way of introducing new decompression tables because today, lengthy and tedious dive logging is required to document any modifications of procedures.

Even though this study has represented an effort to implement statistical techniques, it is right to say that the exact tables performances will be only known in ten years from now, when tables will have been used as standard procedures and 100,000 dives will have been recorded !

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Funding support was provided by the FSH (Fonds de soutien des Hydrocarbures) by the CEPM (Comité des Etudes Pétrolières Marines). Fiche no 4723/83.

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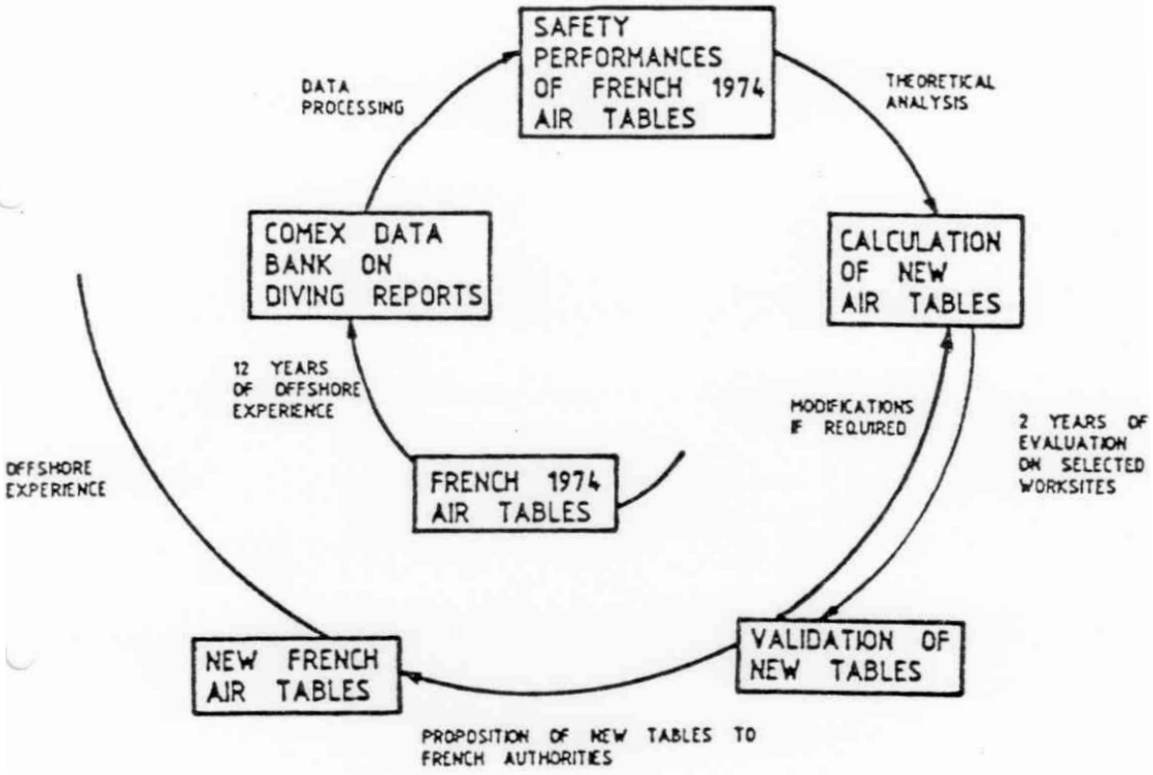
FIGURE N° 1



METHOD USED TO DEVELOP AND VALIDATE NEW AIR DECOMPRESSION PROCEDURES FOR THE FRENCH DIVING LEGISLATIONS.

TABLE Nº 2

LIST OF CURRENTLY RECOGNIZED FACTORS INFLUENCING THE PERFORMANCE OF A DECOMPRESSION

DIVE CONDITIONS	ERRORS OF PROCEDURE	INTER INDIVIDUAL VARIABILITY	INTRA INDIVIDUAL VARIABILITY
- Water or chamber temperature	- Poor control of depth (swell)	- Training, Experience	- Fatigue after travelling
- Wet suit, dry suit, or hot water suit	- Wrong calibration of gauges	- Adaptation to narcosis	- Fatigue after intense diving
- Light or heavy work at bottom	- Error in calculation of bottom time	- Physical fitness	- Hangover, Flue
- Up and down depth variations	- Selection of wrong schedule	- Smoking, Drinking	- Anxiety, Stress
- Swell	- Omitted decompression stop	- Weight, fat content	
- Current	- Shortened decompression	- Age	
- Visibility	- Exceeding the surface interval	- Previous DCS history	
- Narcosis	- Leakage on oro-nasal mask		
- Dry/wet environment	- Wrong quality of oxygen		
	- CO_2 in breathing gas		
	- Work/exercise after decompression		

Hyperlink
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1.3 - Comparison with DCIEM and Norwegian edition 6 tables

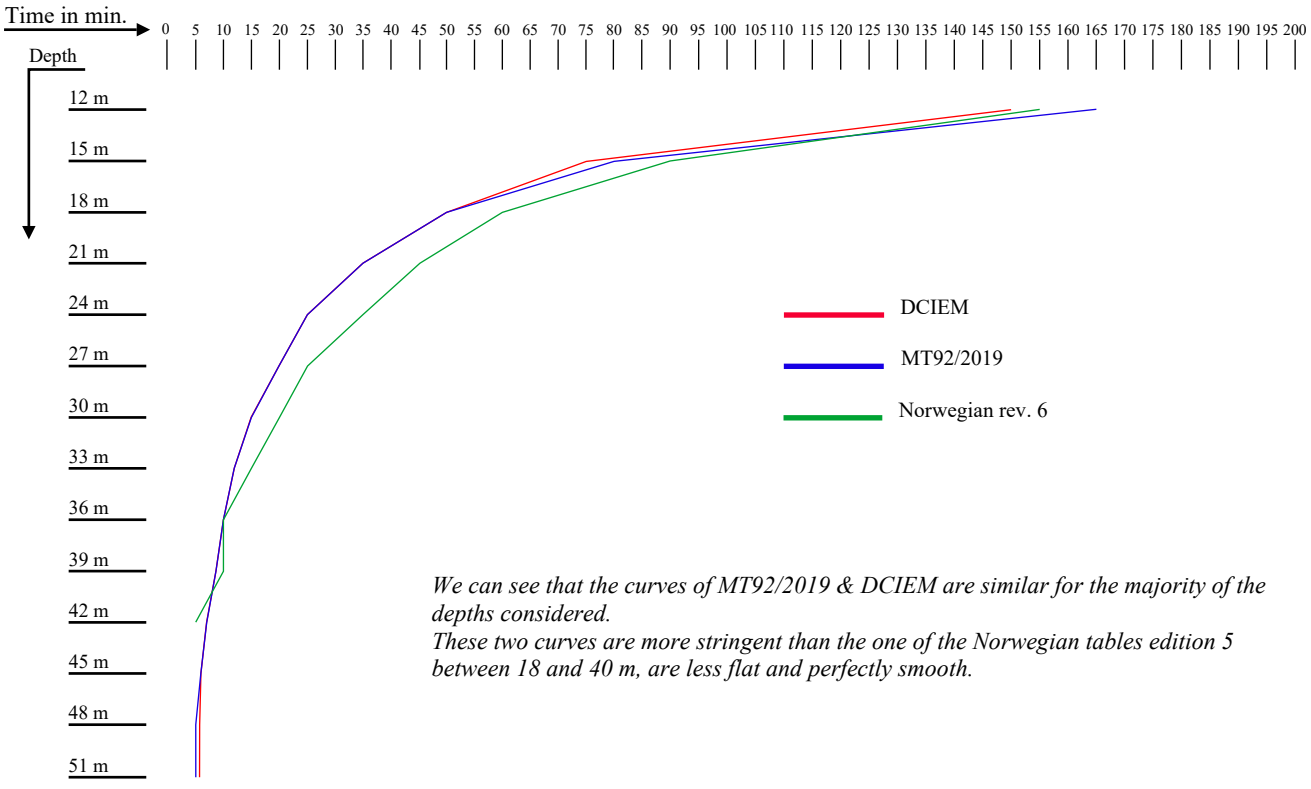
This section aims not to validate the MT92/2019 but to highlight their design and show that, with the DCIEM tables we also promote, they are still comparable and perhaps better than other tables currently used in the industry.

1.3.1 - Comparison of the no-decompression limits

"No-decompression limits curves" are commonly used to visualize whether the mathematic model has been modified, as abrupt direction changes of a curve often indicate a modification of the initial calculation. However, the visualization of the no-decompression limits should be completed by other elements, such as the decompression times for each depth and bottom time, incident reports from databases, and many others. Note that it happens that the authors of a set of tables reinforce the decompression times of some depth to solve weaknesses without touching the initial mathematic model. The fifth edition of the Norwegian tables, published in 2019, is used as a reference with DCIEM to compare MT92/1919 with other decompression models currently used in the diving industry.

Comparison no decompression limits MT92/2019, DCIEM, and Norwegian edition #6

Depth	*MT92/2019*	*DCIEM*	*Norwegian*	*Most stringent*
12 m	*165*	*150*	*160*	*DCIEM*
15 m	*80*	*75*	*90*	*DCIEM*
18 m	*50*	*50*	*60*	*MT92 & DCIEM*
21 m	*35*	*35*	*45*	*MT92 & DCIEM*
24 m	*25*	*25*	***35***	*MT92 & DCIEM*
27 m	*20*	*20*	*25*	*MT92 & DCIEM*
30 m	*15*	*15*	*20*	*MT92 & DCIEM*
33 m	*12*	*12*	*15*	*MT92 & DCIEM*
36 m	*10*	*10*	*10*	–
39 m	*8*	*8*	*10*	*MT92 & DCIEM*
42 m	*7*	*7*	*5*	*Norwegian*
45 m	*6*	*7*	–	*Norwegian*
48 m	*5*	*6*	–	*Norwegian*
51 m	*5*	*6*	–	*Norwegian*

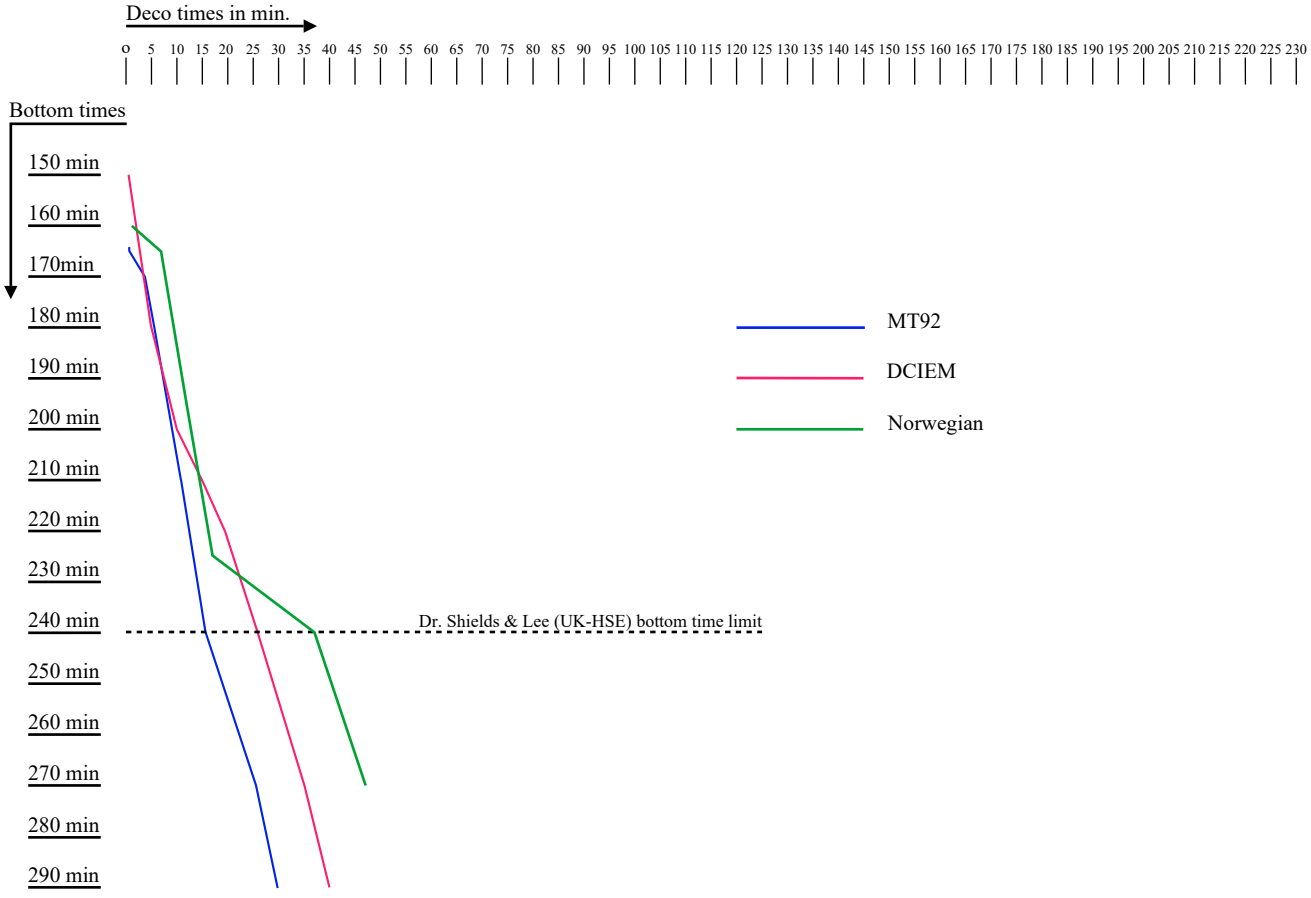


1.3.2 - Comparison of the air in-water decompression stops with those of DCIEM and Norwegian sixth edition

The tables and graphs below compare decompression curves for each depth considered in the MT92 tables with those of the DCIEM and the Norwegian tables. Note that a table with longer decompression times is not automatically the safest, as many elements, such as the ascent rates, the organization of the stops, incidents logs databases, etc., are to be considered to evaluate this point. Nevertheless, these curves allow us to visualize some adjustments of the decompression times, whether the scientists who studied the tables obtained similar answers, and whether another set of tables in use in the commercial diving industry, such as the Norwegian edition #6, provide different or similar results.

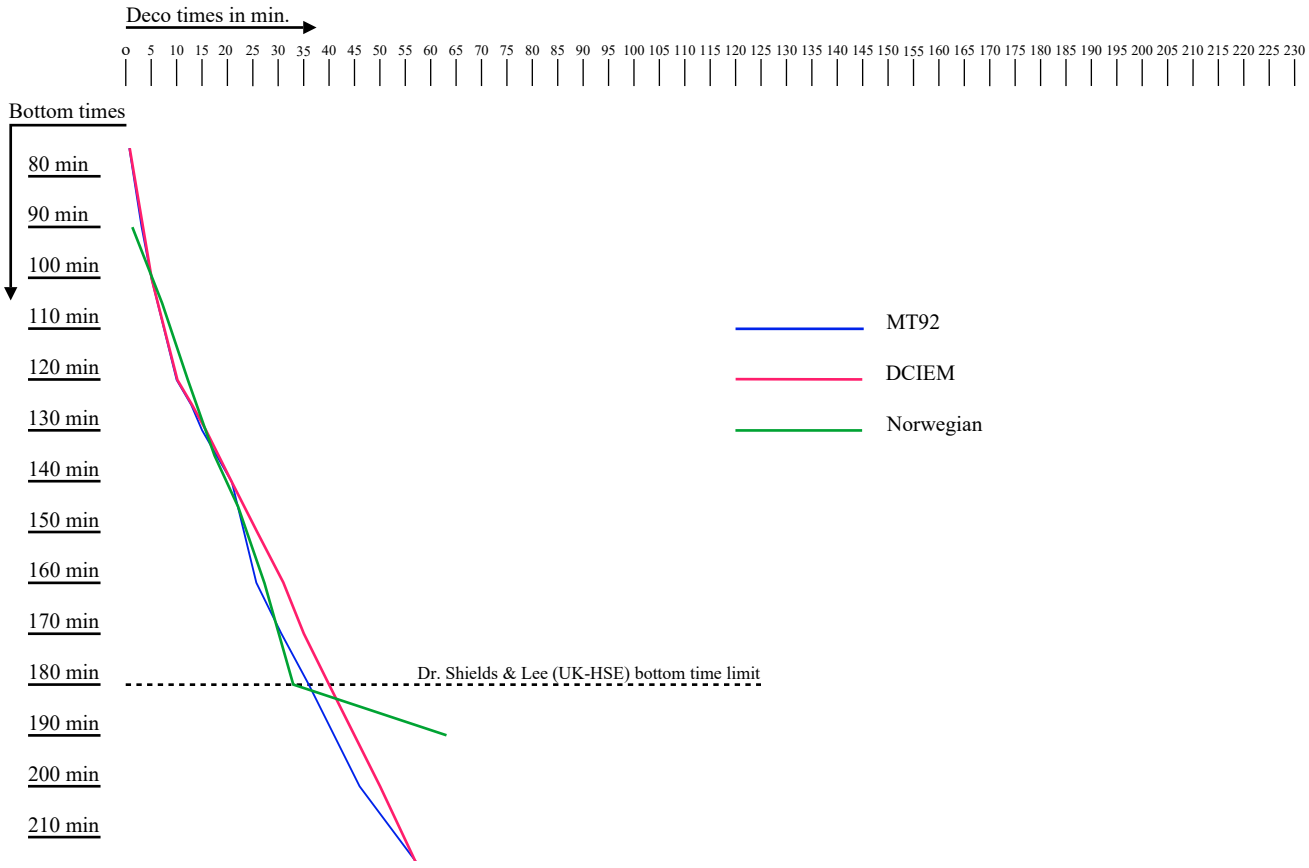
Comparison ascent times MT92, DCIEM, Norwegian edition 6, for a dive at 12 m (in minutes)

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
150	*1:00*	*1:00*	*1:12*
165	*1:00*	*(Stop not indicated)*	*6:54*
170	*3:45*	*(Stop not indicated)*	*(Stop not indicated)*
180	*5:45*	*5:00*	*(Stop not indicated)*
195	*(Stop not indicated)*	*(Stop not indicated)*	*11:54*
200	*(Stop not indicated)*	*10:00*	*(Stop not indicated)*
210	*10:45*	*15:00*	*(Stop not indicated)*
220	*(Stop not indicated)*	*19:00*	*(Stop not indicated)*
225	*(Stop not indicated)*	*(Stop not indicated)*	*16:54*
240	*15:45*	*26:00*	*36:54*
Operational limits UK-HSE			
270	*25:45*	*35:00*	*46:54*
300	*30:45*	*44:00*	–
330	*35:45*	*53:00*	–



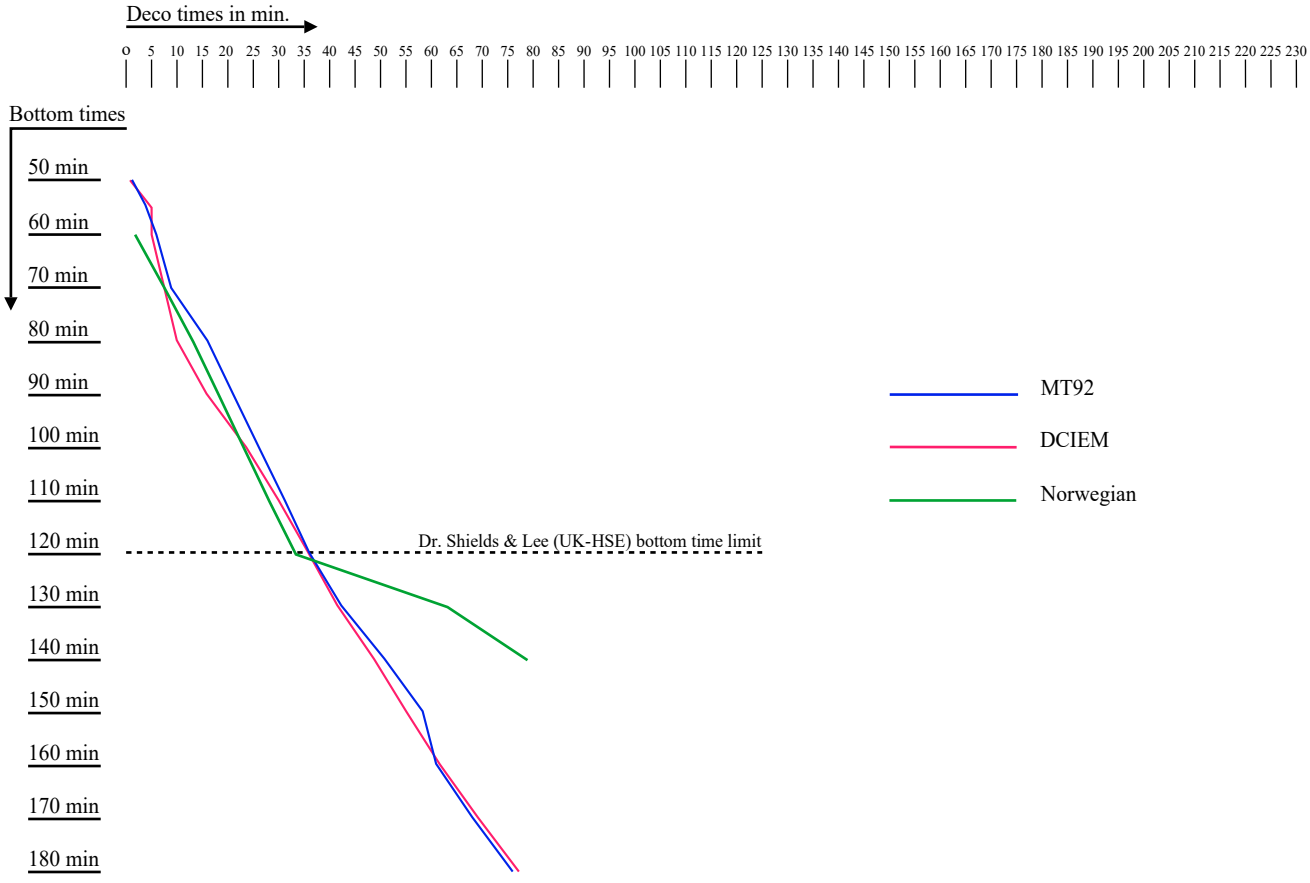
Comparison ascent times MT92, DCIEM, and Norwegian, for a dive at 15 m (minutes)

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
60	*1:00*	*1:00*	*1:30*
75	*1:00*	*1:00*	*1:30*
90	*3:00*	*(Stop not indicated)*	*1:30*
100	*5:00*	*5:00*	*(Stop not indicated)*
105	*(Stop not indicated)*	*(Stop not indicated)*	*7:12*
120	*10:00*	*10:00*	*12:12*
125	*13:00*	*13:00*	*(Stop not indicated)*
130	*15:00*	*16:00*	*(Stop not indicated)*
135	*(Stop not indicated)*	*(Stop not indicated)*	*17:12*
140	*21:00*	*21:00*	*(Stop not indicated)*
145	*(Stop not indicated)*	*(Stop not indicated)*	*22:12*
150	*(Stop not indicated)*	*26:00*	*(Stop not indicated)*
160	*26:00*	*31:00*	*26:30*
170	*31:00*	*35:00*	*(Stop not indicated)*
180	*36:00*	*40:00*	*31:30*
190	*(Stop not indicated)*	*(Stop not indicated)*	*62:54*
Operational limits UK-HSE			
200	*46:00*	*50:00*	*(Stop not indicated)*
220	*61:00*	*59:00*	*(Stop not indicated)*
240	*71:00*	*70:00*	*(Stop not indicated)*



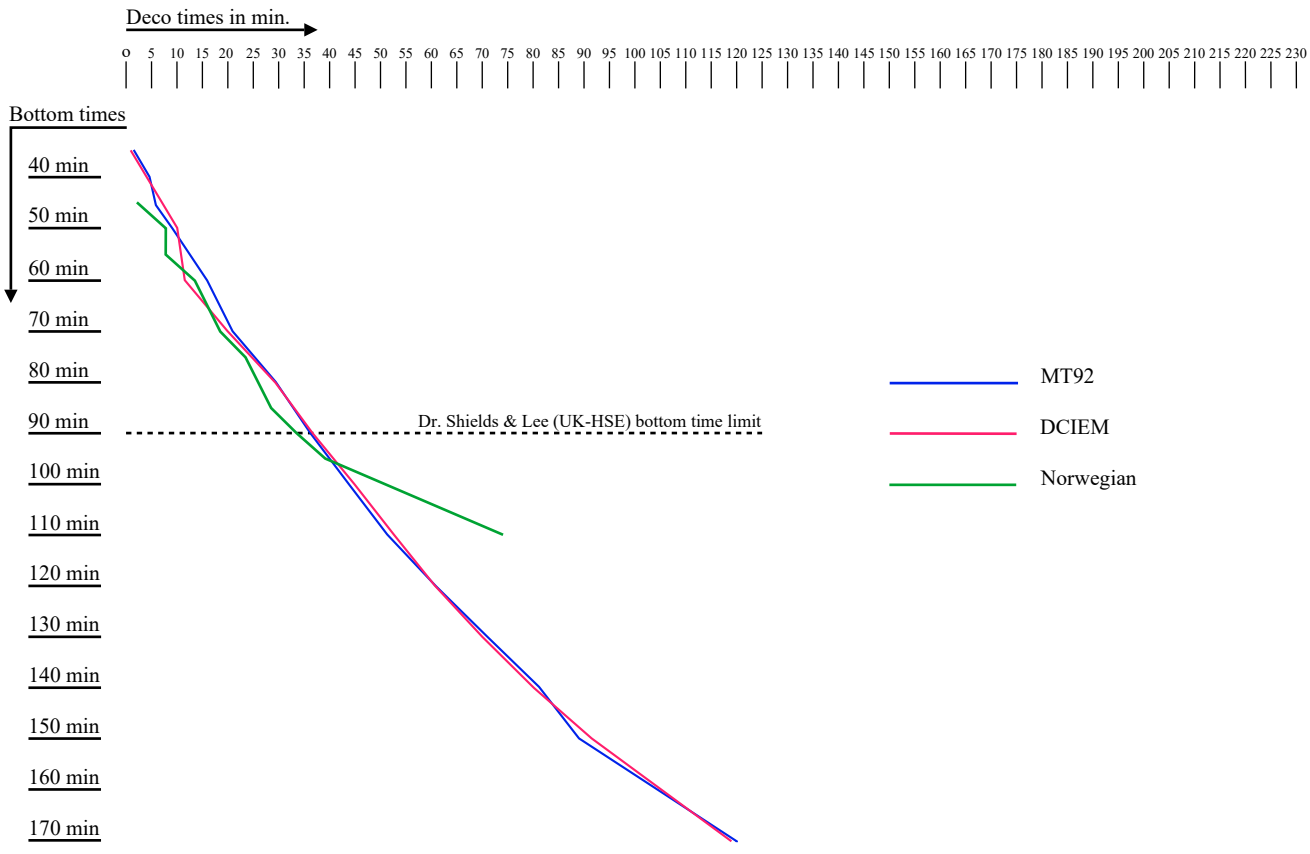
Comparison ascent times MT92, DCIEM, and Norwegian rev. 6, for a dive at 18 m

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
50	*1:30*	*1:00*	*1:48*
55	*4:15*	*5:00*	*1:48*
60	*6:15*	*5:00*	*1:48*
70	*8:15*	*(Stop not indicated)*	*6:48*
80	*16:15*	*10:00*	*13:12*
90	*21:15*	*16:00*	*18:12*
100	*26:15*	*24:00*	*23:12*
110	*31:15*	*30:00*	*28:12*
120	*36:15*	*36:00*	*33:12*
Operational limits UK-HSE			
130	*44:00*	*42:00*	*63:12*
140	*51:00*	*48:00*	*78:54*
150	*58:00*	*55:00*	*(Stop not indicated)*
160	*61:00*	*62:00*	*(Stop not indicated)*
170	*68:00*	*69:00*	*(Stop not indicated)*
180	*76:00*	*77:00*	*(Stop not indicated)*



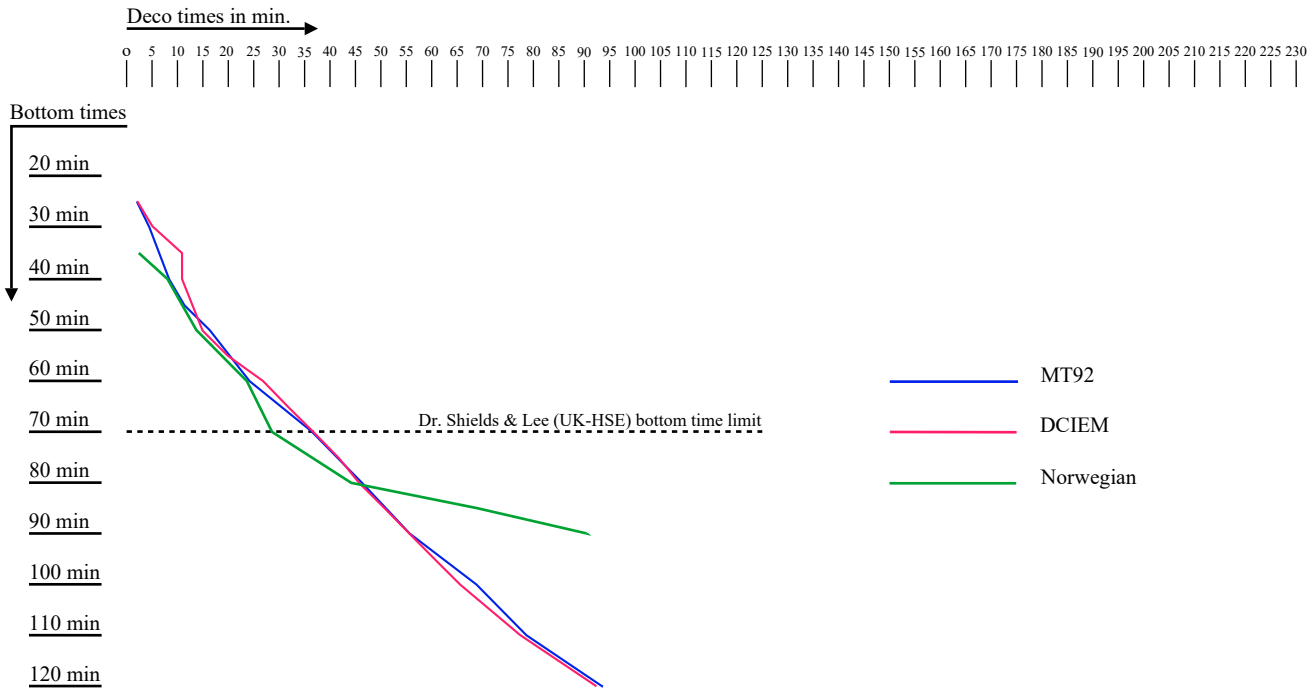
Comparison ascent times MT92, DCIEM, and Norwegian, for a dive at 21 m

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
35	*1:45*	*1:00*	–
40	*4:30*	*5:00*	–
45	*6:30*	*Stop not indicated*	*2:06*
50	*8:30*	*10:00*	*7:48*
60	*16:30*	*12:00*	*13:30*
70	*21:30*	*20:00*	*18:30*
75	*Stop not indicated*	*Stop not indicated*	*23:30*
80	*29:15*	*29:00*	*Stop not indicated*
85	*Stop not indicated*	*Stop not indicated*	*28:30*
90	*36:15*	*37:00*	*33:30*
Operational limits UK-HSE			
95	*Stop not indicated*	*Stop not indicated*	39:12
100	*43:15*	*45:00*	*Stop not indicated*
110	*51:15*	*53:00*	*74:12*
120	*61:15*	*61:00*	*Stop not indicated*
130	*71:15*	*70:00*	*Stop not indicated*
140	*81:15*	*80:00*	*Stop not indicated*
150	*89:00*	*92:00*	*Stop not indicated*
160	*Stop not indicated*	*105:00*	*Stop not indicated*
170	*121:00*	*118:00*	*Stop not indicated*



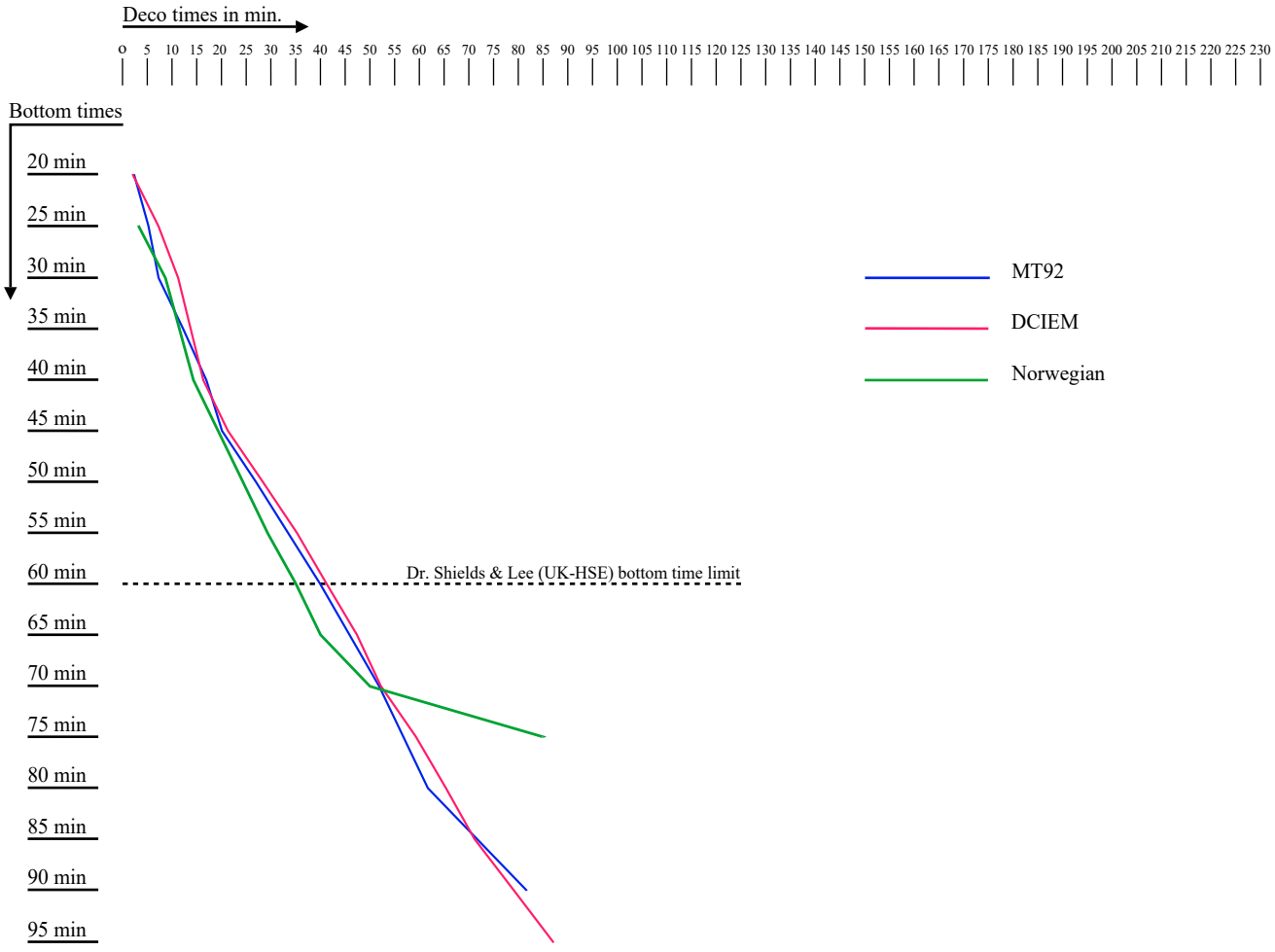
Comparison ascent times MT92, DCIEM, and Norwegian, for a dive at 24 m

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
25	*2:00*	*2:00*	–
30	*4:45*	*5:00*	–
35	*6:45*	*11:00*	*2:24*
40	*8:45*	*11:00*	*8:06*
45	*11:45*	*Stop not indicated*	*Stop not indicated*
50	*16:45*	*15:00*	*13:48*
55	*Stop not indicated*	*20:00*	*18:48*
60	*24:30*	*27:00*	*23:48*
65	*36:30*	*32:00*	*Stop not indicated*
70	*36:30*	*37:00*	*28:48*
Operational limits UK-HSE			
75	*Stop not indicated*	*42:00*	*Stop not indicated*
80	*46:30*	*46:00*	*44:30*
85	*Stop not indicated*	*51:00*	*69:30*
90	*56:30*	*56:00*	*90:12*
95	*Stop not indicated*	*61:00*	*Stop not indicated*
100	*69:15*	*66:00*	*Stop not indicated*
110	*79:15*	*78:00*	*Stop not indicated*
120	*94:15*	*93:00*	*Stop not indicated*



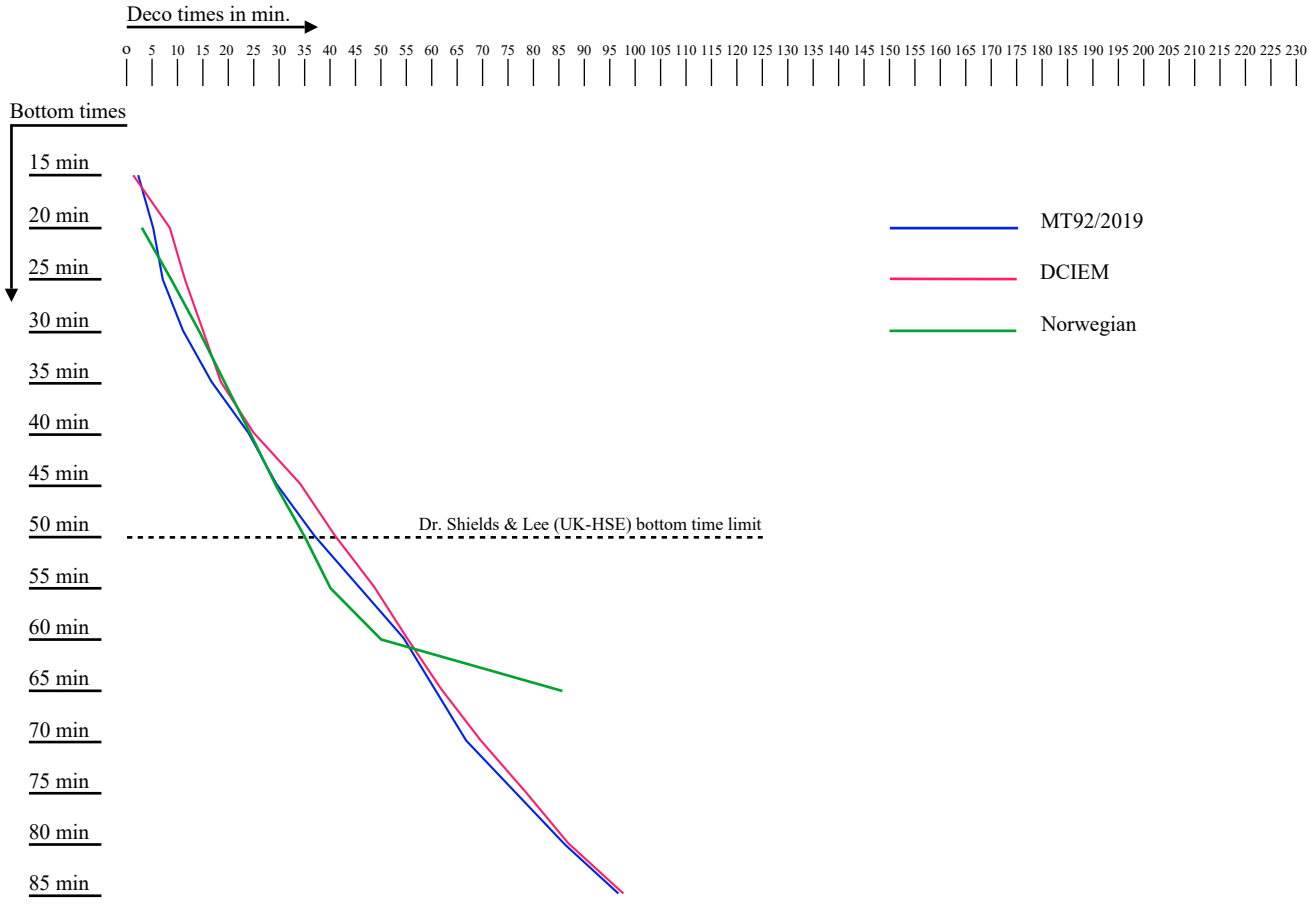
Comparison ascent times MT92, DCIEM, and Norwegian, for a dive at 27 m

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
20	*2:15*	*2:00*	–
25	*5:00*	*7:00*	*2:42*
30	*7:00*	*11:00*	*8:24*
35	*12:00*	*Stop not indicated*	*Stop not indicated*
40	*16:45*	*16:00*	*14:06*
45	*19:45*	*21:00*	*19:06*
50	*26:45*	*28:00*	*24:06*
55	*Stop not indicated*	*35:00*	*29:06*
60	*38:45*	*41:00*	*34:48*
Operational limits UK-HSE			
65	*Stop not indicated*	*47:00*	*39:48*
70	*51:45*	*52:00*	*49:48*
75	*Stop not indicated*	*59:00*	*84:48*
80	*61:30*	*65:00*	*Stop not indicated*
85	*Stop not indicated*	*71:00*	*Stop not indicated*
90	*81:30*	*79:00*	*Stop not indicated*
95	*Stop not indicated*	*87:00*	*Stop not indicated*



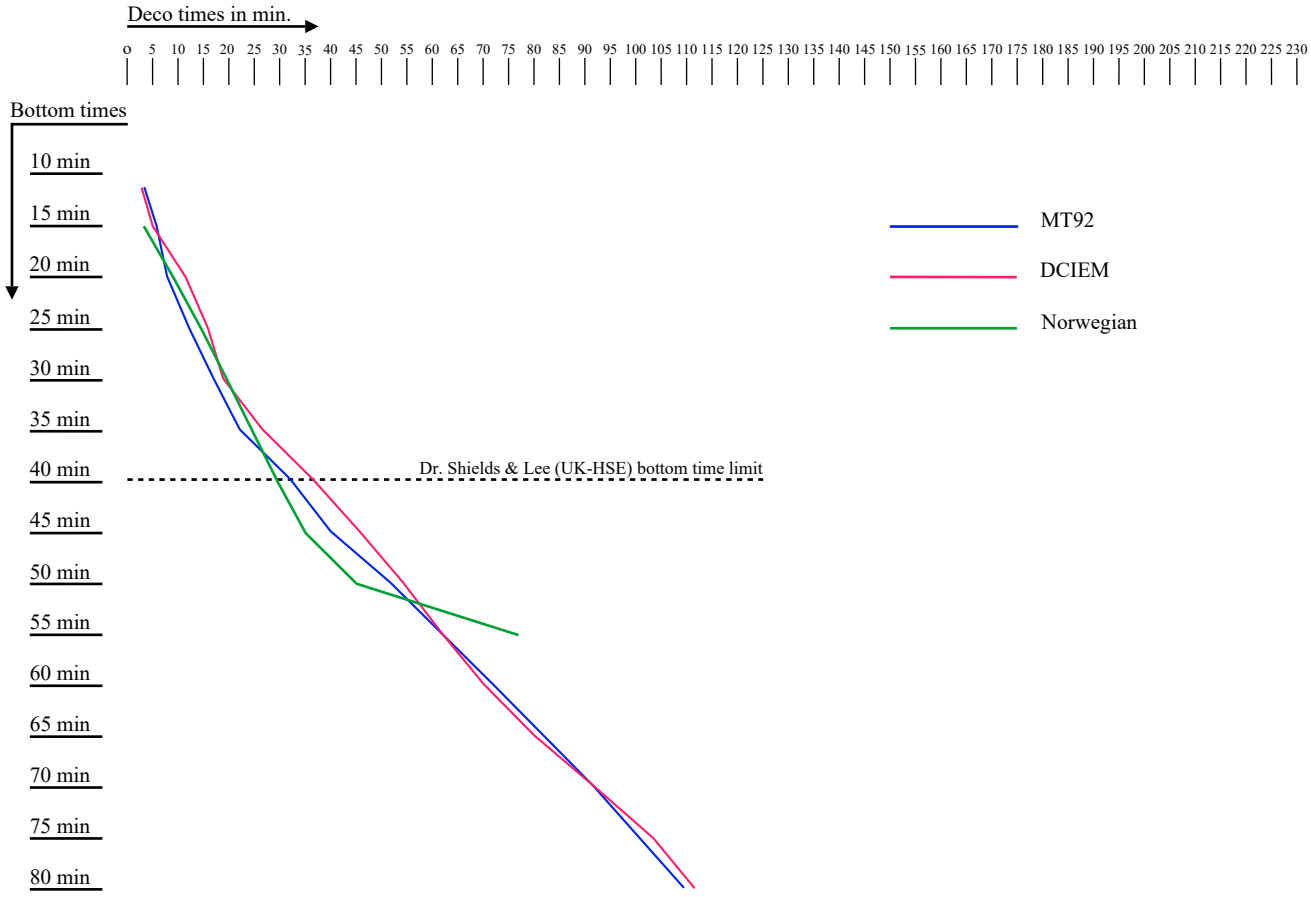
Comparison ascent times MT92, DCIEM, and Norwegian, for a dive at 30 m (minutes)

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
15	*2:30*	*2:00*	–
20	*5:15*	*8:00*	*3:00*
25	*7:15*	*12:00*	*8:42*
30	*12:15*	*15:00*	*12:24*
35	*17:00*	*18:00*	*19:24*
40	*24:00*	*25:00*	*24:24*
45	*29:00*	*34:00*	*29:24*
50	*37:00*	*41:00*	*45:06*
Operational limits UK-HSE			
55	*Stop not indicated*	*48:00*	*40:06*
60	*54:45*	*55:00*	*50:06*
65	*Stop not indicated*	*62:00*	*85:48*
70	*66:45*	*69:00*	*Stop not indicated*
75	*Stop not indicated*	*78:00*	*Stop not indicated*
80	*86:45*	*87:00*	*Stop not indicated*
85	*Stop not indicated*	*97:00*	*Stop not indicated*



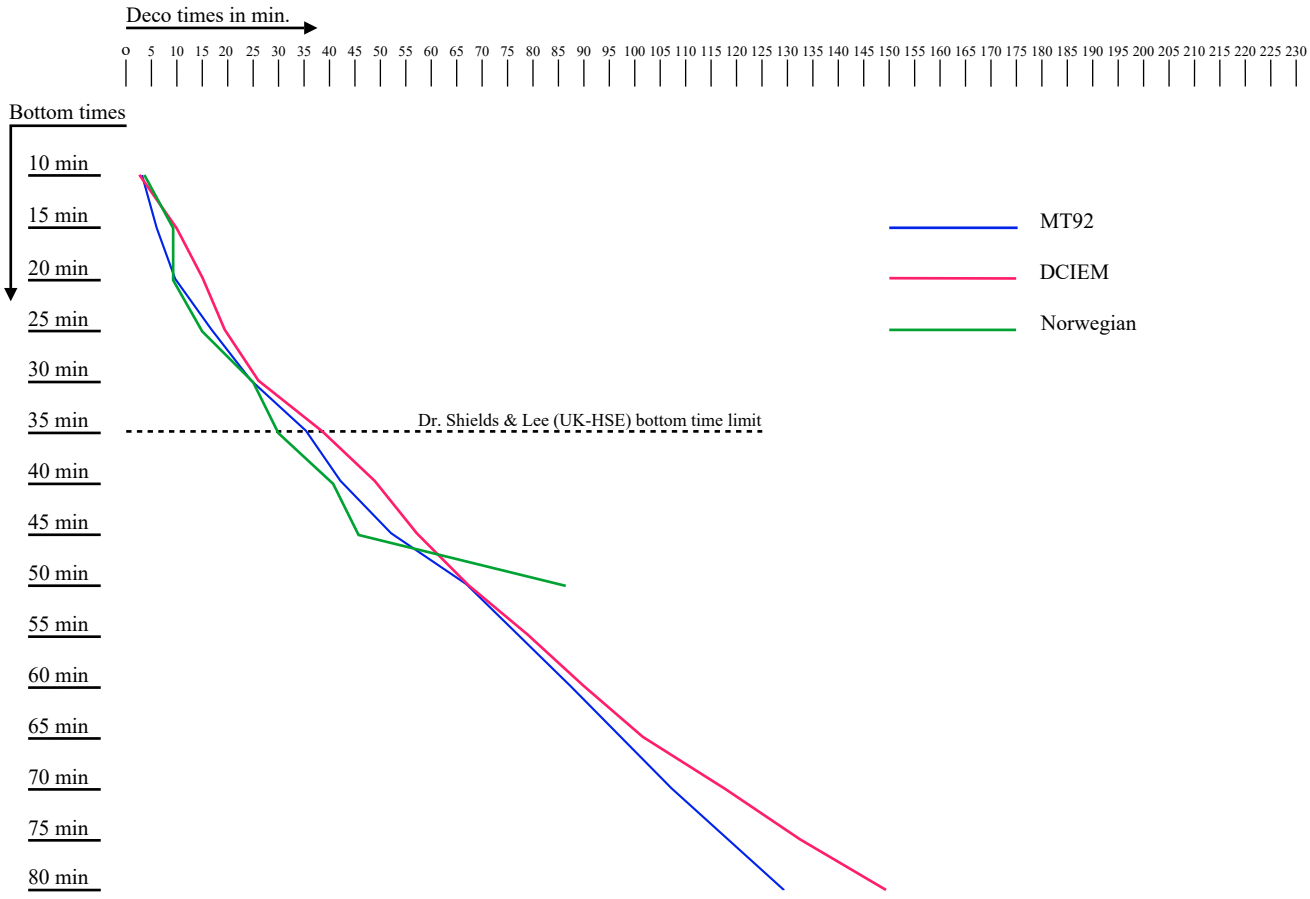
Comparison ascent times MT92, DCIEM, and Norwegian, for a dive at 33 m (minutes)

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
12	*2:45*	*2:00*	–
15	*5:30*	*5*	*3:18*
20	*7:30*	*12*	*9:00*
25	*12:15*	*16*	*14:42*
30	*17:15*	*19*	*19:42*
35	*22:15*	*27*	*24:42*
40	*32:00*	*37*	*29:42*
Operational limits UK-HSE			
45	*40*	*46*	*35:12*
50	*52:00*	*54*	*45:12*
55	*Stop not indicated*	*62*	*76:54*
60	*72:00*	*70*	*Stop not indicated*
65	*Stop not indicated*	*80*	*Stop not indicated*
70	*91:45*	*92*	*Stop not indicated*
75	*Stop not indicated*	*103*	*Stop not indicated*
80	*109:45*	*116*	*Stop not indicated*



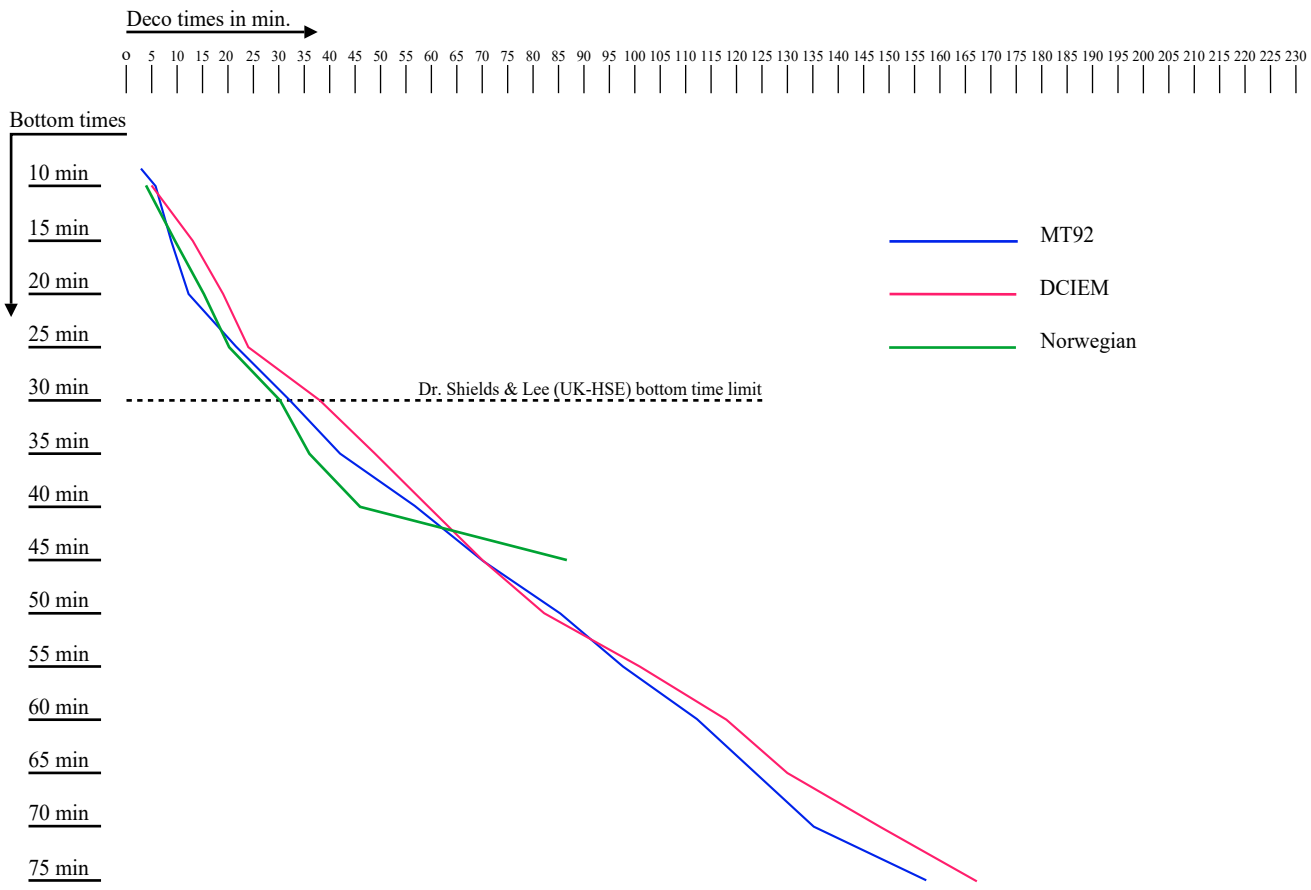
Comparison ascent times MT92, DCIEM, and Norwegian, for a dive at 36 m (minutes)

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
10	*3:00*	*2:00*	*3:36*
15	*5:45*	*10:00*	*9:18*
20	*9:45*	*15:00*	*9:18*
25	*17:30*	*19:00*	*15:00*
30	*24:30*	*26:00*	*25:00*
35	*35:15*	*38:00*	*30:00*
Operational limits UK-HSE			
40	*42:15*	*48:00*	*40:42*
45	*52:15*	*57:00*	*45:42*
50	*67:00*	*67:00*	*86:24*
55	*Stop not indicated*	*78:00*	*Stop not indicated*
60	*87:00*	*90:00*	*Stop not indicated*
65	*Stop not indicated*	*102:00*	*Stop not indicated*
70	*107:00*	*117:00*	*Stop not indicated*
75	*Stop not indicated*	*133:00*	*Stop not indicated*
80	*129:00*	*149:00*	*Stop not indicated*



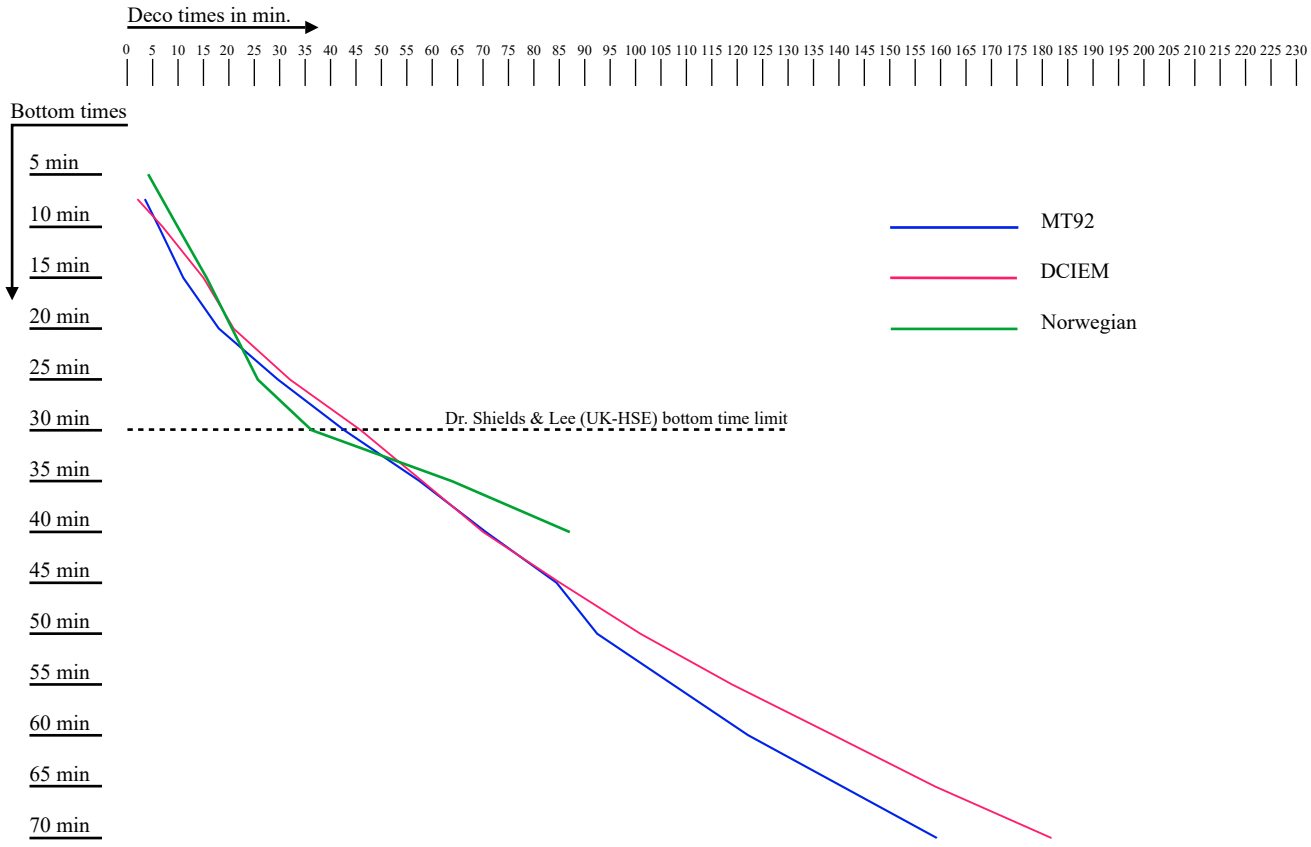
Comparison ascent times MT92, DCIEM, and Norwegian, for a dive at 39 m (minutes)

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
8	*3:15*	*2:00*	–
10	*6:00*	*5:00*	*3:54*
15	*8:00*	*12:00*	*9:36*
20	*12:45*	*18:00*	*15:18*
25	*22:45*	*23:00*	*20:18*
30	*32:30*	*37:00*	*30:18*
Operational limits UK-HSE			
35	*42:30*	*48:00*	*36:00*
40	*57:15*	*59:00*	*46:00*
45	*70:15*	*70:00*	*86:42*
50	*85:15*	*82:00*	*Stop not indicated*
55	*Stop not indicated*	*97:00*	*Stop not indicated*
60	*107:15*	*112:00*	*Stop not indicated*
65	*Stop not indicated*	*130:00*	*Stop not indicated*
70	*135:00*	*148:00*	*Stop not indicated*
75	*157:00*	*167:00*	*Stop not indicated*



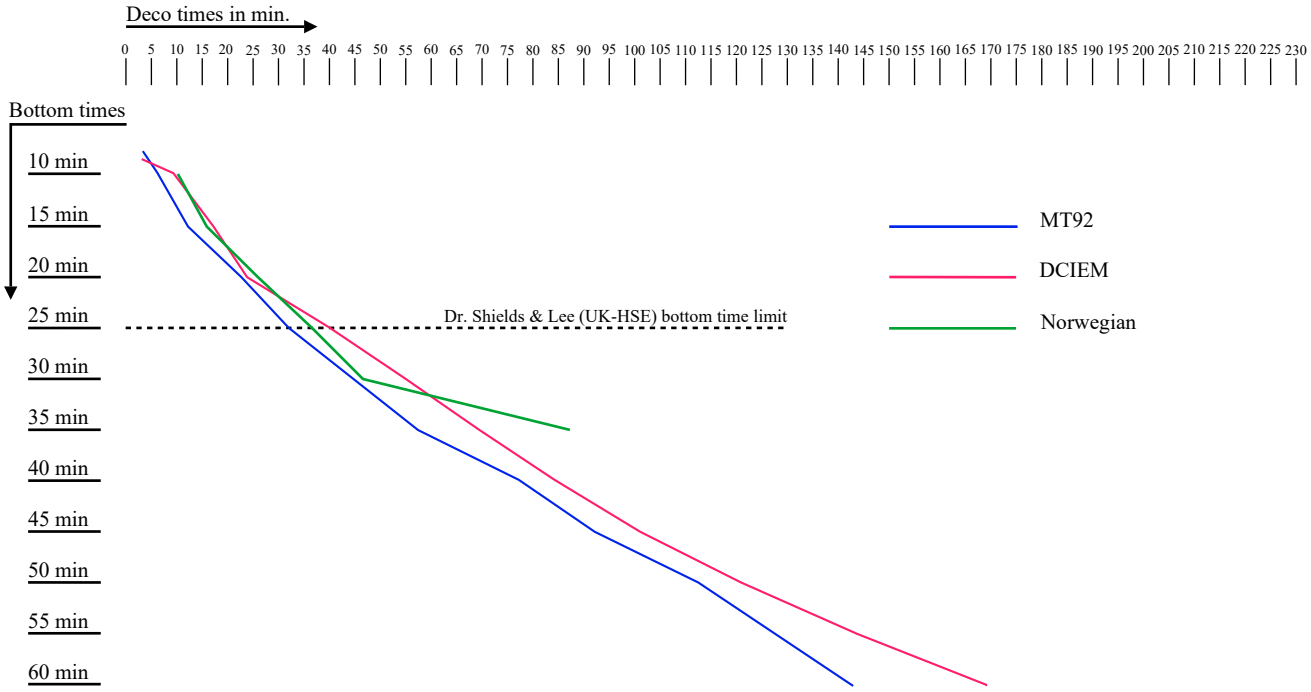
Comparison ascent times MT92, DCIEM, and Norwegian, for a dive at 42 m (minutes)

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
5	–	–	*4:12*
7	*3:30*	*2:00*	*Stop not indicated*
10	*6:15*	*7:00*	*9:54*
15	*11:00*	*15:00*	*15:36*
20	*18:00*	*21:00*	*20:36*
25	*29:45*	*32:00*	*25:36*
30	*42:45*	*46:00*	*36:18*
Operational limits UK-HSE			
35	*57:30*	*58:00*	*64:00*
40	*70:30*	*70:00*	*87:00*
45	*84:30*	*85:00*	*Stop not indicated*
50	*92:30*	*101:00*	*Stop not indicated*
55	*Stop not indicated*	*119:00*	*Stop not indicated*
60	*122:15*	*139:00*	*Stop not indicated*
65	*Stop not indicated*	*159:00*	*Stop not indicated*
70	*159:15*	*182:00*	*Stop not indicated*



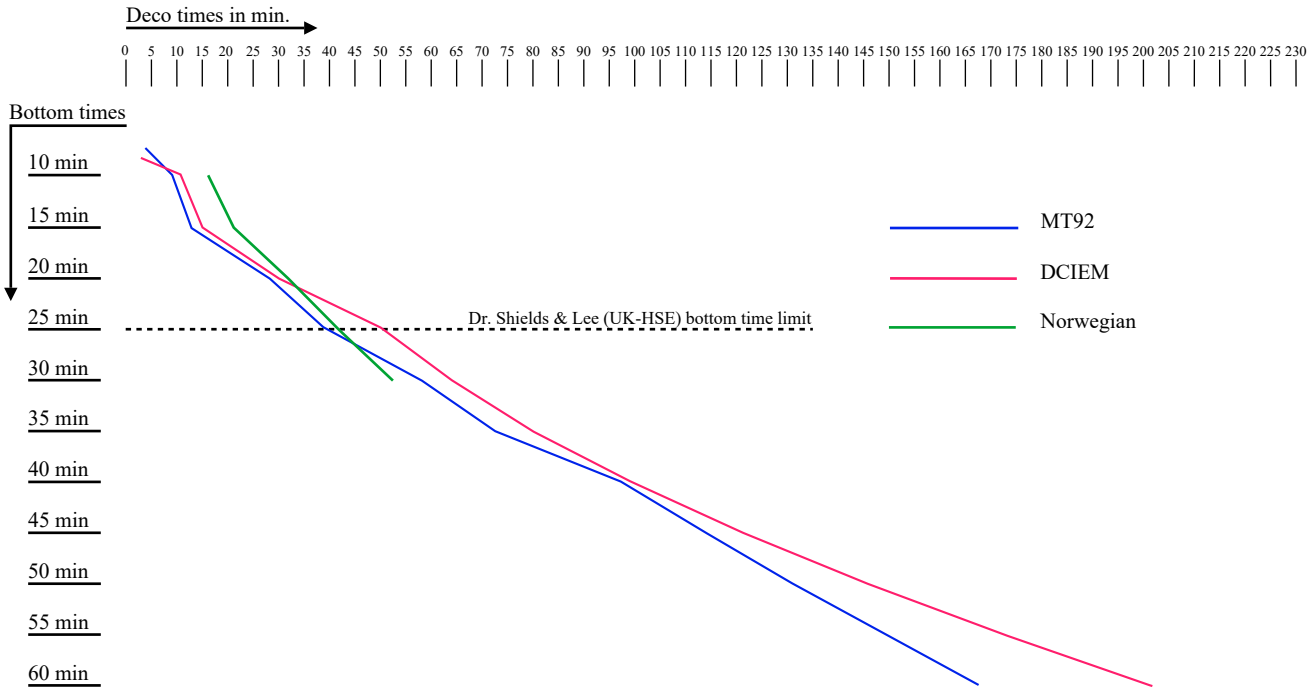
Comparison ascent times MT92, DCIEM, and Norwegian, for a dive at 45 m (minutes)

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
6	*3:45*	–	–
7	*Stop not indicated*	*3:00*	–
10	*6:30*	*9:00*	*10:12*
15	*13:15*	*17:00*	*15:54*
20	*23:00*	*24:00*	*25:54*
25	*33:00*	*40:00*	*36:36*
Operational limits UK-HSE			
30	*Stop not indicated*	*55:00*	*43:54*
35	*57:45*	*69:00*	*87:18*
40	*77:45*	*84:00*	*Stop not indicated*
45	*92:30*	*101:00*	*Stop not indicated*
50	*112:30*	*121:00*	*Stop not indicated*
55	*Stop not indicated*	*144:00*	*Stop not indicated*
60	*142:15*	*168:00*	*Stop not indicated*



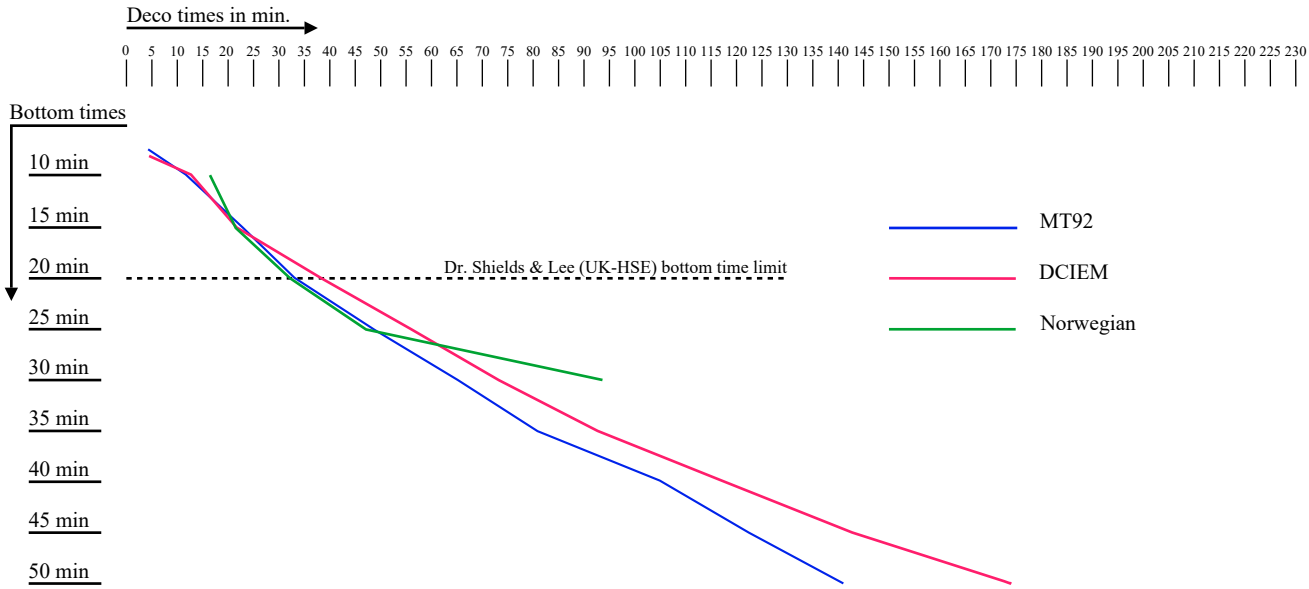
Comparison ascent times MT92, DCIEM, and Norwegian, for a dive at 48 m (minutes)

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
5	*4:00*	*3:00*	–
6	*Stop not indicated*	*3:00*	–
10	*8:45*	*11:00*	*7:00*
15	*13:30*	*20:00*	*21:12*
20	*28:15*	*30:00*	*31:54*
25	*38:15*	*49:00*	*41:54*
Operational limits UK-HSE			
30	*58:00*	*64:00*	*55:30*
35	*73:00*	*80:00*	*Stop not indicated*
40	*97:45*	*99:00*	*Stop not indicated*
45	*114:45*	*121:00*	*Stop not indicated*
50	*130:30*	*146:00*	*Stop not indicated*
55	*Stop not indicated*	*173:00*	*Stop not indicated*
60	*167:30*	*201:00*	*Stop not indicated*



Comparison ascent times MT92, DCIEM, and Norwegian, for a dive at 51 m (minutes)

Bottom time	*Ascent time MT92*	*Ascent time DCIEM*	*Ascent time Norwegian*
5	*4:15*	–	–
6	*Stop not indicated*	*3:00*	–
10	*11:45*	*13:00*	*16:30*
15	*23:30*	*22:00*	*21:30*
20	*32:30*	*38:00*	*32:12*
Operational limits UK-HSE			
25	*48:15*	*56:00*	*47:12*
30	*65:15*	*73:00*	*93:36*
35	*81:00*	*94:00*	*Stop not indicated*
40	*105:00*	*117:00*	*Stop not indicated*
45	*122:45*	*143:00*	*Stop not indicated*
50	*144:45*	*174:00*	*Stop not indicated*



To conclude this comparison:

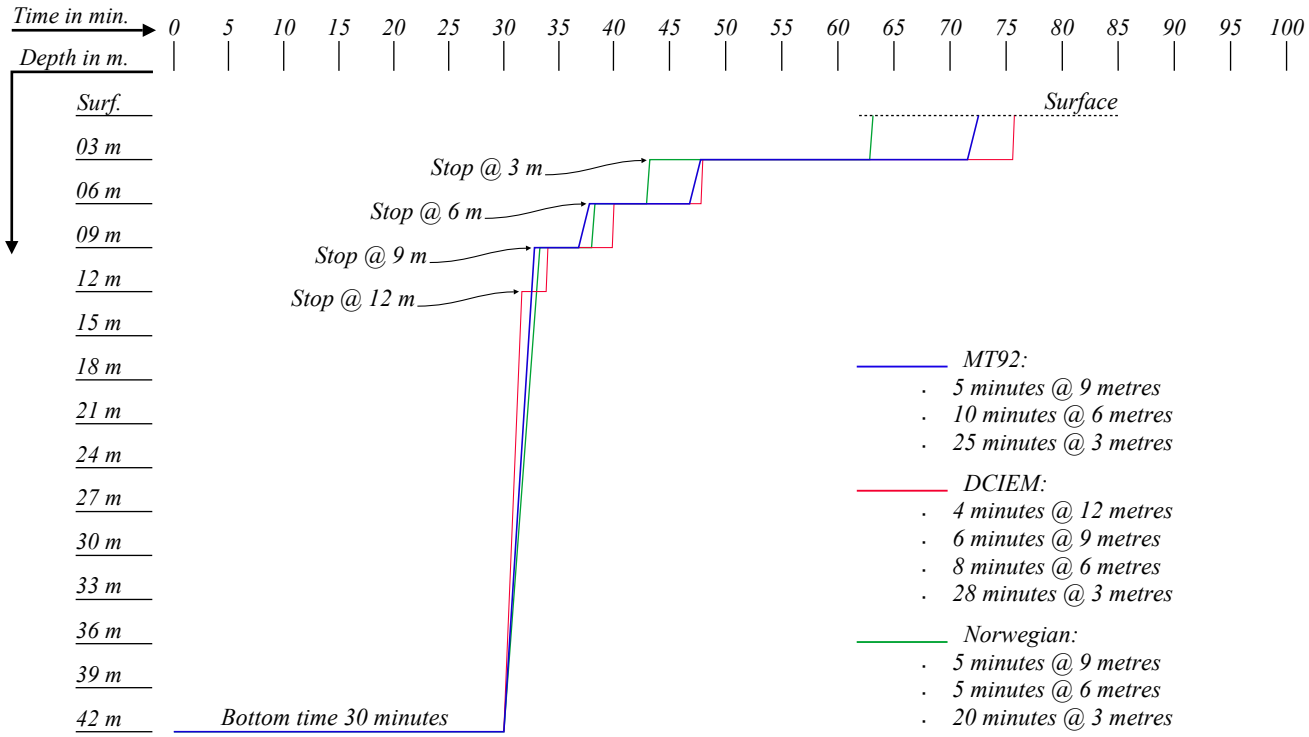
The decompression curves of MT92, DCIEM, and the Norwegian tables edition #6 are quite similar, except at the depth of 12 metres, where they slightly diverge after 200 minutes of bottom time. Additionally, note that the curve of the Norwegian tables edition #6 often changes direction sharply below the Doctor Shields & Lee limit (UK HSE limit), while MT92 and DCIEM provide a smoother continuation, more consistent with the predictive line.
We can conclude, as discussed previously, that MT92 and DCIEM tables have decompression curves similar to the Norwegian tables within the limits recommended by Doctors Shields and Lee and adopted by the UK HSE. Considering that the Norwegian tables, currently used for commercial diving in Norwegian waters and elsewhere, have been recently updated, we can conclude that despite their age, the MT92 and DCIEM tables remain efficient decompression models that have proven their reliability over the years since their publication.

1.3.3 - Other elements to consider

As mentioned earlier, these three sets of tables are based on different decompression strategies, which means that although their decompression times are quite similar, they are not arranged in the same way.
Among the factors influencing decompression time, note the ascent rate, which is part of the decompression process and thus affects the depths and duration of the stops.

- DCIEM tables are designed with an ascent rate of 18 m per minute, and the ascent time from the bottom to the first stop is included in this stop. This rate is also used to ascend between stops but is included in the stop time. This ascent speed is the fastest of the three decompression models considered, and the stops of this set of tables are usually organized to start deeper than those of the MT92 and Norwegian tables. As an example, for a dive of 30 minutes at 42 metres, the first stop is at 12 m, whereas the MT92 and Norwegian tables have their 1st stop at 9 metres.
  Additionally, DCIEM tables typically offer slightly longer decompression times than the MT92 and Norwegian tables. It must be considered that many tables initially designed during the 1980s and still in use have an ascent rate comparable to that of DCIEM. For example, the French Navy's tables, MN90, are designed with an ascent rate of 17 m/min. It is justified in a report published by the CEPISMER (Commission Pratique d'Intervention Sous la Mer = Practical Committee for Intervention Under the Sea), issued in January 1990, where Doctor Meliet explains that the team who studied this table finally preferred this speed instead of a slower one to avoid having accidents due to too-fast ascents because most navy divers were used to it with the previous tables.
  Also note that 60 ft/min (18 m/min) was the US Navy ascent rate during the 1970s and the early 1980s, and that the decompression model of DCIEM tables (Kidd-Stubbs) is an evolution of the initial US Navy model.
- The Norwegian tables have an ascent rate of 10 m/min, which is similar to the ascent speed of many recent decompression models. The 1st stops are organized shallower than with DCIEM. Using the example above of a dive of 30 minutes at 42 metres, the first stop is at 9 m instead of 12 m with DCIEM.
  The ascent time to the 1st stop is not included in the stop time. The time taken to move from one decompression stop to the next should be one minute. Note that these air decompression tables, issued for the first time in 1980 (NUI-report 30-80) and revised in 1991, 2001, 2008, 2017, 2019, and 2024, are initially based on the Royal Navy's Tables 11.
- The MT92 tables provide the most flexible ascent rate of the three proposals, as it can vary between 9 m/min and 15 m/min, depending on the choice of the diving supervisor.
  Note that, for convenience, the French Ministry of Labour has based the published tables on an ascent rate of 12 m/min, which corresponds to the mid-speed between the slowest and the fastest speeds. 12 m/min is also often preferred by many supervisors, as it is easy to monitor on a traditional watch display (divided by 12).
  The ascent time to the 1st stop is not included in the time spent at this stop. However, the last minute of each stop is used to ascend to the next one.
  As with the Norwegian tables, the 1st stops of MT92 are organized shallower than with DCIEM. Thus, using the previous example of a dive of 30 minutes at 42 metres, the first stop is at 9 m instead of 12 m with DCIEM.

The scheme below superposes the decompression graphs of the three models for a dive of 30 minutes at 42 metres.



Another aspect of a diving table set is its facility of use and the types of dives it allows to perform. Regarding this point, and not considering heliox diving, MT 92 provides the following in metric:

- Air table for decompression without stops (Table #1)
- Simplified air standard tables (Table #2)
- Air standard tables with in-water decompression (Table #3)
- Air oxy-6 m tables - In-water & in-bell decompression (Table #4)
- Air oxy 12 m tables - In-bell decompression (Table #5)
- Air/surface decompression tables (Table #6)
- Nitrox equivalent depth table (Table #7)
- Multi level diving table (Table #8)
- Equivalent depth table for diving at altitude (Table #9)
- Correction table for mud diving (Table #10)
- Repetitive diving calculation table (Table #11)

DCIEM provides the following in metric and imperial:

- Standard air decompression (Table #1)
- Short Standard Air Decompression (Table #1S)
- Equivalent air depth for nitrox diving (Table #1N)
- Recommended Bottom Time Limits (Table #2N)
- In-Water Oxygen Decompression at 9 m (Table #2) - Not used for in water stops with this handbook
- Short in-water oxygen decompression (Table #2S)
- Modified In-Water Oxygen Decompression (Table 2M)
- Surface Decompression with Oxygen (Table #3)
- Repetitive Diving Procedures (Tables #4)
    - 4A - Repetitive Factors / Surface intervals Table
    - 4B - No-Decompression Repetitive Diving
- Depth Corrections for Diving at Altitude (Table #5)
- Multi-Level Diving calculation procedure

Norwegian tables edition 6 provide the following in metric

- Standard Air decompression table
- Residual timetable for repetitive dives
- Correction for dive site altitude table & Correction for depth of decompression stops
- Multilevel diving
- EAD-table for open-circuit nitrox with 32 % O2
- EAD-table for open-circuit nitrox with 36 % O 2
- EAD-table for open-circuit nitrox with 40 % O 2
- Surface Decompression Table Using Oxygen
- Transfer Under pressure (TUP) air tables
- Table for calculationg the Equivalent Surface Oxygen Time (ESOT)

Opposite to some recent presentations such as the one of the US Navy revision 7, where the air in water decompression, air oxygen decompression, and surface oxygen decompression tables are grouped on a single chart. These tables are presented on separate documents, which in my opinion, avoids misreading errors. MT92 air standard tables provide following elements for controlling the decompression of the diver:

- Bottom times
- Ascent to time the 1st stop
- Duration of each stop, including the ascent to the next stop or the surface, and the breathing gas
- Total decompression time
- Whether a repetitive dive is possible or not.

Depth 12 metres

Bottom time	Ascent to stop min :sec	Air 18 m	Air 15 m	Air 12 m	Air 9 m	Air 6 m	Air 3 m	Total decompression min :sec	Repetitive dive
165	1 :00	-	-	-	-	-	-	1 :00	Possible
170	0 :45	-	-	-	-	-	3	3 :45	Possible
180	0 :45	-	-	-	-	-	5	5 :45	Possible
210	0 :45	-	-	-	-	-	10	10 :45	No
240	0 :45	-	-	-	-	-	15	15 :45	No
270	0 :45	-	-	-	-	-	25	25 :45	No

The presentation of the DCIEM tables is similar, except the ascent to the 1st stop is not indicated as it is part of this stop.
The presentation of the Norwegian tables is similar, except that the ascent time to the 1st stop is not indicated and that the total decompression time does not include the ascent times to the 1st stop and from the last stop to the surface.
Opposite to MT92 tables, the DCIEM and Norwegian tables use repetitive groups to calculate the successive (repetitive) dive, which obliges using at least two tables, whereas the MT92 procedure considers that the reference tissues are saturated to their maximum acceptable level, which results that only one table is necessary to calculate the penalty to be applied, which is safer and limits the sources of calculation errors (See below).

Repetitive Dive	Surface interval included between :									
Depth (m)	0h00 0h29	0h30 0h44	0h45 0h59	1h00 1h29	1h30 1h59	2h00 2h59	3h00 3h59	4h00 4h59	5h00 5h59	6h00 11h59
12-15	110	90	80	70	60	50	40	30	20	15
15-18	85	70	60	55	50	40	30	20	10	10
18-20	65	55	50	45	40	30	25	15	10	10
21-23	55	45	45	40	35	25	20	15	10	10
24-26	50	40	35	35	25	25	15	15	10	5
27-29	45	35	35	30	25	20	15	10	10	5
30-32	40	30	30	25	25	20	15	10	10	5
33-35	35	30	25	25	20	20	15	10	5	5
36-38	30	25	25	25	20	15	15	10	5	5
39-41	30	25	25	20	20	15	10	10	5	5
42-44	25	25	20	20	15	15	10	10	5	5
45-47	25	20	20	20	15	15	10	10	5	5
48-50	25	20	20	15	15	15	10	10	5	5
51	25	20	20	15	15	10	10	5	5	5
	Penalty to add to the real time									

The procedures below for nitrox, and altitude diving of tables MT92 are also among the most simple, whereas those of the two other tables taken as references are more complex, particularly those of the Norwegian tables.

PROCEDURE FOR NITROX DIVING
EQUIVALENT DEPTH METHOD

Real Depth (m)	Nitrox Mix					
	25/75 (m)	30/70 (m)	35/65 (m)	40/60 (m)	45/55 (m)	50/50 (m)
9	9	9	6	6	6	3
10	9	9	9	6	6	3
11	12	9	9	6	6	6
12	12	12	9	9	6	6
13	12	12	9	9	9	6
14	15	12	12	9	9	6
15	15	15	12	9	9	6
16	15	15	12	12	9	9
17	18	15	15	12	9	9
18	18	15	15	12	12	9
19	18	18	15	15	12	9
20	21	18	15	15	12	9
21	21	18	18	15	12	12

TABLE N°9
PROCEDURE FOR ALTITUDE DIVING
EQUIVALENT DEPTH METHOD

Real Depth (m)	Altitude / Atmospheric pressure					
	300-500m 950mbar	500-1000m 900mbar	1000-1500m 850mbar	1500-2000m 800mbar	2000-2500m 750mbar	2500-3000m 700mbar
5	9	9	9	9	12	12
6	9	9	9	12	12	15
7	9	9	12	12	15	15
8	9	12	12	15	15	18
9	12	12	15	15	18	18
10	12	15	15	15	18	21
11	15	15	15	18	18	21
12	15	15	18	18	21	24
13	15	18	18	21	21	24
14	18	18	21	21	24	27
15	18	18	21	24	24	27
16	18	21	21	24	27	30
17	21	21	24	24	27	30
18	21	24	24	27	30	30

Note that the surface decompression procedures MT92 are among the most stringent, with an interval surface limited to less than 3 minutes instead of 7 minutes for the DCIEM and 5 minutes for the Norwegian tables. Also, the last in-water stop of the Norwegian tables is at 12 m instead of 9 m with the MT92 and that its 1st in-chamber stop is at 15 m instead of 12 m with the MT92. As for the in-water decompression tables, the surface decompression tables MT92 provide all the necessary information (see below). In contrast, the Norwegian tables do not give the ascent time to the 1st stop and the interval surface.

As the system of calculation of penalties for successive (repetitive) dives of MT92 is different from those of the DCIEM and the Norwegian tables, the interval before starting another dive is indicated in hours instead of a repetitive group. Again, this system, in addition to a perfect display, limits the sources of mistakes.

Depth 36 metres

Minimum depth time min	Ascent to stop min :sec	In water			Surface Interval Inferior to	In Chamber		Total decompression min :sec	Interval after dive
		Air 15 m	Air 12 m	Air 9 m		Oxy 12 m	Oxy 12-0		
15	3 :00	-	-	-	3	10	6	22 :00	12h00
20	3 :00	-	-	-	3	10	6	22 :00	12h00
25	3 :00	-	-	-	3	15	6	27 :00	12h00
30	3 :00	-	-	-	3	20	6	32 :00	12h00
35	2 :15	-	-	3	3	25	6	39 :15	12h00
40	2 :15	-	-	3	3	30	6	44 :15	12h00
45	2 :15	-	-	5	3	35	6	51 :15	12h00
50	2 :00	-	3	7	3	40	6	61 :15	12h00

In addition to providing one of the best, or perhaps the best ergonomic, of the tables used in the industry, the MT 92tables offer more functions than the DCIEM and Norwegian tables. For example, the Norwegian tables do not provide in-water oxygen procedures. Also, the tables MT92 are the only set providing tables for diving in the mud, which is useful when pouring concrete, operations in bentonite mixes, or merely diving operations in areas where liquid mud is present near the bottom, which happens in some estuaries, and result in a higher water density as normal fresh or salt water (See below).

DEPTH (m)	Mud Density			
	1.1 (m)	1.2 (m)	1.3 (m)	1.4 (m)
5	6	6	9	9
6	9	9	9	9
7	9	9	12	12
8	9	12	12	12
9	12	12	12	15
10	12	15	15	15
11	15	15	15	18
12	15	15	18	18
13	15	18	18	21
14	18	18	21	21
15	18	18	21	21
16	18	21	21	24
17	21	21	24	24
18	21	21	24	27
19	21	24	27	27
20	24	24	27	30

To conclude this presentation, the MT92 tables are considered safe by the French ministry of labour and the labour ministries of many countries. They have similar decompression curves as the two tables taken in reference, which are also commonly used in the industry , and reputed safe. Their ergonomics are among the best, making them easy to use with fewer risks of human errors due to miscalculation or misreading than many other tables.

1.4 - Enhancing the original procedures

1.4.1 - Purpose

The MT92/2019 tables have been published at the beginning of the nineties, and their study shows that some contingency procedures today in force were not considered during this period and have to be introduced.
The purpose of a diving manual is to make sure that the diving team will not have to face adverse situations without clear guidelines. For this reason, missing procedures have been covered by procedures that are:

- Compatible
- Agreed by at least another competent body
- Already in use in the diving community
- Simple to apply
- Easy to remember

In addition, reinforcements have been added to some existing procedures. Most of them consist of the use of the chamber that is not indicated in the original procedures, except for violated surface intervals in the surface O2 decompression procedure. The use of a chamber as a precaution in the case of an incident is today a standard procedure in the offshore diving industry. Nevertheless, note that reinforcements must be done in respect to the way these tables have been originally designed, so there that there is no modification of the decompression model and the original procedures.
As already said in the presentation, no modification of the original procedure published in 1992 have been made in 2012 and 2019. The decrees of October 2012 and May 2019 focusing only on the classification of the divers, the limitation of the maximum depth that is today compliant with what is performed in the offshore industry, and the conditions of application of this table within the French territories. As a result the table remains as it was published by COMEX and adopted by the French ministry of labour in 1992.
The main reason is that theses revisions have not been made by people unfamiliar with the practices today in force in the offshore diving industry.
One of the essential rules today in force for surface supplied diving is that when a method of decompression is selected a backup procedure must be ready to recover safely the diver if the main method becomes inapplicable. As an example, the backup procedure of “In-water decompression procedure” is the “surface oxygen decompression procedure”. Also, in addition to the uncovered contingencies, the following elements needed some attention:

- Heliox surface decompression procedure is not provided. As a consequence there is no backup decompression procedure available. Note that heliox diving is not discussed in this document.
- The air surface O2 decompression procedure offers fewer bottom times and depths than the in-water air decompression table. For this reason, before launching an in-water decompression dive, the supervisor must make sure that the decompression selected can be performed using the surface oxygen decompression table. To reinforce this point, a warning showing the missing bottom times and depths has been written *(see “Bottom times and depths of in-water and surface O2 decompression tables”)*. Also, additional warnings are in place in the tables to make sure that the supervisor will not organize a dive beyond the limits offered by the surface decompression tables.
- In-water O2 decompression procedure at 6 m offer more bottom times than the standard air decompression procedure. However this point is covered by the implementation of the bottom time limits from doctor Shields and Lee (UK-HSE limits)

  The table for Equivalent Air Depth calculation (Table 7) has been designed for a maximum PPO2 of 1.6 bar. To comply with the latest recommendations from scientists explained in Book #1 *(See in “Adverse effect of hyperbaric oxygen”)*, the maximum PPO2 is reduced to 1.4 bar, and the corresponding table has been updated to this maximum limit.

The reinforcements applied to the table are explained in the next pages as follows:

- Summary of contingencies procedures selected for air in-water & surface decompression tables MT92/2019
- Bottom times and depths of in-water and surface O2 decompression tables
- Reinforcement of the medical tables
- DMAC 7 in place of the original procedure
- UK-HSE (Doctors Shields & Lee) maximum operational limits
- Bottom times reinforcement (Jesus procedure)
- Predive conditioning

1.4.2 - Summary of contingencies procedures selected for air in-water & surface decompression tables MT 92/2019

1.4.2.1 - Standard air in-water decompression

No	*Contingency*	*Procedures MT92*	*Procedure reinforced*	*Comments*
1	Ascent to 1st stop too slow	No procedure indicated	Delay added to the bottom time and decompress in accordance with the new bottom time.	*Source: MN 90* This is a classical procedure easy to remember and that most divers know. It is also in force with the US Navy procedures
2	Ascent to 1st stop too fast:	The diver returns to the half depth within less than three minutes and carries out a five minute stop. Decompression is renewed, based on the total diving time, including re-descent and the five minute stop at half depth.	The diver returns to the half depth within less than three minutes and carries out a five minute stop. Decompression is renewed, based on the total diving time, including re-descent and the five minute stop at half depth. The diver must perform 2 min stop at 3 metres if no stop is scheduled.	*Source: MN 90* It is a "standard procedure" and many divers can testify that it works fine. MN 90 proposes the same procedure than MT92/2012, but it is indicated that the diver must perform a 2 min stop at 3 metres if no stop is scheduled
3	Omitted decompression (Not a blow up)	No procedure indicated in the decree. Nevertheless, the COMEX medical book manual (in chapter 4) recommends this rule for the selection of the recompression table: - For dives above 9 m treat with Cx12 - For dives below 9 m treat with Cx 18	*1) Recompression in chamber not possible in less than 3 minutes:* • <u>If only one stop is omitted:</u> - Return the diver to the stop where the omission occurred in less than 3 minutes, perform this stop from the beginning and continue the decompression using the original schedule. • <u>If more than one stop is omitted:</u> - Return the diver to the deeper omitted stop in less than 3 minutes. - Perform all the omitted stops from the beginning and complete the total schedule. Upon the arrival of the diver on deck, put the diver under 100% O_2 and transfer him to the Deck Decompression Chamber . - Observe for signs of decompression sickness and pulmonary barotrauma and contact the Diving Medical Specialist (DMS). Treat using COMEX procedure if the DMS cannot be contacted: - For dives above 9 m treat with Cx12 - For dives below 9 m treat with Cx 18. *2) Recompression in chamber possible in less than 3 minutes:* • <u>If only one stop is omitted:</u> - Return the diver to the stop where the omission occurred in less than 3 minutes, perform this stop from the beginning and continue the decompression using the original schedule. Observe closely the diver for signs of decompression sickness upon his arrival on deck. • <u>If more than one stop is omitted:</u> - If the stop 9 m is completed and no previous decompression omitted, or the stops below 6 m not scheduled, recompress the diver at 12 m in the chamber in less than 3 min and decompress him using the surface O2. decompression table. - If the stops at 9 m and below are omitted, return the diver to the deeper omitted stop in less than 3 minutes. Perform all the omitted stops from the beginning and	Note that Omitted decompression is not a blow-up (The ascent is made at the normal speed) *Source: MN 90* Return at the interrupted stop in less than 3 minutes and re-start the interrupted stop from the beginning. Then, complete the decompression. Procedure MN 90 is very simple to remember. Nevertheless, we have a chamber and it must be used for prevention . One stop omitted is a situation where the diver misses a stop or is stopped slightly above. It may happen if the reference marks of the winch are incorrect or due to a mistake from the supervisor or the winch man. Generally, the correction is made within a few seconds. Two stop omitted is more undesirable. For this reason, a reinforcement has been introduced. The method for selecting the treatment table if the Diving Medical Specialist is not reachable is from COMEX medical book (chapter 4): - For dives above 9 m treat with Cx12 - For dives below 9 m treat with Cx 18

No	Contingency	Procedures MT 92	Procedure reinforced	Comments
	Omitted decompression (Continuation from the previous page)		complete the total schedule. Then, transfer him to the DDC as soon as possible	
4	Blowup	- If the decompression chamber is not at direct proximity: If the condition of the diver allows it, return to half depth in less than 3 minutes, carry out 5 minutes stop. Decompression is renewed, based on the total diving time, including re-descent and the five minute stop at half depth.	• <u>If the decompression chamber is not at direct proximity:</u> At the surface give 100% O2 to the diver, and transfer him to the chamber. In the chamber, treat: - For dives above 9 m treat with Cx12 - For dives below 9 m treat with Cx 18 • <u>If the decompression chamber is at direct proximity</u>: Transfer to the chamber in less than 3 min and treat: - For dives above 9 m treat with Cx12 - For dives below 9 m treat with Cx 18	*Sources MT92 & COMEX medical book*
5	Delays in leaving a stop or between decompression stops	No procedure	- Remember that the last minute of the stop is used to ascent to the next stop. - When the delay happens at and shallower than 12 m: Ignore the delay, and complete the decompression normally. - When the delay happens deeper than 12 m: Recalculate the required decompression using the multilevel table (Table #8)	*Sources: MT92 multi level diving & US Navy* The US Navy manual says that the decompression must be recalculated for stops at and below 15 m. However, MT92/2019 is provided with a multilevel diving table that can be used to verify the decompression schedule. This rule is mainly given for information because if the operational limit UK-HSE is applied as it should be, there is no stop below 9 m. Nevertheless, this procedure highlights the fact that longer stop times at depth can trigger re-saturation. This information is more useful in the case of heliox dives which call for deep stops. Most diving teams tend to apply longer stops than scheduled in the table. This time is often lost because the teams are afraid to burn stops and ascent too fast.
6	Travel rate between decompression stops too fast	No procedure	- If the rate of ascent is faster than 3 m/min, stop the ascent, allow the chronometer to catch up, and then continue the ascent. - Consider an early arrival at the next stop as an omitted decompression.	The 1st procedure is commonly used by scuba and surface supplied divers. For the 2nd procedure: MT 92 considers that the ascent is part of the decompression of the stop that has been left. For this reason, we can consider an early arrival at the next stop as an omitted decompression.
7	Difficulty in performing the 3 metre stop	- Perform the 3 m air stop at 6 m - Or, switch to surface decompression table	- Perform the 3 m air stop at 6 m - Or, switch to surface decompression table *(No reinforcement)*	
8	Exceeding the planned bottom time	Use either the next bottom time, or the last bottom time that should be used only as a backup.	Use either the next bottom time, or the last bottom time that should be used only as a backup. *(No reinforcement)*	Note that the surface decompression table offers fewer bottom times than the corresponding depth of the in-water decompression table. A warning is in place with a comparison of the bottom times. Warnings are also in place in the tables to alert the supervisor.
9	Exceeding the planned depth	Select the next depth	Select the next depth *(No reinforcement)*	Note that the maximum depth of the surface decompression table is 51 m instead of 60 m for the in water table

1.4.2.2 - Air surface oxygen decompression

No	*Contingency*	*Procedures MT 92*	*Procedure reinforced*	*Comments*
1	Ascent to 1st stop too slow	No procedure indicated	Delay added to the bottom time and decompress in accordance with the new bottom time.	*Source: MN 90* This is a classical procedure easy to remember and that all the divers know.
2	Ascent to 1st stop too fast:	The diver returns to the half depth within less than three minutes and carries out a five minute stop. Decompression is renewed, based on the total diving time, including re-descent and the five minutes stop at half depth.	The diver returns to the half depth within less than three minutes and carries out a five minute stop. Decompression is renewed, based on the total diving time, including re-descent and the five minute stop at half depth. The diver must perform 2 min stop at 3m if no stop is scheduled	*Source: MN 90* It is a "standard procedure" and many divers can testify that it works fine.
3	Omitted decompression (not associated to a blowup)	No procedure	• <u>If only one stop is omitted:</u> Return the diver to the stop where the omission occurred in less than 3 minutes, perform this stop from the beginning and continue the decompression using the original schedule. Observe closely the diver for signs of decompression sickness upon his arrival on deck.. • <u>If more than one stop is omitted:</u> - If the stop 9 m is completed and no previous decompression omitted, or the stops below 6 m not scheduled, recompress the diver at 12 m in the chamber in less than 3 min and decompress him using the surface O2. decompression table. - If the stops at 9 m and below are omitted, return the diver to the deeper omitted stop in less than 3 minutes. Perform all the omitted stops from the beginning and complete the total schedule. Then, transfer him to the DDC and apply Cx18	Procedure also explained in standard air *Sources: MN 90 & COMEX medical book*
4	Blowup	No procedure indicated for in-chamber deco, but procedure for air standard exist. Also the treatment is indicated in COMEX medical book	Transfer to the chamber as soon as possible and treat: - Use Cx12 if the depth of the dive is above 9m - use Cx 18 if the depth of the dive is below 9m	*Source: COMEX medical book*
5	Decompression stress during the surface interval	No procedure	The diver should be treated for decompression sickness if the signs and symptoms of the surface interval stress have not been completely resolved when he is confirmed on oxygen at 12 m in the chamber. In this case, the chamber must be compressed to 18 m and the treatment table Cx 18 Comex, or table 6 USN initiated.	*Sources: DCIEM & COMEX medical book*
6	Interval from in water stop 9 m to in-chamber stop 12 m exceeding four minutes	- If the surface interval exceeds four minutes but does not exceed five minutes, switch to the next longer table time. - If the surface interval exceeds five minutes, consider the dive as a shortened deco and apply the procedure for decompression accident type 1	If the surface interval exceeds four minutes but does not exceed five minutes, switch to the next longer table time. If the surface interval exceeds five minutes, consider the dive as a shortened decompression, and apply the procedure for decompression accident type 1 *(No reinforcement)*	

No	Contingency	Procedures MT 92	Procedure reinforced	Comments
7	Delays in leaving a stop or between decompression stops	No procedure	- When the delay happens at and shallower than 12 m: Ignore the delay, and complete the decompression normally. - When the delay happens deeper than 12 m: Recalculate the required decompression using the multilevel table (Table #8)	*Source: MT92 & US Navy* The US Navy manual says that the decompression must be recalculated for stops at and below 15 m. However, MT92/2019 is provided with a multilevel diving table that can be used to verify the decompression schedule. This rule is mainly given for information because if the operational limit UK-HSE is applied as it should be, there is no stop below 9 m.
8	Travel rate between decompression stops too fast	No procedure	- If the rate of ascent is faster than 3 m/min, stop the ascent, allow the chronometer to catch up, and then continue the ascent. - Consider an early arrival at the next stop as an omitted decompression.	The 1st procedure is commonly used by scuba and surface supplied divers. MT 92 considers that the ascent is part of the decompression of the stop that has been left. For this reason, we can consider an early arrival at the next stop as an omitted decompression.
9	Delay when travelling from the in-water stop 9 m to the surface	No procedure	- Ignore the delay and continue the ascent at the normal rate. DO NOT try to recover the delay. When at the surface, transfer to the the chamber in less than 4 minutes after leaving the 9 m stop. - If the surface interval is more than 4 minutes, apply the procedures for internal surface exceeding the planned time.	This is a classical procedure. If the winch- man try to recover the lost time, we have a fast ascent: The time can be recovered at the surface if the team is well organised.
10	Travel rate between from the in-water stop 9 m to the surface too fast	No procedure	If the rate of ascent is faster than 9 m/min, stop the ascent, allow the chronometer to catch up, and then continue the ascent.	*Source: Diving community*
11	Diver unable to reach the 12 m stop in chamber	No procedure	Two procedures can be used to solve this problem: - The procedure US Navy indicated in the US Navy manual revision 6.1 - The procedure US Navy "reinforced" from Dr Massimelli (DMAC) which is the original procedure USN with additional O2 stops at 3m (10 ft).	*Sources USN & Dr Massimelli (DMAC)* Such incident may happen during surface decompression and must be quickly solved. The "safe way out procedure" had been published by USN in 2006 and is the only existing procedure to solve such problem. This procedure is applicable to any surface decompression table.
12	Oxygen supply breakdown	If the loss of the oxygen supply is permanent: MT-92/2012 says: Decompress the divers on air using the standard air table for the same depth. Use the maximum bottom time available for safety.	For temporary loss of oxygen supply. The divers breathe chamber air. Return the divers to oxygen breathing when the supply is reestablished. Consider any time spent on air as dead time (The valid decompression is the time spent on O2). If oxygen cannot be reestablished, Decompress the divers on air using the standard air table for the same depth. Use the maximum bottom time available for safety.	*Common procedures:*
13	Acute oxygen poisoning during the decompression	No procedure	Remove the O2 mask, breathe air for 15 minutes, then resume the decompression at the point interruption. Generally the crisis will not happen again but the incident must be reported to the diving medical specialist. In the case that a 2nd crisis starts, the decompression will have to be completed on air. (Continue on the next page)	Acute oxygen poisoning is explained in the document "Diving Accidents". Additional procedure is classical and explained in many diving medical docs Also, explained in diver medic courses

No	Contingency	Procedures MT 92	Procedure reinforced	Comments
	Acute oxygen poisoning during the decompression (Continuation from the previous page)		In case of convulsions, the attendant must prevent the casualty from injuring himself, check the airways and makes sure that the tongue will not be swallowed (A padded mouth piece may be gently placed between the teeth to protect the tongue). After the convulsion, the patient may be unconscious for a short time. Important: DO NOT attempt to decompress a diver during a convulsion: The casualty will be unable to exhale with the high risk to create a pulmonary barotrauma. The ascent to the next stop must begin only after full recovery and the patient is relaxed. If the decompression has to be completed on air use the procedure indicated previously: Decompress the diver on air using the standard air table for the same depth of dive. Use the maximum table time available for safety.	*Sources:* *Refer to Book #1 / Adverse effects of hyperbaric oxygen.*
14	Exceeding the planned bottom time	Use either the next bottom time, or the last bottom time that should be used only as a backup.	- Use either the next bottom time, or the last bottom time that should be used only as a backup. - If there is no bottom time available, switch to in-water decompression table and complete the decompression in the water. - If the in-water stops are not possible due to adverse weather conditions, and there is no in chamber stop corresponding to the bottom time, perform the in-water stops until 9 m, then, transfer the diver to the chamber in less than 4 minutes. In the chamber treat using the Cx 18 (procedure COMEX omitted decompression)	Use the in-water air in the case that no surface deco procedure is available is acceptable if the weather is fine. Nevertheless, accumulation of mistakes may lead to a problem if the diver is in the water and the decompression is impossible. In this case he must be decompressed using a medical table as no table is available. Based on the fact that the decompression profile of the in-water decompression table and in-chamber decompression table is normally the same until the 9 m stop, the 9 m stop is performed to allow a safe transfer (in less than 4 minutes) to the chamber. A warning is included in the procedure to prevent the supervisor from considering it a standard practice.
15	Exceeding the planned depth	Select the next depth, or the last depth that should be used only as a backup	Select the next depth, or the last depth that should be used only as a backup. If there is no depth available, switch to in-water decompression table, select the depth attained by the diver and complete the decompression in the water. If the in-water stops are not possible due to adverse weather conditions, perform the in-water stops until 9 m then transfer the diver to the chamber in less than 4 minutes. In the chamber treat using CX18	This is a similar procedure than the previous one . As indicated the surface decompression table offers fewer bottom times and depths than the in-water air decompression table. - Procedure must be in place to make sure that the divers will work within the UK-HSE limits. - Procedures must be in place to recover safely the diver in the case that the diver is outside the limits given by the table.

1.4.2.3 - Nitrox procedures

No	*Contingency*	*Procedures MT92*	*Procedure reinforced*	*Comments*
1	Acute oxygen poisoning during the decompression	No procedure	• Minor symptoms during the dive - The nitrox supply must be stopped, and the helmet flushed with air. - The divers ascent to the basket which should be stored above him (that should reduce the partial pressure of O2) . - The stand by diver must be sent to assist the diver. - The decompression table to apply is the air decompression table for the actual depth of the diver, if the diver has been passed on air when at depth. - If the diver has been passed on air when the "equivalent air dive" level has been reached or passed, the decompression to apply is the one corresponding to the equivalent air dive level. • Serious symptoms during the dive - If the symptoms are too severe, but the epileptic crisis not yet started, the diver must be passed on air, removed from water and surface decompression procedure should be applied. Surface decompression must be considered even for trivial cases, and must be organized for all cases that could become more serious. The advantage of decompression in chamber is that the casualty can be easily controlled, which is not the case if the casualty is wearing his helmet and underwater. - The selection of the decompression table is to be done according to what is explained in the point 8.1. - If the epileptic crisis is started in the water, the diver cannot be ascended as he is not able to exhale. If the ascent is undertaken, it can trigger a pulmonary barotrauma. In this case, the solution is to wait the end of the crisis and ascend later on. But during such crisis, the diver can swallow his tongue or vomit in his helmet. Suffocation or vomit swallowed by the lungs can be the result. In both cases the final result could be death. For these reasons, an epileptic crisis at depth must be avoided. The diver must inform the diving supervisor of any symptom/bad feeling. Prudence must be the rule!	*Sources:* *Refer to Book #1 / Adverse effects of hyperbaric oxygen.*
14	Calculation Equivalent Air Depth (EAD)	Maximum partial pressure limited to 1.6 bar in table 7	Modification Table 7: To comply with the latest scientific research, the maximum partial pressure has been adjusted to 1.4 bar. As a result, the depths where the PPO2 were above 1.4 bar have been erased.	*Sources:* *Refer to Book #1 / Adverse effects of hyperbaric oxygen.*

1.4.3 - Bottom times and depths of in-water and surface O2 decompression tables

As explained before, when starting a diving operation using in-water decompression, the corresponding surface oxygen decompression table must be ready.
The study of MT 92/2012 tables shows that the surface decompression table offers fewer bottom times and depths than the in-water air decompression table. For this reason, warnings have been introduced and highlighted to make sure that the decompression selected can be performed using the surface oxygen decompression table.

The table below shows a comparison of the bottom times of in-water and surface O2 decompression tables. It can be found in each diving document. In addition similar warnings are in the tables.

Depth	*Bottom times Standard air table*	*Bottom times Surface Oxygen deco. table*	*UK-HSE bottom time limits*	*Comments*
12 m	165 to 360 min	180 to 360 min	240 min	
15 m	80 to 270 min	90 to 180 min	180 min	The surface O2 deco table is limited to 180 min that is also the UK-HSE bottom time limit. Manage to have at least 1 recovery table. Nevertheless 2 recovery tables is better. Also, take this problem into consideration if the safety procedure selected is one additional bottom time.
18 m	50 to 210 min	60 to 150 min	120 min	4 bottom times are missing in the surface deco. table. Nevertheless there are 3 bottom times after the IOGP bottom time limit.
21 m	35 to 180 min	40 to 120 min	90 min	4 bottom times are missing in the surface deco. table. Nevertheless there is 3 bottom times after the IOGP bottom time limit.
24 m	25 to 150 min	30 to 90 min	70 min	6 bottom times are missing in the surface deco. table. Only 2 bottom times after the UK-HSE bottom time limit. Take this into consideration if the safety procedure selected is one additional bottom time.
27 m	20 to 130 min	25 to 70 min	60 min	6 bottom times are missing in the surface deco. Table. Only 1 bottom time after the UK-HSE bottom time limit. Take this into consideration if the safety procedure selected is one additional bottom time.
30 m	15 to 110 min	20 to 60 min	50 min	5 bottom times are missing in the surface deco. table. Only 1 bottom time after the UK-HSE bottom time limit. Take this problem into consideration if the safety procedure selected is one additional bottom time.
33 m	12 to 100 min	15 to 60 min	40 min	4 bottom times are missing in the surface deco. table.
36 m	10 to 90 min	15 to 50 min	35 min	4 bottom times are missing in the surface deco. table.
39 m	8 to 80 min	10 to 40 min	30 min	5 bottom times are missing in the surface deco. table. Only 2 bottom times after the UK-HSE bottom time limit.
42 m	7 to 70 min	10 to 40 min	30 min	4 bottom times are missing in the surface deco. able. Only 2 bottom times after the UK-HSE bottom time limit.
45 m	6 to 60 min	10 to 30 min	25 min	4 bottom times are missing in the surface deco. table. Only 1 bottom time after the UK-HSE bottom time limit. Take this into consideration if the safety procedure selected is one additional bottom time.
48 m	5 to 60 min	10 to 30 min	25 min	5 bottom times are missing in the surface deco. table. Only 1 bottom time after the UK-HSE bottom time limit. Take this into consideration if the safety procedure selected is one additional bottom time.
51 m	5 to 50 min	10 to 30 min	20 min	4 bottom times are missing in the surface deco. table. Only 2 bottom times after the UK-HSE bottom time limit. There is no surface decompression table below this level: Limit the depth to have at least 2 recovery tables. Take this into consideration if the safety procedure selected is one additional bottom time.
54 m	5 to 45 min	No table	Beyond the limit	No surface O2 decompression table.
57 m	5 to 40 min	No table	Beyond the limit	No surface O2 decompression table.
60 m	5 to 35 min	No table	Beyond the limit	No surface O2 decompression table.

1.4.4 - Reinforcement of the medical tables

MT92 initially proposed only COMEX tables Cx12 (Table 1) and Cx30 (Table 2), so one table for treatment of type 1 decompression accidents (CX12) and the 2nd table (CX30) for treatment of type 2 decompression accidents based on the use of heliox. The latest revision has provided the CX18 for treatments at 18 m

This handbook proposes the full collection of COMEX tables as it is considered that the selection of a treatment table is a medical act that is normally under the responsibility of the diving medical specialist. That is why for every action where a medical table has to be used for prevention or to solve a problem it is said *"Contact the diving medical specialist and follow his instructions"*. Nevertheless, the diving medical specialist is not on board, and for this reason, the diving team must have all the tables the diving medical specialist may decide to use.
Also, the team must have guidance for solving a decompression sickness or and arterial gas embolism in case the communication with the diving medical specialist cannot be established. Limit the selection of tables to only three tables is not realistic for the following reasons:

- It gives the divers a false feeling of safety, which results that many of them think that applying a Cx12 (table 1), Cx18 (table 2), or Cx30 (table 3) will automatically solve all the decompression sickness and Arterial Gas Embolism problems they can be confronted with. Every chamber operator who has been confronted with real cases knows that it is not true and that treatments using Cx30 may have to be continued with "Cx30 saturation" that is not indicated in the latest decree of May 2019. For this reason, it has been integrated in this handbook.
- The treatment tables published in MT92/2019 do not cover all possible scenarios. As an example, the procedure for selecting the preventive treatment tables is not indicated in MT92/2019. Nevertheless the procedure is available in the COMEX medical book *(chapter 4)* edited in 1986. This procedure should be used in case the diving medical specialist cannot be contacted on time. This procedure considers two possible cases:
  - Depth of the dive less than 9 m: Treat using Cx 12
  - Depth of the dive more than 9 m: Treat using Cx 18
- A lot of hyperbaric doctors consider suitable and efficient to have a full set of medical tables available instead to only a few of them. Many of them also prefer having several sets of tables where they can select the most suitable procedure for the situation encountered.

US Navy Treatment Tables are the most commonly used by hyperbaric doctors, in Asia and Americas. It is the reason, they are published in this manual in addition to what is said in the text above.

- Some people believe that because the treatment tables published in the decree of May 2019 are table 1 (Cx12), table 2 (Cx18), and table 3 (Cx30), only these tables have to be applied to solve decompression illness or Arterial Gas Embolism. This is false, as the use of a treatment table is a medical act under the sole responsibility of the diving medical specialist who is a doctor, and is the most competent person to solve medical cases linked to diving.
  Note that the diving medical specialist should be selected according to the guidelines from states, and other competent medical organizations, and be recognized as a diving doctor. Lists of recognized doctors are provided in Logistics/Diving doctors & clinics on the website Diving and ROV Specialists.com.

  The purpose of treatment tables is to save or preserve a compromised life. As a simple rule, decompression tables are designed to protect divers from decompression sickness. They are calculated according to a bottom time at a certain depth for a particular activity. Treatment tables are designed to solve a situation where a diver is beyond the operational limit of the decompression table that has been selected or is already suffering from decompression sickness or arterial gas embolism. Treatment tables are applied according to symptoms and possible development of an illness and not according to a bottom time at a certain depth. The doctor will check the dive profile of the diver, but it is to have a clear idea of what happened and refine his strategy.
  A lot of doctors are used to USN medical tables because they have been taught with them. So they will tend to apply these tables in priority.
  Some other doctors do not hesitate to use tables from different origins. As an example, Cx30 with 50/50 heliox is commonly used if heliox is available onboard. For this reason, the full sets of US Navy and COMEX treatment tables are in this handbook. Note that the diving medical specialist must indicate the preferred set of medical tables before starting the diving operations.

To conclude on this point:

The handbooks published by diving and ROV specialists propose the full sets of US Navy and COMEX treatment tables whatever is the decompression table used (DCIEM or MT92/2019). The reason is that these medical sets of tables are the most used in the offshore industry. That gives the advantage to propose many options and not limit the diving medical specialist and the diving team to only 2 tables.
Other treatment tables exist, and the Diving Medical Specialist may decide to use another table than those proposed in these manuals. Nevertheless, it has been considered that too many options could be difficult to manage, and should double the size of document "Diving accidents" that is already more than 300 pages.

1.4.5 - DMAC 7 in place of the original procedure for flying after diving

DMAC 7 “Flying after diving: Recommendations” is a guidance that was 1st published by the Diving Medical Advisory Committee (DMAC) in 1982 and was then regularly reviewed. The current version (Revision #2), published in November 2017 provides some reinforcement of the previous ones
It must be remembered that this guidance is based on COMEX procedures, and was also initially part of MT92 tables. That can be verified by comparing the two tables below that were published in 1992 (MT/92) and in 2001 (DMAC 7)

Diving procedure used	Variation in pressure or altitude	
	Greater than 500 m (Approx 50 hPa)	Greater than 2600 m or a flight in a commercial aircraft (Approx 250 hPa
No stop air diving	*2 hours*	*4 hours*
Air or heliox diving with stops	*12 hours*	*12 hours*
Heliox saturation	*12 hours*	*12 hours*
Emergency recompression	*24 hours*	*48 hours*

MT 92 - May 1992

Diving without Decompression Illness (DCI) problems	Minimum times before flying at cabin altitude	
	2000’ (600 m)	All other flights
No-stop dives Total time under pressure less than 60 minutes within previous 12 hours	*2 hours*	*8 hours (24 hours)**
All other air and nitrox diving, heliox and mixed gas bounce diving (less than 4 hours under pressure)	*12 hours*	*24 hours*
Heliox saturation (more than 4 hours under pressure)		
Air, Nitrox or Trimix saturation (more than 4 hours under pressure)	*24 hours*	*48 hours*

**8 hours applies to short flights. For longer flights, as for example intercontinental flights, the time is extended to 24 hours*

Table #1 of DMAC 07 - Rev. 1 - March 2001

We can see that the initial document was the same. However, there were already some differences with revision #1 from the DMAC, published nine years later: Flying after diving was reinforced. Note that the altitude of 500 m (1640 ft) was raised to 600 m (1968 ft) by the DMAC. Another point is that this guidance DMAC 7 introduced the recommendation below regarding flying following therapy for DCI, which was not part of the MT92 tables.

	Minimum times before flying at cabin altitude	
	2000’ (600 m)	All other flights
Immediate and complete resolution of symptoms on first recompression	*24 hours*	*48 hours*
Cases without immediate response or with residual symptoms must be decided on an individual basis by a diving medical specialist. Generally wait as long as possible.	*Consult a diving medical specialist*	

Table #2 of DMAC 07 - Rev. 1 - March 2001

As indicated in the introduction, no reinforcement of the original procedure published in 1992 has been made in 2012 and 2019. Also, the recommendations for flying after diving were removed from the decree of 30 November 2012 and then returned in the decree of 14 May 2019 as it was initially published in 1992, except that it was added that flying after heliox saturation is not permitted before 12 hours inland and 48 hours offshore, which is illogical as inland or offshore saturation result in the same problem of decompression. This illogical procedure is not from the creators of the table.

For the reasons above, and also because most offshore teams are today familiar with the guidance DMAC 7. It is advisable to adopt revision #2 of DMAC 7, published in 2017, in place of the original procedure, which should be considered obsolete. Note that this latest update of DMAC 7 results that the standby period before flying after a no decompression dive is now 18 and 24 hours instead of 4 hours with the original procedure MT92 and that the standby period before flying after a DCI is now 72 hours instead of 48 hours with the previous revision of DMAC 7 *(Remember that this table #2 was not part of MT92 procedures)*.

1 - Diving without Decompression Illness problems or any symptoms	***Minimum times before flying at cabin altitude***	
	2000' (600 m)	***All other flights***
No-stop dives Total time under pressure less than 60 minutes within previous 12 hours	*2 hours*	*18 hours (24 hours)**
All other air and nitrox diving, heliox and mixed gas bounce diving (less than 4 hours under pressure)	*12 hours*	*24 hours*
Heliox saturation (more than 4 hours under pressure)		
Air, Nitrox or Trimix saturation (more than 4 hours under pressure)	*24 hours*	*48 hours*

** 18 hour time applies to short flights (less than 3 hours). For longer flights the time is extended to 24 hours*

2 - Following therapy for DCI, advice must be sought from a diving medical specialist	***Minimum times before flying at cabin altitude***	
	2000' (600 m)	***All other flights***
Immediate and complete resolution of symptoms on first recompression	*24 hours*	*72 hours*
Cases without immediate response or with residual symptoms must be decided on an individual basis by a diving medical specialist. Generally wait as long as possible.	*Consult a diving medical specialist*	

Residual risks will be reduced by giving 100% oxygen during the flight. Following landing the diver should be assessed by a diving medical specialist.

1.4.6 - Implement the "Jesus factor"

The “Jesus factor”, is an old concept based on the fact that a table is developed for a determined population of divers, which does not always correspond to the divers operating on the job site. This procedure was initially implemented because most tables used during the 60s and 70s were initially designed for military divers which resulted in numerous decompression accidents. This “Jesus factor” is described in detail in the document *“The incidence of decompression sickness arising from commercial offshore air-diving operations in the UK sector of the North sea during 1982/83”* issued in December 1997 by doctors Shields and Lee.

Even though the tables currently used, such as MT 92 or DCIEM, have provided considerable improvements, this procedure that consists in adding bottom time or switching to the next deeper depth continues to be applied by numerous supervisors and is mandatory with some companies because databases have demonstrated that the tables need to be sometimes reinforced according to the tasks performed, the environmental conditions, and the age of the diver.

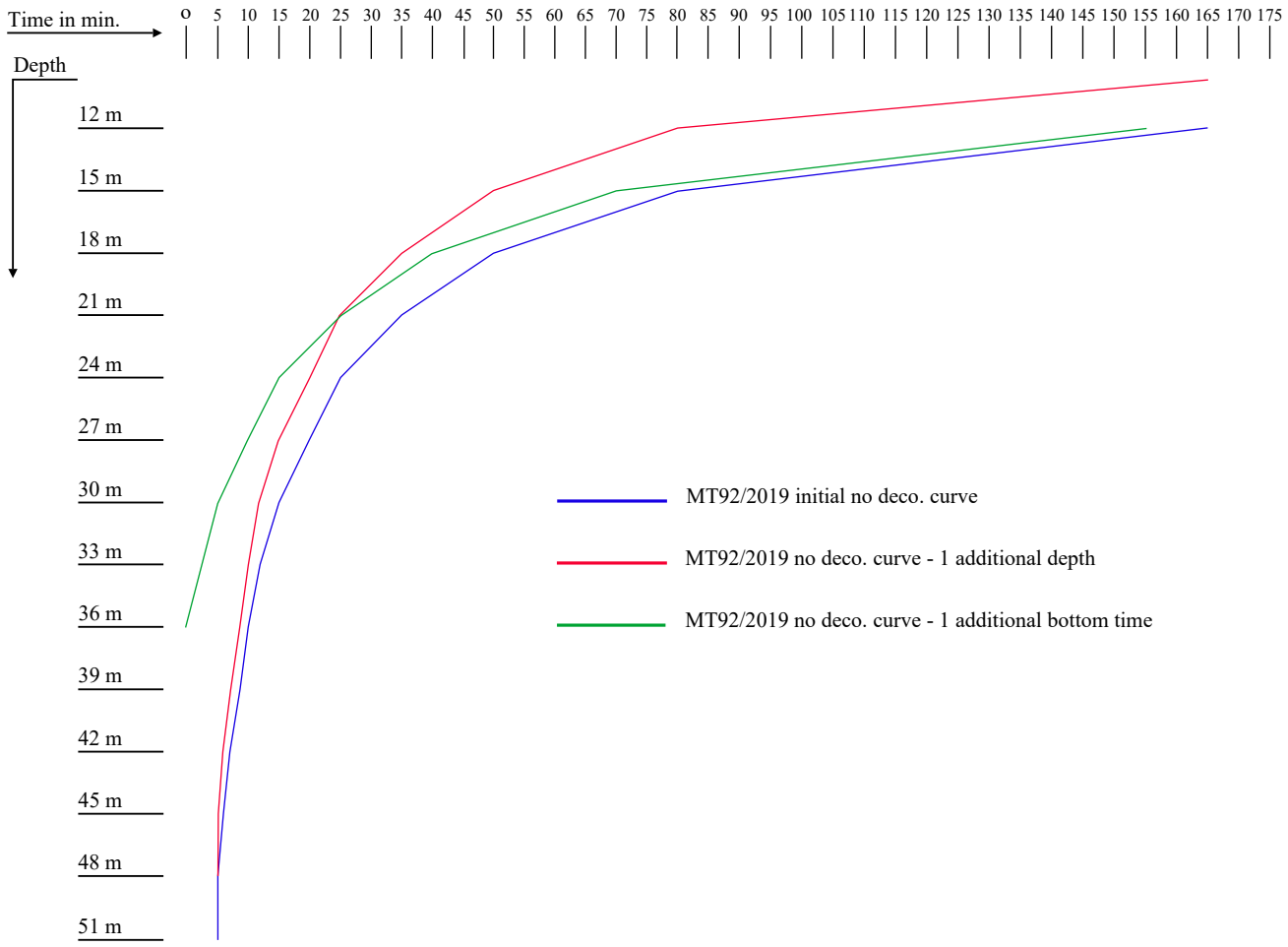
In addition to preserving the divers' health, many companies ensure that no decompression sickness happens because such an undesirable event results in incident reports that may damage their reputation. This point is not the most glorious, but it must be taken into account.

This procedure is officially introduced in the MT 92 tables manual, where it is indicated: *“When diving or working conditions are difficult, the risk of a decompression accident is higher. It is an established fact that poor physical condition, nervous tension, poor visibility, cold and accumulated fatigue after weeks of intensive diving, predispose a diver to decompression sickness. Similarly, a current, uncertain depth control and poor sea conditions make decompression procedures difficult to follow and thus increase the risk of a decompression accident. All these factors must be taken into consideration when a decompression table is chosen. In the case where diving conditions are such that they may adversely affect decompression safety, the next longest time on the bottom in the table should be used in order to give the divers an additional margin of safety”.*

It is also part of the Norwegian tables where it is said in chapter “prevention for decompression illness”: *”If there are circumstances increasing the risk for decompression illness, the decompression should be more conservative than prescribed by the tables. Especially this is true if multiple risk increasing factors are present and for dives with bottom times bordering the maximum allowed bottom time. In such cases the standard air decompression tables should be used more conservatively by decompressing according to a table time one or two steps longer than otherwise”.*

This concept has also been adopted by manufacturers of diving computers designed for scuba diving that provide the possibility to reinforce the basic decompression profile. These reinforcements usually consist of shifting the decompression curve and do not modify the mathematic model *(see the scheme below)*.

This handbook recommends applying at minimum an additional bottom time or depth, except for dives with perfect sea and underwater conditions for performing light works and using short bottom times.



1.4.7 - Predive conditioning procedures

Current diving tables control the risks linked to Decompression Sickness (DCS) by managing factors such as the dive duration, the depth, the ascent rate, and the duration of the stops. However, in the paper *"Preconditioning Methods and Mechanisms for Preventing the Risk of Decompression Sickness in Scuba Divers: A Review"*, doctors Emmanuel Gemp & Jean-Eric Blatteau say that clinical data supporting the importance and the role of each factor on Decompression Sickness (DCS) development are lacking due in part to the great inter/intra-variability between individuals regarding susceptibility to DCS. They also say that based on their clinical experience and Divers Alert Network (DAN) statistics, most injured divers presenting neurological DCS (75%–90%) followed their dive profile and did not performed inadequate decompression schedules, which puts forward the notion that conservative dive profiles are no guarantor of protection against DCS and that novel means are required for DCS prevention.

The fact that diving time and nitrogen pressure are not the only determinants of Vascular Gas Embolisms (VGE) formation and that factors such as the variation between individuals and other not fully clarified phenomenons is taken into account by many other scientists. For example, doctors Peter Germonpré & Costantino Balestra confirm these points in their study *"Preconditioning to reduce decompression stress in scuba divers"*. For these reasons, new concepts still under evaluation have been developed to explain the production of Vascular Gas Embolisms (VGE), such as the generally admitted assumption that bubbles form from already present gaseous nuclei, and that these initially unstable nuclei may be trapped in intercellular hydrophobic crevices on the endothelial surface or be coated by surface-active molecules like surfactant, platelets, or proteins and thus stabilized by these processes before being released into the bloodstream. These mechanisms of nuclei formation are still debated by scientists with also the role of body substances such as Nitric Oxide (NO), an omnipresent intercellular messenger, modulating blood flow and neural activity, which is thus responsible for vasodilatation. That opens to studies on chemical reactions and drugs that may be used to interfere in these phenomenon and be used to control the production of Vascular Gas Embolisms (VGE).

In the paper called *"Static Metabolic Bubbles as Precursors of Vascular Gas Emboli During Divers' Decompression: A Hypothesis Explaining Bubbling Variability"* Jean-Pierre Imbert, Salih Murat Egi, Peter Germonpré, and Costantino Balestra make a status of the research ongoing and propose solutions that will probably result in new decompression tables in the near future.

As there is, for the moment, no table integrating these new concepts in a public release for commercial diving, we continue to use tables such as DCIEM or MT 92/2019 that, although they are not integrating these new concepts, have proved to be and continue to be efficient means of control. However, some elements from the studies mentioned above can be implemented to improve these procedures. Among the solutions investigated to improve decompression, the authors of this document insist on the benefits of "pre-dive conditioning", which refers to experimental studies made to demonstrate that exercises, oxygen, or substances uptake before the immersion have beneficial effects on decompression. These beneficial effects are assumed to result from eliminating nuclei by physical processes or/and chemical reactions.

To highlight the advantage of the pre-dive conditioning, we can refer to a paragraph of this study where the authors remember experiments made by doctors Gennser & al. that concluded that five weeks of bed-rest significantly increased bubble grades after decompression. The reasons given to explain these results are the following:

- Bedrest conditions are associated to minimal activity and therefore to a minimal metabolism. The consequence is that the initial Static Metabolic Bubbles (SMB) volume in the divers prior to the dive was maximal.
- The lack of exercise reduces vibrations and it is likely that most of the available Active Hydrophobic Spots (AHS) were populated by SMB.
- After a bedrest, the divers started the dive with a high density of SMB with a maximal volume that favored higher grades of detected VGE.

Scientists have successfully tested the pre-dive conditioning solutions listed below on humans.

- Endurance exercise:
  This process consists of exercises requiring 70 to 90% of maximum heart rate performed before the dive. Note that the maximum heart rate is often calculated with the formula "220 minus the age of the person tested".
- Hydration:
  This concept is based on the fact that it has long been suggested that dehydration may increase the risk of Decompression Sickness (DCS) and that experiments have been made on animals that correlate it.
- Heat exposure:
  This concept leans on papers that demonstrated that moderate dehydration resulting in stroke volume reduction induced by a predive exercise could decrease venous circulating bubbles in divers.
- Oxygenation:
  These procedures are based on the assumption that oxygen breathing before diving eliminates pre-existing gas micronuclei before they can grow into bubbles. The proposed mechanism is based on the ability of oxygen to replace nitrogen in the nucleus by diffusion. The reduction of oxygen pressure after switching from oxygen to air could enhance the consumption of oxygen from the nucleus, thus eliminating it completely.
- Vibration:
  This procedure consists of submitting the diver to sessions on vibrating mattresses sold to all public. The effects expected are similar to those obtained with predive exercise except that more efficiency is looked for.
- Jumping:
  This technique aims to provoke blood displacement and muscular contractions to dislodge VGE nuclei. The method selected to obtain the expected result consists of jumping on a mini trampoline.

- Specific substances uptake:
  This terminology refers to drugs or food that can be used to control chemical reactions linked to decompression, such as nitric oxide (NO) production.

The processes of these experiments are described in papers available on the "Diving and ROV Specialists.com" website and through recognized scientific article publishers.
We, nevertheless, need to take into account the fact that these reinforcement processes are experimental and that, despite the positive results obtained, they may not apply to commercial diving operations due to implementation issues and the fact that the procedures described have been tested with military and sportive SCUBA divers, so initially thought in the function of the concept to be tested and according to methods practiced for this type of diving instead of the intensive operations we commonly organize in commercial diving. For these reasons, it is reasonable to be conservative regarding these new procedures, so only to apply what has been tested and not go outside these limits, even though we may feel that some variations of the solutions described may work.

- Regarding endurance exercise and hydration, doctors Gempp & Blatteau conclude their article *"Preconditioning Methods and Mechanisms for Preventing the Risk of Decompression Sickness in Scuba Divers: A Review"* by saying *"Evidence suggests that, for a population of trained and military divers, endurance exercise (even in a warm environment) associated with oral hydration prior to the dive is beneficial in vascular bubble reduction"*.
- Normobaric pre-dive oxygen breathing is a procedure that is easy to implement with standard air diving, and is described in a paper called *"Pre-dive normobaric oxygen reduces bubble formation in scuba divers"*, published by doctors Olivier Castagna, Emmanuel Gempp, and Jean-Eric Blatteau. Because no tests have been made with nitrox and oxygen decompression stops, we must abstain from merging this concept with these procedures, even though there is no apparent conflict, and we feel that the two concepts used together may give excellent results. This is, of course, based on the idea of the conservative approach discussed previously.
- Whole body vibration results better than normobaric oxygen breathing and endurance exercise, and this concept can also be implemented for standard air diving.

However, in an article called "Pre-dive Whole-Body Vibration Better Reduces Decompression-Induced Vascular Gas Emboli than Oxygenation or a Combination of Both", doctors Costantino Balestra, Sigrid Theunissen, Virginie Papadopoulou, Cedric Le Mener, Peter Germonpré, François Guerrero, & Pierre Lafère say that pre-dive conditioning with only whole body vibration was more efficient during experiments than predive-conditioning with normobaric oxygen and body vibration performed together. They say that this absence of synergy could be explained by the fact that the two modes of preconditioning, mechanical or diffusion, could act on the same nuclei and thus be in direct competition. That demonstrates that procedures that have not been tested must not be implemented, so the idea of the conservative approach must always prevail.

1.4.8 - Operational limits UK-HSE

These recommended limits are those of the UK-HSE report *"The incidence of decompression sickness arising from commercial offshore air-diving operations in the UK sector of the North sea during 1982/83"* issued in December 1997 by doctors Shields and Lee. This report is available on our website and can also be found on the UK HSE website.

Depth		***Bottom times limits Surf. Deco. & In-water***
Metres	***Feet***	
0 - 12	*0 - 40*	*240*
15	*50*	*180*
18	*60*	*120*
21	*70*	*90*
24	*80*	*70*
27	*90*	*60*
30	*100*	*50*
33	*110*	*40*
36	*120*	*35*
39	*130*	*30*
42	*140*	*30*
45	*150*	*25*
48	*160*	*25*
50	*164*	*20*

These recommendations have been adopted by numerous organizations and are commonly used offshore. We have integrated in them in the MT92/tables: A yellow bar where it is written “Maximum operational limitUK-HSE” is provided in each table.

Depth 24 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
25	2:00	-	-	-	-	-	-	2:00	Possible
30	1:45	-	-	-	-	-	3	4:45	Possible
35	1:45	-	-	-	-	-	5	6:45	Possible
40	1:45	-	-	-	-	-	7	8:45	Possible
45	1:45	-	-	-	-	-	10	11:45	Possible
50	1:45	-	-	-	-	-	15	16:45	Possible
60	1:30	-	-	-	-	3	20	24:30	Possible
70	1:30	-	-	-	-	5	30	36:30	Possible
Maximum operational limit UK-HSE									
80	1:30	-	-	-	-	10	35	46:30	Possible
90	1:30	-	-	-	-	15	40	56:30	Possible
100	1:15	-	-	-	3	20	45	69:15	Possible
110	1:15	-	-	-	3	25	50	79:15	Possible
120	1:15	-	-	-	3	30	60	94:15	Possible
130	1:15	-	-	-	5	30	65	101:15	Possible
140	1:15	-	-	-	10	35	70	116:15	No
150	1:15	-	-	-	10	40	75	126:15	No

2 - Implement the MT92 air standard and nitrox procedures

2.1 - Air Standard Procedures

MT 92 - 2012/COMEX standard air in-water decompression tables are only metric. They are designed for altitudes below 300 m . For altitudes above 300 m, a correction must be applied using table 9 “Diving at altitude”.

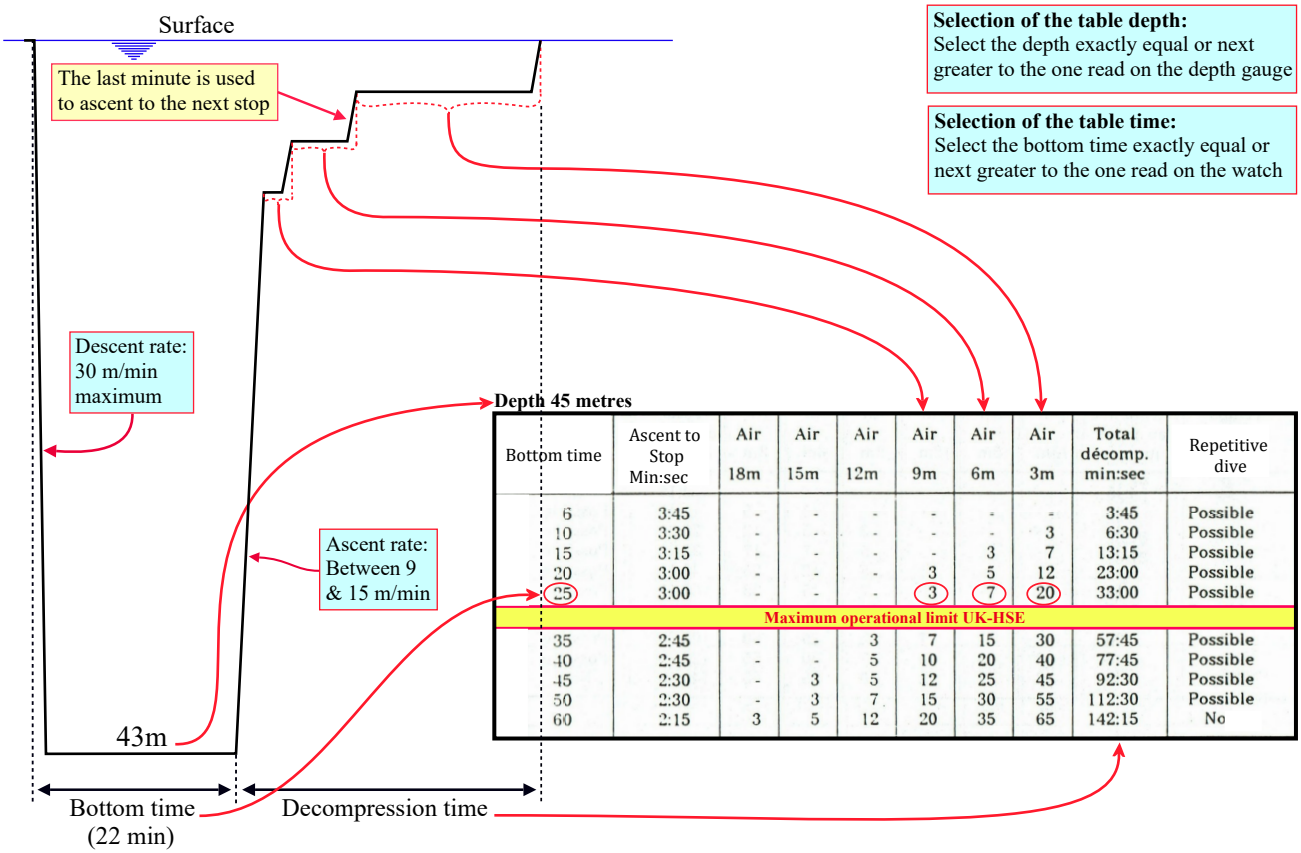
Each table displays the following information:

- Depth of the table selected in meters
- Bottom times in minutes
- Stop depths in meters & time to be performed at the indicated depth
- Total deco time
- Repetitive dive possible or not (no group)
- The operational limits IOGP and HSE have been integrated into the tables (see explanations point 10.1)

2.1.1 - Calculate the decompression using table #3

2.1.1.1 - Presentation

- The depth to select is the maximum depth reached by the diver during his dive. The supervisor must select the depth that is exactly equal to or next greater than the one read on the depth gauge.
- The rate of descent must not exceed 30 metres per minute
- The bottom time is the time between the moment where the diver leaves the surface and the moment where he leaves the bottom. The bottom time to select is exactly equal to or greater than the one indicated on the watch. The supervisor must always use a time from an adjustment table in the case where the diver exceeds the anticipated time on the bottom. For this reason, the last time available in the table should not normally be used.
- The ascent to the first stop (or to the surface) must be accomplished at a rate between 9 and 15 metres per minute. The times of ascent indicated in the decompression tables correspond to the rate of 12 metres per minute (3 m /15 sec.).
- The decompression depths are indicated in the ribbon between the columns “Ascent to stop” and “Total decompression”. The duration of the stops are in the columns below.
- The stop time begins as soon as the diver arrives at the depth for this stop. The last minute of the stop time is used for ascent to the following stop (or to the surface). Note that the diver(s) must not work or be exposed to difficult environmental conditions (strong current, waves) during the stops.
- The “Total decompression” is the addition of the ascent and the stops.



Depth 45 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
6	3:45	-	-	-	-	-	-	3:45	Possible
10	3:30	-	-	-	-	-	3	6:30	Possible
15	3:15	-	-	-	-	3	7	13:15	Possible
20	3:00	-	-	-	3	5	12	23:00	Possible
25	3:00	-	-	-	3	7	20	33:00	Possible
Maximum operational limit UK-HSE									
35	2:45	-	-	3	7	15	30	57:45	Possible
40	2:45	-	-	5	10	20	40	77:45	Possible
45	2:30	-	3	5	12	25	45	92:30	Possible
50	2:30	-	3	7	15	30	55	112:30	Possible
60	2:15	3	5	12	20	35	65	142:15	No

To help the supervisor, the maximum operational limits UK-HSE have been introduced in the original tables (Table #3). According to the recommendations from Doctors Shields and Lee, the bottom times beyond this limit should not be used, except in the case of an emergency.
Note that a dive beyond the limit will be considered an incident by some clients such as IOGP members.

Depth 12 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
165	1:00	-	-	-	-	-	-	1:00	Possible
170	0:45	-	-	-	-	-	3	3:45	Possible
180	0:45	-	-	-	-	-	5	5:45	Possible
210	0:45	-	-	-	-	-	10	10:45	No
240	0:45	-	-	-	-	-	15	15:45	No
Maximum operational limit UK-HSE									
270	0:45	-	-	-	-	-	25	25:45	No
300	0:45	-	-	-	-	-	30	30:45	No
330	0:45	-	-	-	-	-	35	35:45	No
360	0:45	-	-	-	-	-	40	40:45	No

Normal diving conditions

To be used in case of an emergency

2.1.1.2 - Make sure of the corresponding bottom times in the surface O2 decompression table

As explained in point 3.4.3 of Chapter A of Book #2, before starting a diving operation using in-water decompression, the corresponding surface oxygen decompression table must be ready.
The study of MT 92/2019 tables shows that the surface decompression table offers fewer bottom times and depths than the in-water air decompression table. For this reason, before launching the in-water decompression dive, the supervisor must make sure that the decompression selected can be performed using the surface oxygen decompression table.

The table below shows a comparison of the bottom times of in-water and surface O_2 decompression tables.
It is considered good practice to have at least 2 recovery tables. Also consider the reinforcement safety procedure.

Depth	*Bottom times Standard air table*	*Bottom times Surface Oxygen deco. table*	*UK-HSE bottom time limits*	*Comments*
12 m	165 to 360 min	180 to 360 min	240 min	
15 m	80 to 270 min	90 to 180 min	180 min	The surface O2 deco table is limited to 180 min that is also the UK-HSE bottom time limit. Manage to have at least 1 recovery table as the last time is 30 min. Nevertheless 2 recovery tables is better. Also, take this problem into consideration if the safety procedure selected is one additional bottom time.
18 m	50 to 210 min	60 to 150 min	120 min	4 bottom times are missing in the surface deco. table. Nevertheless there are 3 bottom times after the UK-HSE bottom time limit.
21 m	35 to 180 min	40 to 120 min	90 min	4 bottom times are missing in the surface deco. table. Nevertheless there is 3 bottom times after the UK-HSE bottom time limit.
24 m	25 to 150 min	30 to 90 min	70 min	6 bottom times are missing in the surface deco. table. Only 2 bottom times after theUK-HSE bottom time limit. Take this problem into consideration if the safety procedure selected is one additional bottom time.
27 m	20 to 130 min	25 to 70 min	60 min	6 bottom times are missing in the surface deco. Table. Only 1 bottom time after the UK-HSE bottom time limit. Take this problem into consideration if the safety procedure selected is one additional bottom time.
30 m	15 to 110 min	20 to 60 min	50 min	5 bottom times are missing in the surface deco. table. Only 1 bottom time after the UK-HSE bottom time limit. Take this problem into consideration if the safety procedure selected is one additional bottom time.
33 m	12 to 100 min	15 to 60 min	40 min	4 bottom times are missing in the surface deco. table.
36 m	10 to 90 min	15 to 50 min	35 min	4 bottom times are missing in the surface deco. table.
39 m	8 to 80 min	10 to 40 min	30 min	5 bottom times are missing in the surface deco. table. Only 2 bottom times after the UK-HSE bottom time limit.
42 m	7 to 70 min	10 to 40 min	30 min	4 bottom times are missing in the surface deco. able. Only 2 bottom times after the UK-HSE bottom time limit.

Depth	*Bottom times Standard air table*	*Bottom times Surface Oxygen deco. table*	*UK-HSE bottom time limits*	*Comments*
45 m	6 to 60 min	10 to 30 min	25 min	4 bottom times are missing in the surface deco. table. Only 1 bottom time after the UK-HSE bottom time limit. Take this problem into consideration if the safety procedure selected is one additional bottom time.
48 m	5 to 60 min	10 to 30 min	25 min	5 bottom times are missing in the surface deco. table. Only 1 bottom time after the UK-HSE bottom time limit. Take this problem into consideration if the safety procedure selected is one additional bottom time.
51 m	5 to 50 min	10 to 30 min	20 min	4 bottom times are missing in the surface deco. table. Only 2 bottom times after the UK-HSE bottom time limit. There is no surface decompression table below this level: Limit the depth to have at least 1 recovery table. Take this problem into consideration if the safety procedure selected is one additional depth.
54 m	5 to 45 min	No table	Beyond the limit	No surface O2 decompression table.
57 m	5 to 40 min	No table	Beyond the limit	No surface O2 decompression table.
60 m	5 to 35 min	No table	Beyond the limit	No surface O2 decompression table.

2.1.1.3 - Standard air tables (Table 3)

Depth 12 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
165	1:00	-	-	-	-	-	-	1:00	Possible
170	0:45	-	-	-	-	-	3	3:45	Possible
180	0:45	-	-	-	-	-	5	5:45	Possible
210	0:45	-	-	-	-	-	10	10:45	No
240	0:45	-	-	-	-	-	15	15:45	No
Maximum operational limit UK-HSE									
270	0:45	-	-	-	-	-	25	25:45	No
300	0:45	-	-	-	-	-	30	30:45	No
330	0:45	-	-	-	-	-	35	35:45	No
360	0:45	-	-	-	-	-	40	40:45	No

Depth 15 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
80	1:15	-	-	-	-	-	-	1:15	Possible
90	1:00	-	-	-	-	-	3	4:00	Possible
100	1:00	-	-	-	-	-	5	6:00	Possible
110	1:00	-	-	-	-	-	7	8:00	Possible
120	1:00	-	-	-	-	-	12	13:00	Possible
130	1:00	-	-	-	-	-	15	16:00	Possible
140	1:00	-	-	-	-	-	20	21:00	Possible
150	1:00	-	-	-	-	-	25	26:00	Possible
160	1:00	-	-	-	-	-	25	26:00	No
170	1:00	-	-	-	-	-	30	31:00	No
180	1:00	-	-	-	-	-	35	36:00	No
Maximum operational limit UK-HSE									
210	1:00	-	-	-	-	-	45	46:00	No
240	1:00	-	-	-	-	-	60	61:00	No
270	1:00	-	-	-	-	-	70	71:00	No

WARNING:
The corresponding surface decompression table is limited to 180 minutes of bottom time. **Do not select bottom times beyond 170 min** to have at least 1 recovery table available in the surface decompression table (surf. deco table last bottom times are 150 and 180 min)
Note that it is wiser to have 2 recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 18 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
50	1:30	-	-	-	-	-	-	1:30	Possible
55	1:15	-	-	-	-	-	3	4:15	Possible
60	1:15	-	-	-	-	-	5	6:15	Possible
70	1:15	-	-	-	-	-	7	8:15	Possible
80	1:15	-	-	-	-	-	15	16:15	Possible
90	1:15	-	-	-	-	-	20	21:15	Possible
100	1:15	-	-	-	-	-	25	26:15	Possible
110	1:15	-	-	-	-	-	30	31:15	Possible
120	1:15	-	-	-	-	-	35	36:15	Possible
Maximum operational limit UK-HSE									
130	1:00	-	-	-	-	3	40	44:00	Possible
140	1:00	-	-	-	-	5	45	51:00	Possible
150	1:00	-	-	-	-	7	50	58:00	Possible
160	1:00	-	-	-	-	10	50	61:00	Possible
170	1:00	-	-	-	-	12	55	68:00	Possible
180	1:00	-	-	-	-	15	60	76:00	Non
210	1:00	-	-	-	-	20	70	91:00	Non

Depth 21 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
35	1:45	-	-	-	-	-	-	1:45	Possible
40	1:30	-	-	-	-	-	3	4:30	Possible
45	1:30	-	-	-	-	-	5	6:30	Possible
50	1:30	-	-	-	-	-	7	8:30	Possible
60	1:30	-	-	-	-	-	15	16:30	Possible
70	1:30	-	-	-	-	-	20	21:30	Possible
80	1:15	-	-	-	-	3	25	29:15	Possible
90	1:15	-	-	-	-	5	30	36:15	Possible
Maximum operational limit UK-HSE									
100	1:15	-	-	-	-	7	35	43:15	Possible
110	1:15	-	-	-	-	10	40	51:15	Possible
120	1:15	-	-	-	-	15	45	61:15	Possible
130	1:15	-	-	-	-	20	50	71:15	Possible
140	1:15	-	-	-	-	25	55	81:15	Possible
150	1:00	-	-	-	3	25	60	89:00	No
180	1:00	-	-	-	5	40	75	121:00	No

Depth 24 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
25	2:00	-	-	-	-	-	-	2:00	Possible
30	1:45	-	-	-	-	-	3	4:45	Possible
35	1:45	-	-	-	-	-	5	6:45	Possible
40	1:45	-	-	-	-	-	7	8:45	Possible
45	1:45	-	-	-	-	-	10	11:45	Possible
50	1:45	-	-	-	-	-	15	16:45	Possible
60	1:30	-	-	-	-	3	20	24:30	Possible
70	1:30	-	-	-	-	5	30	36:30	Possible
Maximum operational limit UK-HSE									
80	1:30	-	-	-	-	10	35	46:30	Possible
90	1:30	-	-	-	-	15	40	56:30	Possible
100	1:15	-	-	-	3	20	45	69:15	Possible
110	1:15	-	-	-	3	25	50	79:15	Possible
120	1:15	-	-	-	3	30	60	94:15	Possible
130	1:15	-	-	-	5	30	65	101:15	Possible
140	1:15	-	-	-	10	35	70	116:15	No
150	1:15	-	-	-	10	40	75	126:15	No

Depth 27 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
20	2:15	-	-	-	-	-	-	2:15	Possible
25	2:00	-	-	-	-	-	3	5:00	Possible
30	2:00	-	-	-	-	-	5	7:00	Possible
35	2:00	-	-	-	-	-	10	12:00	Possible
40	1:45	-	-	-	-	3	12	16:45	Possible
45	1:45	-	-	-	-	3	15	19:45	Possible
50	1:45	-	-	-	-	5	20	26:45	Possible
60	1:45	-	-	-	-	7	30	38:45	Possible
Maximum operational limit UK-HSE									
70	1:45	-	-	-	3	12	35	51:45	Possible
80	1:30	-	-	-	3	17	40	61:30	Possible
90	1:30	-	-	-	5	25	50	81:30	Possible
100	1:30	-	-	-	10	30	55	96:30	Possible
110	1:30	-	-	-	12	30	65	108:30	Possible
120	1:30	-	-	-	15	35	70	121:30	Possible
130	1:15	-	-	3	20	40	75	139:15	No

WARNING:
The corresponding surface decompression table is limited to 70 min bottom time. **Do not select bottom times beyond 60 min** to have at least 1 recovery table available in the surface decompression procedure.
Note that it is wiser to have 2 recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 30 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
15	2:30	-	-	-	-	-	-	2:30	Possible
20	2:15	-	-	-	-	-	3	5:15	Possible
25	2:15	-	-	-	-	-	5	7:15	Possible
30	2:15	-	-	-	-	-	10	12:15	Possible
35	2:00	-	-	-	-	3	12	17:00	Possible
40	2:00	-	-	-	-	5	17	24:00	Possible
45	2:00	-	-	-	-	7	20	29:00	Possible
50	2:00	-	-	-	-	10	25	37:00	Possible
Maximum operational limit UK-HSE									
60	1:45	-	-	-	3	15	35	54:45	Possible
70	1:45	-	-	-	5	20	40	66:45	Possible
80	1:45	-	-	-	10	25	50	86:45	Possible
90	1:30	-	-	3	12	30	60	106:30	Possible
100	1:30	-	-	3	17	35	65	121:30	Possible
110	1:30	-	-	3	20	40	75	139:30	No

WARNING:
The corresponding surface decompression table is limited to 60 min bottom time. **Do not select bottom times beyond 50 min** to have at least 1 recovery table available in the surface decompression procedure.
Note that it is wiser to have 2 recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 33 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
12	2:45	-	-	-	-	-	-	2:45	Possible
15	2:30	-	-	-	-	-	3	5:30	Possible
20	2:30	-	-	-	-	-	5	7:30	Possible
25	2:15	-	-	-	-	3	7	12:15	Possible
30	2:15	-	-	-	-	3	12	17:15	Possible
35	2:15	-	-	-	-	5	15	22:15	Possible
40	2:00	-	-	-	3	7	20	32:00	Possible
Maximum operational limit UK-HSE									
45	2:00	-	-	-	3	10	25	40:00	Possible
50	2:00	-	-	-	5	15	30	52:00	Possible
60	2:00	-	-	-	10	20	40	72:00	Possible
70	1:45	-	-	3	12	25	50	91:45	Possible
80	1:45	-	-	3	15	30	60	109:45	Possible
90	1:45	-	-	5	20	35	65	126:45	Possible
100	1:45	-	-	10	25	40	75	151:45	No

Depth 36 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
10	3:00	-	-	-	-	-	-	3:00	Possible
15	2:45	-	-	-	-	-	3	5:45	Possible
20	2:45	-	-	-	-	-	7	9:45	Possible
25	2:30	-	-	-	-	3	12	17:30	Possible
30	2:30	-	-	-	-	5	17	24:30	Possible
35	2:15	-	-	-	3	10	20	35:15	Possible
Maximum operational limit UK-HSE									
40	2:15	-	-	-	3	12	25	42:15	Possible
45	2:15	-	-	-	5	15	30	52:15	Possible
50	2:00	-	-	3	7	20	35	67:00	Possible
60	2:00	-	-	3	12	25	45	87:00	Possible
70	2:00	-	-	5	15	30	55	107:00	Possible
80	2:00	-	-	7	20	35	65	129:00	Possible
90	1:45	-	3	12	25	40	75	156:45	No

Depth 39 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
8	3:15	-	-	-	-	-	-	3:15	Possible
10	3:00	-	-	-	-	-	3	6:00	Possible
15	3:00	-	-	-	-	-	5	8:00	Possible
20	2:45	-	-	-	-	3	7	12:45	Possible
25	2:45	-	-	-	-	5	15	22:45	Possible
30	2:30	-	-	-	3	7	20	32:30	Possible
Maximum operational limit UK-HSE									
35	2:30	-	-	-	5	10	25	42:30	Possible
40	2:15	-	-	3	7	15	30	57:15	Possible
45	2:15	-	-	3	10	20	35	70:15	Possible
50	2:15	-	-	3	10	25	45	85:15	Possible
60	2:15	-	-	5	15	30	55	107:15	Possible
70	2:00	-	3	10	20	35	65	135:00	Possible
80	2:00	-	3	12	25	40	75	157:00	No

Depth 42 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
7	3:30	-	-	-	-	-	-	3:30	Possible
10	3:15	-	-	-	-	-	3	6:15	Possible
15	3:00	-	-	-	-	3	5	11:00	Possible
20	3:00	-	-	-	-	3	12	18:00	Possible
25	2:45	-	-	-	3	7	17	29:45	Possible
30	2:45	-	-	-	5	10	25	42:45	Possible
Maximum operational limit UK-HSE									
35	2:30	-	-	3	7	15	30	57:30	Possible
40	2:30	-	-	3	10	20	35	70:30	Possible
45	2:30	-	-	5	12	25	40	84:30	Possible
50	2:30	-	-	5	15	25	45	92:30	Possible
60	2:15	-	3	10	17	30	60	122:15	Possible
70	2:15	-	5	12	25	40	75	159:15	No

Depth 45 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
6	3:45	-	-	-	-	-	-	3:45	Possible
10	3:30	-	-	-	-	-	3	6:30	Possible
15	3:15	-	-	-	-	3	7	13:15	Possible
20	3:00	-	-	-	3	5	12	23:00	Possible
25	3:00	-	-	-	3	7	20	33:00	Possible
Maximum operational limit UK-HSE									
35	2:45	-	-	3	7	15	30	57:45	Possible
40	2:45	-	-	5	10	20	40	77:45	Possible
45	2:30	-	3	5	12	25	45	92:30	Possible
50	2:30	-	3	7	15	30	55	112:30	Possible
60	2:15	3	5	12	20	35	65	142:15	No

WARNING:
The corresponding surface decompression table is limited to 30 min bottom time. **Do not select bottom times beyond 20 min** to have at least 1 recovery table available in the surface decompression procedure. For the same reason, this depth should be the last depth as **there is no surface decompression table available beyond 51 m.**
Note that it is wiser to have 2 recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 48 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
5	4:00	-	-	-	-	-	-	4:00	Possible
10	3:45	-	-	-	-	-	5	8:45	Possible
15	3:30	-	-	-	-	3	7	13:30	Possible
20	3:15	-	-	-	3	7	15	28:15	Possible
25	3:15	-	-	-	5	10	20	38:15	Possible
Maximum operational limit UK-HSE									
30	3:00	-	-	3	7	15	30	58:00	Possible
35	3:00	-	-	5	10	20	35	73:00	Possible
40	2:45	-	3	7	15	25	45	97:45	Possible
45	2:45	-	5	10	17	30	50	114:45	Possible
50	2:30	3	5	10	20	30	60	130:30	Possible
60	2:30	3	7	15	25	40	75	167:30	No

WARNING:
The corresponding surface decompression table is limited to 30 min bottom time. **Do not select bottom times beyond 25 min** to have at least 1 recovery table available in the surface decompression table.
Also, there is no surface decompression table available beyond 51 metres.
Note that it is wiser to have 2 recovery tables.

Depth 51 metres

Warning: The maximum operational depth HSE/IOGP is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
5	4:15	-	-	-	-	-	-	4:15	Possible
10	3:45	-	-	-	-	3	5	11:45	Possible
15	3:30	-	-	-	3	5	12	23:30	Possible
20	3:30	-	-	-	5	7	17	32:30	Possible
Maximum operational limit UK-HSE									
25	3:15	-	-	3	5	12	25	48:15	Possible
30	3:15	-	-	5	7	15	35	65:15	Possible
35	3:00	-	3	5	10	20	40	81:00	Possible
40	3:00	-	5	7	15	25	50	105:00	Possible
45	2:45	3	5	10	17	30	55	122:45	Possible
50	2:45	3	7	12	20	35	65	144:45	No

WARNING:
There is no surface decompression table available beyond this limit.
Also, consider this if the safety procedure selected is one additional depth.

Depth 54 metres

Warning: The maximum operational depth UK-HSE is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
5	4:15	-	-	-	-	-	3	7:15	No
10	4:00	-	-	-	-	3	7	14:00	No
15	3:45	-	-	-	3	5	12	23:45	No
20	3:30	-	-	3	5	10	17	38:30	No
25	3:30	-	-	5	7	15	30	60:30	No
30	3:15	-	3	5	10	20	35	76:15	No
35	3:15	-	5	7	12	25	45	97:15	No
40	3:00	3	5	10	15	30	55	121:00	No
45	3:00	5	7	12	20	35	60	142:00	No

WARNING: There is no surface decompression table available for this depth.

Depth 57 metres

Warning: The maximum operational depth UK-HSE is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
5	4:30	-	-	-	-	-	3	7:30	No
10	4:15	-	-	-	-	3	7	14:15	No
15	4:00	-	-	-	3	7	15	29:00	No
20	3:45	-	-	3	5	10	20	41:45	No
25	3:30	-	3	5	7	15	30	63:30	No
30	3:30	-	3	7	10	20	40	83:30	No
35	3:15	3	5	7	15	25	50	108:15	No
40	3:15	3	7	10	20	30	60	133:15	No

WARNING: There is no surface decompression table available for this depth.

Depth 60 metres

Warning: The maximum operational depth UK-HSE is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
5	4:45	-	-	-	-	-	5	9:45	No
10	4:15	-	-	-	3	5	7	19:15	No
15	4:00	-	-	3	5	7	15	34:00	No
20	4:00	-	-	5	7	12	25	53:00	No
25	3:45	-	3	5	10	20	35	76:45	No
30	3:30	3	5	7	12	25	45	100:30	No
35	3:30	3	5	10	15	30	55	121:30	No

WARNING: There is no surface decompression table available for this depth.

2.1.2 - Table 1 and Table 2

Table 3, that is described in point 4.1.1 *(see the previous page)*, should be used to calculate the decompressions. It allows managing dives from 12 m to 60 m.

Shallow depths above 12 m are not indicated in Table 3. The main reason is that these depths are not calling for decompression. Nevertheless, a table is necessary to manage shallow dives above 12 m. For this reason, Table 1 "No-decompression limits for air diving" is provided. Table 1 should also be used to apply when reinforcing the decompression ("Jesus procedure" described by Doctor Shields & Lee) above 12 m *(see point 4.5)*.

The depth indicated in this table are from 7.5 m to 51 m. The no-decompression limits are indicated for surface intervals of 12 hours, 6 hours, and 4 hours. Note that the maximum UK-HSE bottom time above 12 m is limited to 240 minutes (4 hrs). Also, note that a repetitive dive should not be performed except, in the case of an emergency.

Table 1

Depth	Surface interval		
	12 h 00	6 h 00	4 h 00
7,5 m	No limit	No limit	No limit
9,0 m	360 min	330 min	300 min
10,5 m	270 min	250 min	240 min
12 m	165 min	150 min	135 min
13,5 m	100 min	90 min	90 min
15 m	80 min	70 min	60 min
18 m	50 min	40 min	35 min
21 m	35 min	25 min	20 min
24 m	25 min	20 min	10 min
27 m	20 min	15 min	10 min
30 m	15 min	10 min	5 min
33 m	12 min	7 min	2 min
36 m	10 min	5 min	-
39 m	8 min	3 min	-
42 m	7 min	2 min	-
45 m	6 min	-	-
48 m	5 min	-	-
51 m	5 min	-	-

Reminder: - The maximum UK-HSE bottom time above 12 m is limited to 240 minutes
- The maximum depth UK-HSE is 50 m

Table 2 *(see below)* should not be used to manage the decompressions during the dive. Nevertheless, this table has the advantage to show the main decompression profiles in only one table. For this reason, it can be used to compare dive profiles and prepare the dive plans.

Note that the UK-HSE bottom time limits (From Doctors Shields and Lee) have been added to the original table.

Table 2

Depth	Maximum bottom times in minutes														IOGP limits
12 m	165	170	180	195	210	240	-	-	-	-	-	-	-	-	240 min.
15 m	80	90	100	110	115	130	-	-	-	-	-	-	-	-	180 min.
18 m	50	55	60	70	75	80	-	-	-	-	-	-	-	-	120 min.
21 m	35	40	45	50	55	60	-	-	-	75	-	-	-	-	90 min.
24 m	25	30	35	40	45	50	-	-	55	60	-	-	-	-	70 min.
27 m	20	25	30	33	35	-	-	40	45	48	-	55	-	-	60 min.
30 m	15	20	25	28	30	-	-	35	38	42	-	47	55	-	50 min.
33 m	12	15	20	23	-	-	25	30	32	37	-	40	47	-	40 min.
36 m	10	15	17	20	-	-	22	25	27	32	-	34	40	43	35 min.
39 m	8	10	15	17	-	-	20	22	24		27	30	35	38	30 min.
42 m	7	10	13	14	-	-	18	20	-	-	24	27	30	33	30 min.
45 m	6	10	12	13	-	-	15	18	-	-	22	25	28	30	25 min.
48 m	5	8	10	12	-	-	15	-	-	-	20	23	26	28	25 min.
51 m	5	7	8	-	-	-	12	-	-	-	18	21	24	25	20 min.
54 m	-	5	7	-	-	-	10	-	-	-	16	19	-	23	
57 m	-	5	6	-	-	-	10	-	-	-	14	17	-	21	
60 m	-	-	5	-	-	-	8	-	-	-	12	-	-	18	
Stops	**Ascent to first stop** (ascent at 12 m/min)														The UK-HSE maximum depth is 50 m
12m	-	-	-	-	-	-	-	-	-	-	-	-	-	3	
9m	-	-	-	-	-	-	-	-	-	-	3	3	5	5	
6m	-	-	-	-	-	-	3	3	3	3	5	7	10	12	
3m	-	3	5	7	10	15	7	12	15	20	15	20	25	25	

2.1.3 - Decompression safety procedure (Jesus procedure) implementation

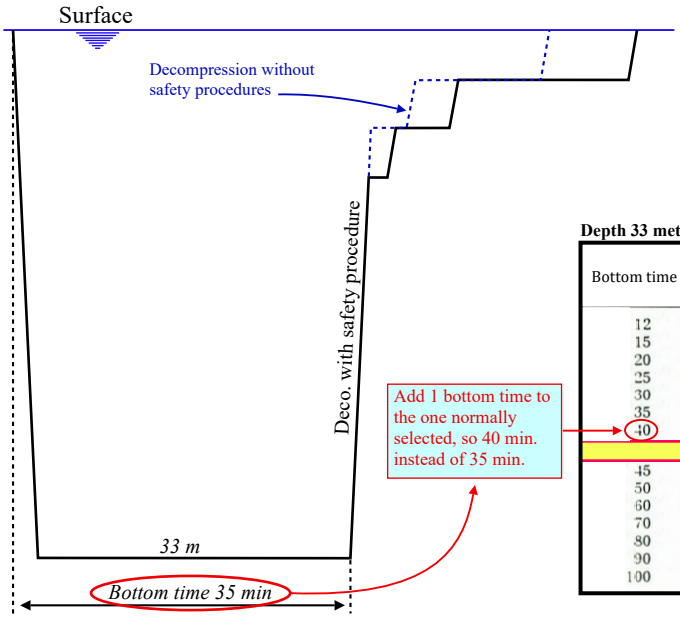
These reinforcements are based on the explanations provided in point 3.4.6, “Decompression safety procedure” of Book #2 of this handbook. The recommendation is to apply an additional bottom time or depth at a minimum except for light works performed in perfect diving conditions. It is also recommended to reinforce the decompression of divers older than 50 years. These reinforcements consist of shifting from 1 table to another to avoid miscalculations.

2.1.3.1 - Apply the safety procedure above 12 m depth

As explained point 4.1.2, shallow depths above 12 m are not indicated in Table 3. For this reason, dives above this level should be managed using Table 1.
No-stop dives up to 270 minutes are possible at 10.5 m, and longer no-decompression times are possible at shallower depths. Thus, reinforcements are usually unnecessary at very shallow depths. However, in the case of a safety procedure to be applied, the method that consists of applying one additional depth can be used. For example, for a dive between 7.5 and 9 m, apply a depth of 10.5 m, or for a dive between 9 m and 10.5 m, apply a depth of 12 m.

2.1.3.2 - Apply the safety procedure using table 3

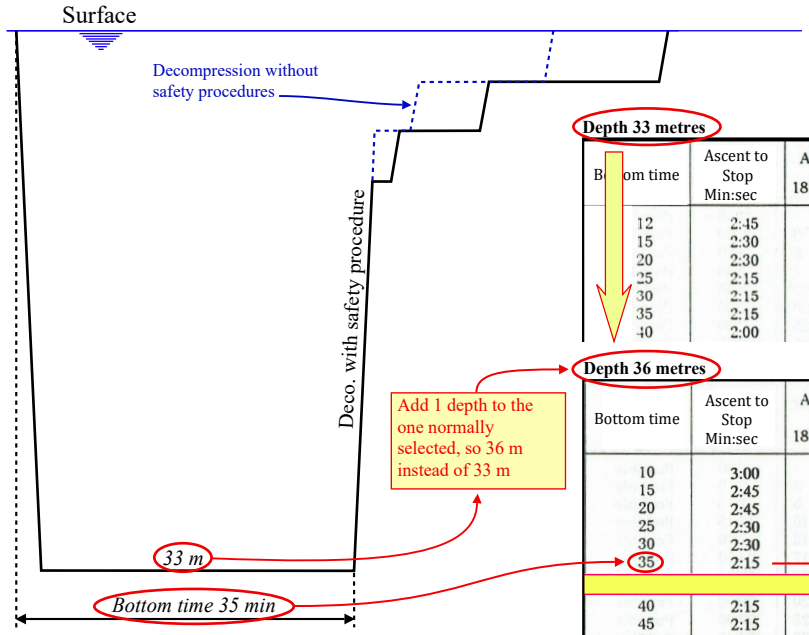
Three solutions are presented below that can be compared using the schemes: One additional bottom time, one additional depth, and a combination of the two procedures. This last method results in very long decompression and is applicable only for exceptionally difficult conditions.



Safety procedure: 1 additional bottom time.
Difference = + 9 minutes and 45 seconds

Depth 33 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
12	2:45	-	-	-	-	-	-	2:45	Possible
15	2:30	-	-	-	-	-	3	5:30	Possible
20	2:30	-	-	-	-	-	5	7:30	Possible
25	2:15	-	-	-	-	3	7	12:15	Possible
30	2:15	-	-	-	-	3	12	17:15	Possible
35	2:15	-	-	-	-	5	15	22:15	Possible
40	2:00	-	-	-	3	7	20	32:00	Possible
Maximum operational limit UK-HSE									
45	2:00	-	-	-	3	10	25	40:00	Possible
50	2:00	-	-	-	5	15	30	52:00	Possible
60	2:00	-	-	-	10	20	40	72:00	Possible
70	1:45	-	-	3	12	25	50	91:45	Possible
80	1:45	-	-	3	15	30	60	109:45	Possible
90	1:45	-	-	5	20	35	65	126:45	Possible
100	1:45	-	-	10	25	40	75	151:45	No



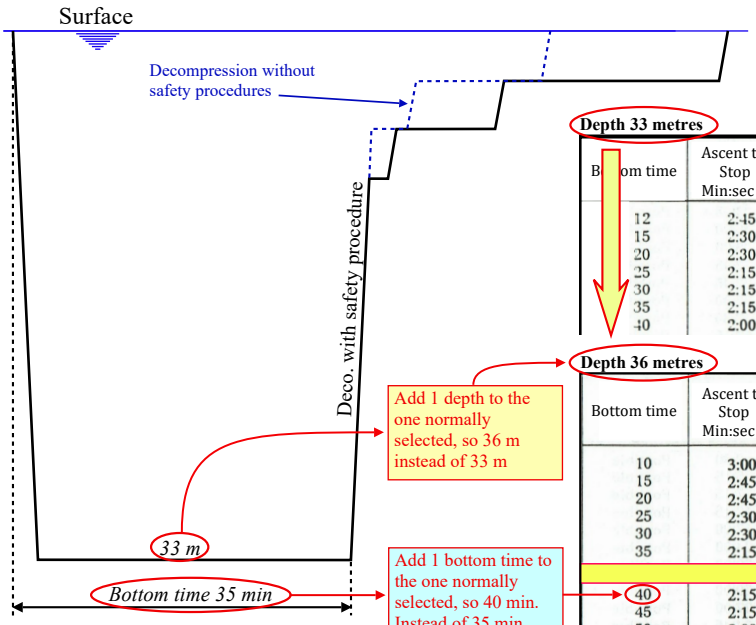
Safety procedure: 1 additional depth.
Difference = + 12 minutes and 45 seconds

Depth 33 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
12	2:45	-	-	-	-	-	-	2:45	Possible
15	2:30	-	-	-	-	-	3	5:30	Possible
20	2:30	-	-	-	-	-	5	7:30	Possible
25	2:15	-	-	-	-	3	7	12:15	Possible
30	2:15	-	-	-	-	3	12	17:15	Possible
35	2:15	-	-	-	-	5	15	22:15	Possible
40	2:00	-	-	-	3	7	20	32:00	Possible

Depth 36 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
10	3:00	-	-	-	-	-	-	3:00	Possible
15	2:45	-	-	-	-	-	3	5:45	Possible
20	2:45	-	-	-	-	-	7	9:45	Possible
25	2:30	-	-	-	-	3	12	17:30	Possible
30	2:30	-	-	-	-	5	17	24:30	Possible
35	2:15	-	-	-	3	10	20	35:15	Possible
Maximum operational limit UK-HSE									
40	2:15	-	-	-	3	12	25	42:15	Possible
45	2:15	-	-	-	5	15	30	52:15	Possible
50	2:00	-	-	3	7	20	35	67:00	Possible
60	2:00	-	-	3	12	25	45	87:00	Possible
70	2:00	-	-	5	15	30	55	107:00	Possible
80	2:00	-	-	7	20	35	65	129:00	Possible
90	1:45	-	3	12	25	40	75	156:45	No



Safety procedure: 1 additional depth + 1 additional bottom time

Difference = + 19 minutes and 45 seconds

Depth 33 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
12	2:45	-	-	-	-	-	-	2:45	Possible
15	2:30	-	-	-	-	-	3	5:30	Possible
20	2:30	-	-	-	-	-	5	7:30	Possible
25	2:15	-	-	-	-	3	7	12:15	Possible
30	2:15	-	-	-	-	3	12	17:15	Possible
35	2:15	-	-	-	-	5	15	22:15	Possible
40	2:00	-	-	-	3	7	20	32:00	Possible

Depth 36 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
10	3:00	-	-	-	-	-	-	3:00	Possible
15	2:45	-	-	-	-	-	3	5:45	Possible
20	2:45	-	-	-	-	-	7	9:45	Possible
25	2:30	-	-	-	-	3	12	17:30	Possible
30	2:30	-	-	-	-	5	17	24:30	Possible
35	2:15	-	-	-	3	10	20	35:15	Possible
Maximum operational limit UK-HSE									
40	2:15	-	-	-	3	12	25	42:15	Possible
45	2:15	-	-	-	5	15	30	52:15	Possible
50	2:00	-	-	3	7	20	35	67:00	Possible
60	2:00	-	-	3	12	25	45	87:00	Possible
70	2:00	-	-	5	15	30	55	107:00	Possible
80	2:00	-	-	7	20	35	65	129:00	Possible
90	1:45	-	3	12	25	40	75	156:45	No

Important: These procedures are reinforcements of the decompression, so a reinforcement of the actual bottom time and depth, which are limited by the “maximum operational limits UK-HSE”.
Prior to applying the safety procedure, make sure that the not reinforced bottom time for the actual depth is above this limit, then apply the safety procedure.

2.1.4 - Successive dives *(Repetitive dives)*

MT92/2019 considers that the residual nitrogen gradually reduces to a normal level over approximately 12 hours, so a diver planning to make a second dive within this period must calculate this residual nitrogen.
Please note that the IMCA organization, which previously prohibited repetitive dives for normal operations, has removed this rule from its recent guidelines.
However, it should be pointed out that some clients reject this new guidance and have maintained this rule. Even though the client's policy prohibits these practices for normal operations, it must be kept in mind that these procedures should be available to schedule an emergency dive at all times.

2.1.4.1 - Equivalent time method

The equivalent time method is used with air standard, Air/Oxy/6 m and Air/Oxy/12 m, breathing air or nitrox.
This method is prohibited with surface decompression tables.

This method can be used for a first repetitive dive after the first dive bearing the mention “Possible” in the column “Repetitive dive” of the decompression table.

Depth 12 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
165	1:00	-	-	-	-	-	-	1:00	Possible
170	0:45	-	-	-	-	-	3	3:45	Possible
180	0:45	-	-	-	-	-	5	5:45	Possible
210	0:45	-	-	-	-	-	10	10:45	No
240	0:45	-	-	-	-	-	15	15:45	No
Maximum operational limit HSE/IOGP									
270	0:45	-	-	-	-	-	25	25:45	No
300	0:45	-	-	-	-	-	30	30:45	No
330	0:45	-	-	-	-	-	35	35:45	No
360	0:45	-	-	-	-	-	40	40:45	No

The equivalent bottom time depends on the depth of the repetitive dive and the surface interval. It does not depend on the characteristics of the preceding dive.

The equivalent time is found in Table 11 *(see below)*. The procedure of calculation is as follows:

1. Select the depth of the repetitive dive
2. Select the surface interval
3. Read the time at the intersection of surface interval and repetitive dive depth columns.

Depth repetitive dive	2 Surface interval between: 0h00 0h29	0h30 0h44	0h45 0h59	1h00 1h29	1h30 1h59	2h00 2h59	3h00 3h59	4h00 4h59	5h00 5h59	6h00 11h59
1 12–15m	110	90	80	70	60	50	40	30	20	15
15–18m	85	70	60	55	50	40	30	20	10	10
18-20m	65	55	50	45	40	30	25	15	10	10
21-23m	55	45	45	40	35	25	20	15	10	10
24-26m	50	40	35	35	25	25	15	15	10	5
27-29m	45	35	35	30	25	20	15	10	10	5
30-32m	40	30	30	25	25	20	15	10	10	5
33-35m	35	30	25	25	20	20	15	10	5	5
36-38m	30	25	25	25	20	15	15	10	5	5
39-41m	30	25	25	20	20	15	10	10	5	5
42-44m	25	25	20	20	15	15	10	10	5	5
45-47m	25	20	20	20	15	15	10	10	5	5
48-50m	25	20	20	15	15	15	10	10	5	5
51m	25	20	20	15	15	10	10	5	5	5
	Time to add to the real bottom time									

4. Add this time *(Penalty)* to the actual bottom time to obtain the “bottom equivalent time” of the repetitive dive.
   Example: Actual bottom time of 170 min. + Penalty of 60 min.= Equivalent bottom time of 230 min.
5. This “equivalent bottom time” is used to select the decompression time using the actual depth of the repetitive dive.

Depth 12 metres

Actual bottom time = 170 min. *(See example)*

Equivalent bottom time = 230 min. *(See example)*

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
165	1:00	-	-	-	-	-	-	1:00	Possible
170	0:45	-	-	-	-	-	3	3:45	Possible
180	0:45	-	-	-	-	-	5	5:45	Possible
210	0:45	-	-	-	-	-	10	10:45	No
240	0:45	-	-	-	-	-	15	15:45	No
Maximum operational limit UK-HSE									
270	0:45	-	-	-	-	-	25	25:45	No
300	0:45	-	-	-	-	-	30	30:45	No
330	0:45	-	-	-	-	-	35	35:45	No
360	0:45	-	-	-	-	-	40	40:45	No

In this example, 15 minutes stop at 3 m should be performed for 170 min bottom time

2.1.4.2 - Added times method

This method is used with all decompression tables breathing air and/or with oxygen stops, except surface decompression tables. Note that this method may lead to longer decompression durations

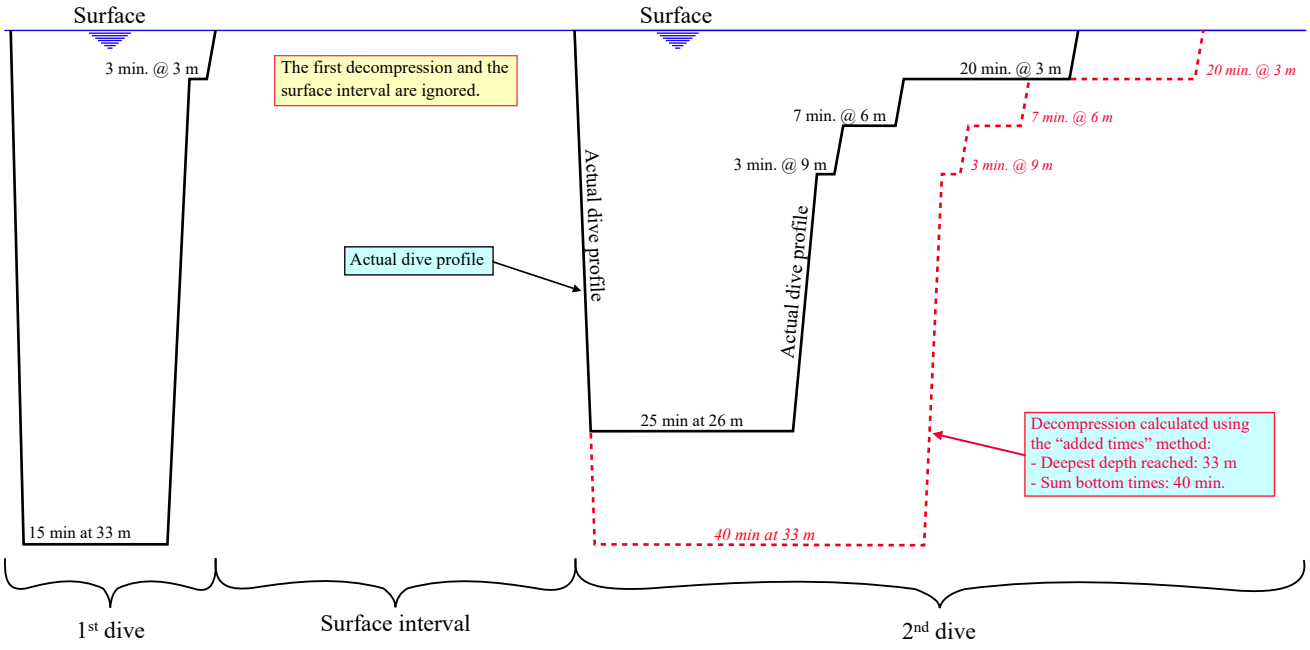
The method is based on the assumption that the two dives constitute one dive only. The first decompression and the surface interval are ignored.

To determine the repetitive dive decompression, consider:

1. A time equal to the sum of bottom times of the two dives
2. The deepest depth reached during the two dives

Example:

1st dive = 15 minutes at 33 m
2nd dive = 25 minutes at 26 m → - Deepest depth reached: 33 m - Sum bottom times: 40 min. → Decompression 2nd dive: 40 minutes at 33 m



2.1.5 - Multilevel diving (Also called “riser dives”)

A multilevel dive is a dive during which the bottom time is spent at two or more depths.
The multilevel procedure allows to calculate the decompression time of a dive that has been performed at different depths so that the diver can be decompressed according to an equivalent depth, resulting in a shorter decompression time than a decompression time based only on the maximum depth attained by the diver. Thus, this procedure considers that a dive spent at a given maximum depth followed by a shallower depth needs less decompression that a dive performed only at the deepest depth. However, this method has the following limitations:

- The levels must be sorted in decreasing depths (thus, in addition to the fact we do not recommend them for the reasons explained in , inverse profiles are not applicable)
- The last level depth should be deeper than first stop of the final decompression (Of course, the divers are not allowed to work during decompression stops).
- Take into account that many companies have banished the use of this procedure as a result of accidents due to miscalculations. For this reason, if it is decided to employ it, we recommend limiting it to only two steps.
- It is recommended to calculate the equivalent depth before the operation.

The table #8 below is used to calculate the equivalent depth. The procedure for using it is the following:

1. Determine the first working depth D1 and the associate bottom time T1 and enter the table with D1 and T1 and read the coefficient C1 at the intersection.
2. Determine the second working depth D2 and the associate bottom time T2 and enter the table with T2 and D2 and read the coefficient C2 at the intersection.
3. Add T1 to T2 to obtain the total bottom T3 which can be used to calculate the equivalent depth. If the exact value is not mentioned in the table, use the next greater values.
4. Add C1 to C2 to obtain the sum of the coefficient C3.
5. Use the table to determine the equivalent depth. Find T3 in the time column. Read across to find the coefficient equal to or next greater than C3. Then, follow the column up to read the equivalent depth.
6. Select the decompression table using this equivalent depth and T3 as bottom time.

Time spent at the work level	Work level depth														
	9 m	12m	15m	18m	21m (D2)	24m	27m	30m (D3)	33m	36m	39m	42m (D1)	45m	48m	51m
5 min	5	6	8	9	11	12	14	15	17	18	20	21	23	24	26
10 min	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51
15 min	14	18	23	27	31	36	41	45	50	54	59	63	68	72	77
T1 20 min	18	24	30	36	42	48	54	60	66	72	78	84 (C1)	90	96	102
25 min	23	30	38	45	52	60	68	75	83	90	98	105	113	120	128
T2 30 min	27	36	45	54	63 (C2)	72	81	90	99	108	117	126	135	144	153
40 min	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204
T3 50 min	45	60	75	90	105	120	135	150 (C3)	165	180	195	210	225	240	255
60 min	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306
70 min	63	84	105	126	147	168	189	210	231	252	273	294	315	336	357
80 min	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408
90 min	81	108	135	162	189	216	243	270	297	324	351	378	405	432	459
100 min	90	120	150	180	210	240	270	300	330	360	390	420	450	480	
110 min	99	132	165	198	231	264	297	330	363	396	429	462	495		
120 min	100	144	180	216	252	288	324	360	396	432	468	504			
130 min	117	156	195	234	273	312	351	390	429	468	507				
140 min	126	168	210	252	294	336	378	420	462	504					
150 min	135	180	225	270	315	360	405	450	495						
180 min	162	216	270	324	378	432	486	540							
210 min	189	252	315	378	441	504	567								
240 min	216	288	360	432	504	576									
270 min	243	324	405	486	567										
300 min	270	360	450	540											

2.1.6 - Depth correction for diving at altitude

Diving at altitude requires the adaptation of decompression tables due to the variation of surface atmospheric pressure. A commonly used procedure to calculate the necessary correction consists of calculating the "Equivalent depth" using the equation below, based on the ratio between the absolute ambient pressure at depth and the surface atmospheric pressure. Note that the equivalent depth is always more profound than the actual depth, and the decompression time is therefore always longer than at sea level.

$$Equivalent\ \ depth = \frac{Actual\ depth\ at\ dive\ site\ x\ Atmospheric\ pressure\ at\ sea\ level}{Atmospheric\ pressure\ at\ dive\ site}$$

Another problem due to the difference between the local and sea level atmospheric pressures is the variation of the reference pressure of bourdon tube depth gauges that results in degraded readings. As a result, the depth read at the gauge is shallower than the actual depth. This variation can be calculated in metres using the formula below:

10 x (atmospheric pressure sea level (bar) - atmospheric pressure worksite (bar)).

Add the calculated variation to the reading provided by the bourdon tube gauge to obtain the actual depth.
Note that electronic diving depth gauges display the real (actual) depths.

The decompression table adaptation is made by using the equivalent depth table below (Table #9), which can be used for initial or repetitive dives. Note that this procedure does not modify the ascent rate and stops of the equivalent table.
The procedure for finding the equivalent depth is as follows:

1. Determine the local altitude in metres (or actual atmospheric pressure in millibar or hPa).
2. Calculate the real depth of the dive in metres (see above).
3. On the table, read the equivalent depth at the crossing of the real depth and the altitude.
4. Use the equivalent table to implement the decompression of the diver.

Real depth	Altitude & atmospheric pressure					
	300-500m	500-1000m	1000-1500m	1500-2000m	2000-2500m	2500-3000m
	950 mbar	900 mbar	850 mbar	800 mbar	750 mbar	700 mbar
5 m	9 m	9 m	9 m	9 m	12 m	12 m
6 m	9 m	9 m	9 m	12 m	12 m	15 m
7 m	9 m	9 m	12 m	12 m	15 m	15 m
8 m	9 m	12 m	12 m	15 m	15 m	18 m
9 m	12 m	12 m	15 m	15 m	18 m	18 m
10 m	12 m	15 m	15 m	15 m	18 m	21 m
11 m	15 m	15 m	15 m	18 m	18 m	21 m
12 m	15 m	15 m	18 m	18 m	21 m	24 m
13 m	15 m	18 m	18 m	21 m	21 m	24 m
14 m	18 m	18 m	21 m	21 m	24 m	27 m
15 m	18 m	18 m	21 m	24 m	24 m	27 m
16 m	18 m	21 m	21 m	24 m	27 m	30 m
17 m	21 m	21 m	24 m	24 m	27 m	30 m
18 m	21 m	24 m	24 m	27 m	30 m	30 m
19 m	21 m	24 m	27 m	27 m	30 m	33 m
20 m	24 m	24 m	27 m	30 m	30 m	33 m
21 m	24 m	27 m	27 m	30 m	33 m	36 m
22 m	24 m	27 m	30 m	30 m	33 m	36 m
23 m	27 m	27 m	30 m	33 m	36 m	39 m
24 m	27 m	30 m	30 m	33 m	36 m	39 m
25 m	27 m	30 m	33 m	36 m	39 m	42 m
26 m	30 m	30 m	33 m	36 m	39 m	42 m
27 m	30 m	33 m	36 m	39 m	42 m	45 m
28 m	30 m	33 m	36 m	39 m	42 m	45 m
29 m	33 m	36 m	36 m	39 m	45 m	48 m
30 m	33 m	36 m	39 m	42 m	45 m	48 m
31 m	36 m	36 m	39 m	42 m	45 m	51 m
32 m	36 m	39 m	42 m	45 m	48 m	51 m
33 m	36 m	39 m	42 m	45 m	48 m	54 m
34 m	39 m	39 m	42 m	45 m	51 m	54 m
35 m	39 m	42 m	45 m	48 m	51 m	57 m
36 m	39 m	42 m	45 m	48 m	54 m	57 m
37 m	42 m	45 m	48 m	51 m	54 m	60 m
38 m	42 m	45 m	48 m	51 m	54 m	60 m
39 m	42 m	45 m	48 m	54 m	57 m	60 m
40 m	45 m	48 m	51 m	54 m	57 m	
41 m	45 m	48 m	51 m	54 m	60 m	
42 m	45 m	48 m	54 m	57 m	60 m	
43 m	48 m	51 m	54 m	57 m		
44 m	48 m	51 m	54 m	60 m		
45 m	48 m	54 m	57 m	60 m		
46 m	51 m	54 m	57 m	60 m		
47 m	51 m	54 m	60 m			
48 m	54 m	57 m	60 m			
49 m	54 m	57 m	60 m			
50 m	54 m	57 m				

2.1.7 - Depth correction for mud diving

The procedure for diving in the mud is provided to adapt the existing tables to conditions when the density of the water (or the liquid) is more elevated than average. That can happen when pouring concrete in closed reservoirs where there is no water circulation, operations in the bentonite, or merely diving operations in liquid mud, which occurs in some lakes and some parts of estuaries of rivers carrying large quantities of sediments.
An indicator that the density of the water is more elevated than usual is when the diver has difficulties coming down with the ballast he is used to. Another indicator is that the surface of the water looks heavier than usual, so it does not produce splashing like regular water. Note that due to the increased density of the liquid, the depth gauge does not provide the real depth, so the reading is more profound than the actual depth.
The MT92/2019 tables set provides an equivalent depth table (Table #10) that can be used to select the suitable air/oxy and standard air tables for diving with a liquid density varying from 1.1 to 1.4. Note that the equivalent table selected can be used for initial or successive dives. Also, its ascent rate, stop depths and stop durations are the same as diving in fresh and saltwater. However, note that this procedure is not suitable for surface decompression.
The procedure for calculating the equivalent table is as follows:

1. Calculate the water/mud density.
2. Check the real depth.
3. On the table, read the equivalent depth at the crossing of the real depth and the liquid density.
4. Use the equivalent depth to select the suitable decompression table.

Depth	Liquid density			
	1.1	1 1.2	1. 3	1.4
5 m	6 m	6 m	9 m	9 m
6 m	9 m	9 m	9 m	9 m
7 m	9 m	9 m	12 m	12 m
8 m	9 m	12 m	12 m	12 m
9 m	12 m	12 m	12 m	15 m
10 m	12 m	12 m	15 m	15 m
11 m	15 m	15 m	15 m	18 m
12 m	15 m	15 m	18 m	18 m
13 m	15 m	18 m	18 m	21 m
14 m	18 m	18 m	21 m	21 m
15 m	18 m	18 m	21 m	21 m
16 m	18 m	21 m	21 m	24 m
17 m	21 m	21 m	24 m	24 m
18 m	21 m	24 m	24 m	27 m
19 m	21 m	24 m	27 m	27 m
20 m	24 m	24 m	27 m	30 m
2 21 m	24 m	27 m 3	30 m	30 m
22 m	27 m	27 m	30 m	33 m
23 m	27 m	30 m	30 m	33 m
24 m	27 m	30 m	33 m	36 m
25 m	30 m	33 m	33 m	36 m
26 m	30 m	33 m	36 m	39 m
27 m	30 m	33 m	36 m	39 m
28 m	33 m	36 m	39 m	42 m
29 m	33 m	36 m	39 m	42 m
30 m	33 m	36 m	39 m	42 m
31 m	36 m	39 m	42 m	45 m
32 m	36 m	39 m	42 m	45 m
33 m	39 m	42 m	45 m	48 m
34 m	39 m	42 m	45 m	48 m
35 m	39 m	42 m	48 m	51 m
36 m	42 m	45 m	48 m	51 m
37 m	42 m	45 m	51 m	54 m
38 m	42 m	48 m	51 m	54 m
39 m	45 m	48 m	51 m	57 m
40 m	45 m	48 m	54 m	57 m
41 m	48 m	51 m	54 m	60 m
42 m	48 m	51 m	57 m	60 m
43 m	48 m	54 m	57 m	
44 m	51 m	54 m	60 m	
45 m	51 m	54 m	60 m	
46 m	51 m	57 m	60 m	
47 m	54 m	57 m		
48 m	54 m	60 m		
49 m	54 m	60 m		
50 m	57 m			

4 *Use the table 27 metres*

2.1.8 - Contingencies

The MT92 tables were studied during the end of the eighties. Some procedures today in force in the diving industry were not implemented during this period and were not provided in the original table. To update this point, the missing procedures have been covered by well-known practices, agreed upon by competent bodies or the diving community, and are easy to remember.

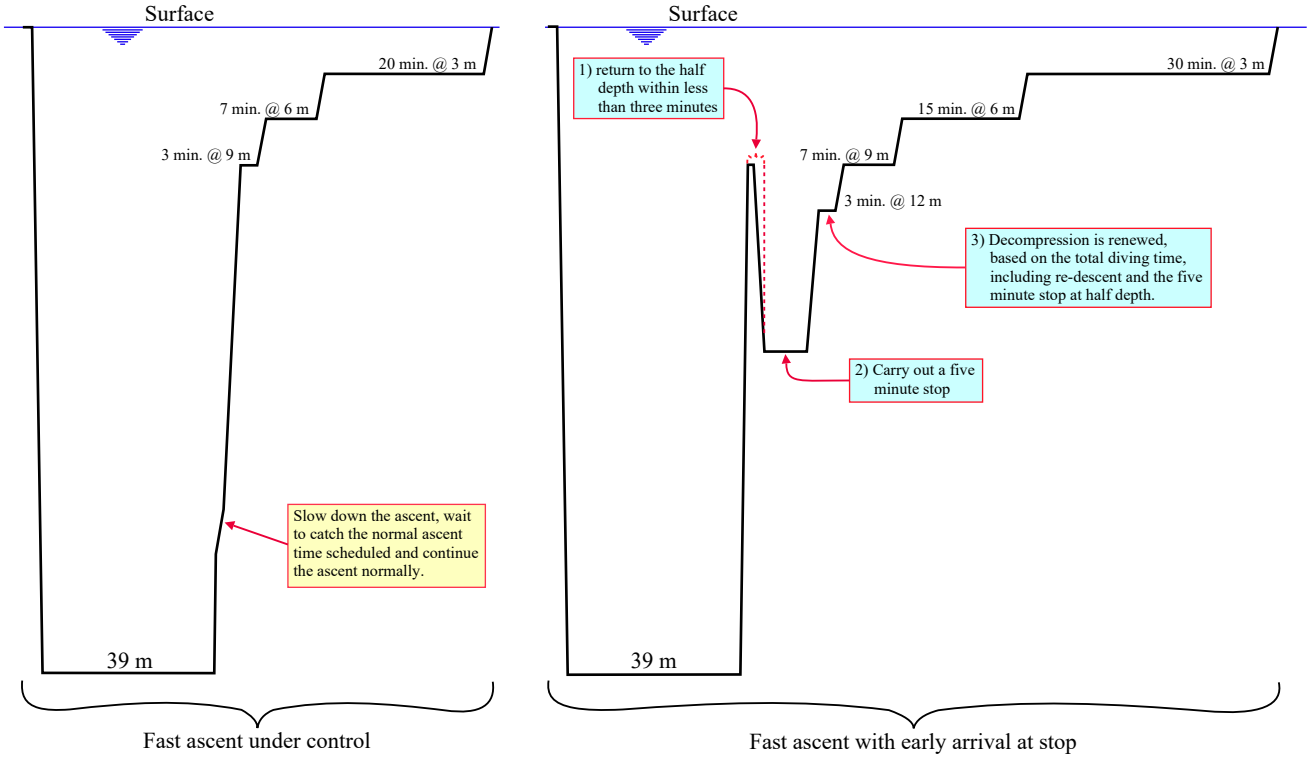
2.1.8.1 - Ascent to 1st stop too slow

Add the delay to the bottom time and decompress in accordance with the new bottom time.

2.1.8.2 - Ascent to 1st stop too fast

There are two possible scenarios:

- If of a short duration and detected sufficiently early, slow down the ascent, wait to catch the normal ascent time scheduled and continue the ascent normally.
- If the fast ascent has not been stopped sufficiently early, the diver returns to the half depth within less than three minutes and carries out a five minute stop. Decompression is renewed, based on the total diving time, including re-descent and the five minute stop at half depth. If there is no decompression, perform a safety stop 3min/3m. Observe the diver for signs of decompression sickness (DCS) and pulmonary barotrauma upon his arrival on deck, and keep him two hours in direct proximity of the chamber.



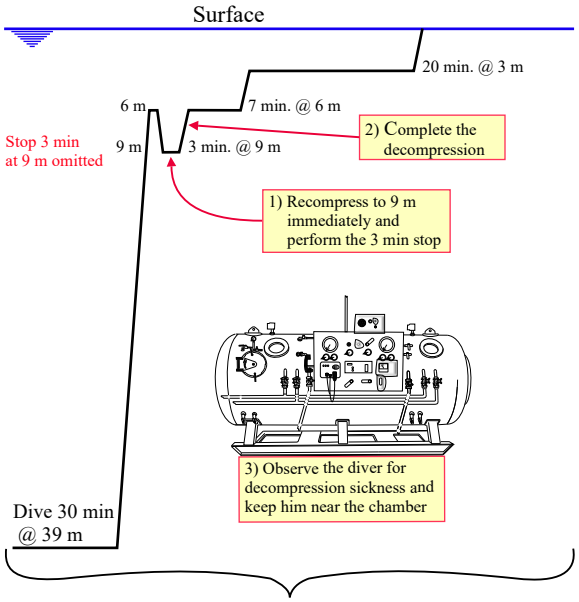
*2.1.8.3 - **Omitted decompression** (not associated with a blow-up)*

- *Recompression in chamber is not possible in less than 3 minutes:*

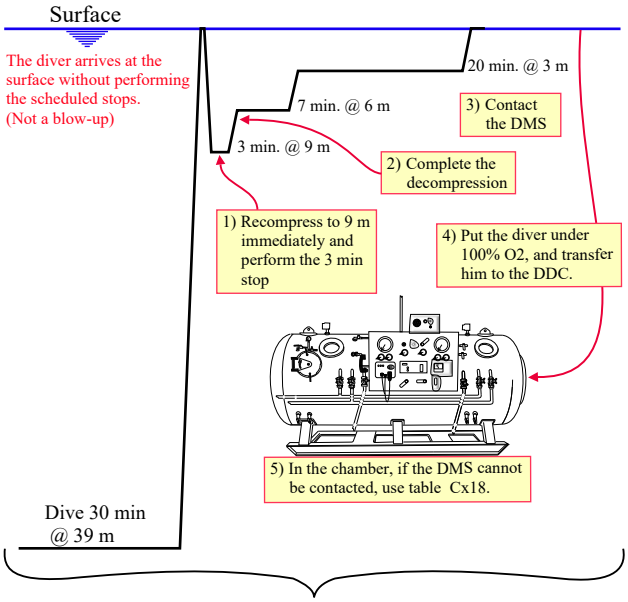
- If only one stop is omitted:
  Return the diver to the stop where the omission occurred in less than 3 minutes, perform this stop from the beginning and continue the decompression using the original schedule. Observe closely the diver for signs of decompression sickness upon his arrival on deck.
  Example: Following a dive of 30 minutes at 39 m, the standard air table calls for: 3 min. at 9 m, 7 min. at 6 m 20 min. at 3 m
  Due to an error, the 1st stop has not been performed and the diver arrives at the 6 m stop. *(Diver asymptomatic).*
  Reaction: Recompress immediately to 9 m for 3 min and complete all the stops scheduled. Upon the arrival of the diver on deck, observe for signs of decompression sickness.
- If more than one stop is omitted:
  Return the diver to the deeper omitted stop in less than 3 minutes. Perform all the omitted stops from the beginning and complete the total schedule. Upon the arrival of the diver on deck, put the diver under 100% O_2 and transfer him to Deck Decompression Chamber (DDC). Observe for signs of decompression sickness and pulmonary barotrauma and contact the Diving Medical Specialist (DMS).
  When in the chamber, follow the instructions from the diving medical specialist. If the communication with the diving medical specialist cannot be established (and only in this case), apply the procedure COMEX for omitted decompression that consists of using treatment table Cx18 Comex.

Example: Following a dive with the profile as in the example above, the diver arrives at the surface without performing the scheduled stops *(Diver is asymptomatic)*.

Reaction: Recompress to 9 m for 3 min and complete the total schedule. Then put the diver under 100% O_2 and transfer him to the DDC. Observe for signs of DCS and pulmonary barotrauma, contact the DMS, or apply treatment table Cx18 if the DMS cannot be contacted.



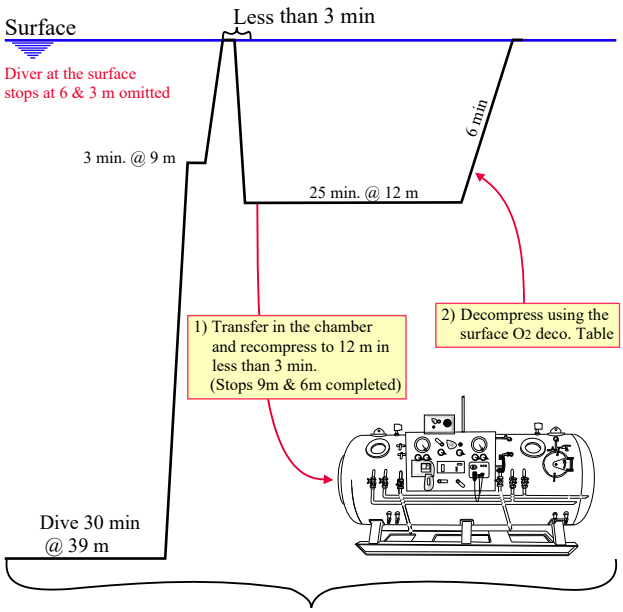
Only 1 stop omitted



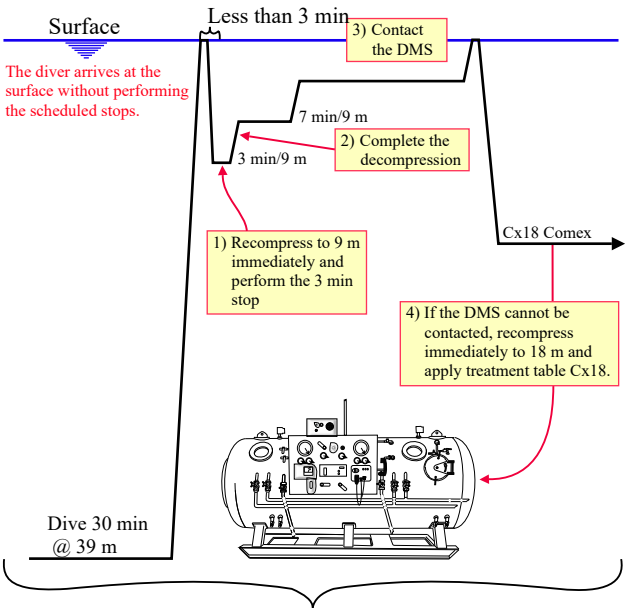
More than 1 stop omitted

- *Recompression in chamber possible in less than 3 minutes*:

- If only one stop is omitted:
  Return the diver to the stop where the omission occurred in less than 3 minutes, perform this stop from the beginning and continue the decompression using the original schedule. Observe closely the diver for signs of decompression sickness upon his arrival on deck.
- If more than one stop is omitted:
  - If the stop 9 m is completed and no previous decompression omitted, or the stops below 6 m not scheduled, recompress the diver at 12 m in the chamber in less than 3 min and decompress him using the surface O2. decompression table. Observe for signs of decompression sickness (DCS) and pulmonary barotrauma. If the interval is more than 3 minutes contact the DMS and treat for too long surface interval.
  - If the stops at 9 m and below are omitted, return the diver to the deeper omitted stop in less than 3 minutes. Perform all the omitted stops from the beginning and complete the total schedule. Then, transfer him to the DDC as soon as possible (less than 3 minutes). Observe for signs of decompression sickness and pulmonary barotrauma and contact the diving medical specialist.
    When in the chamber, follow the instructions from the diving medical specialist. If the communication with the diving medical specialist cannot be established (and only in this case), apply the procedure COMEX for omitted decompression that consists of using treatment table Cx18 Comex.



Stop 9 m completed or not scheduled

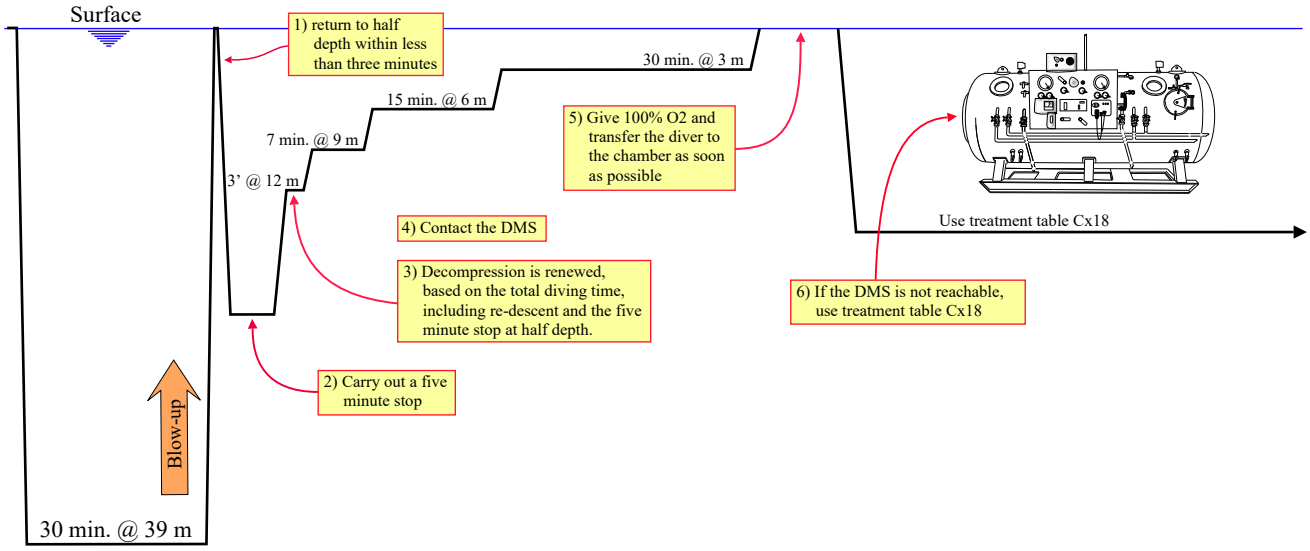


Stop 9 m and deeper not completed

2.1.8.4 - Blow up

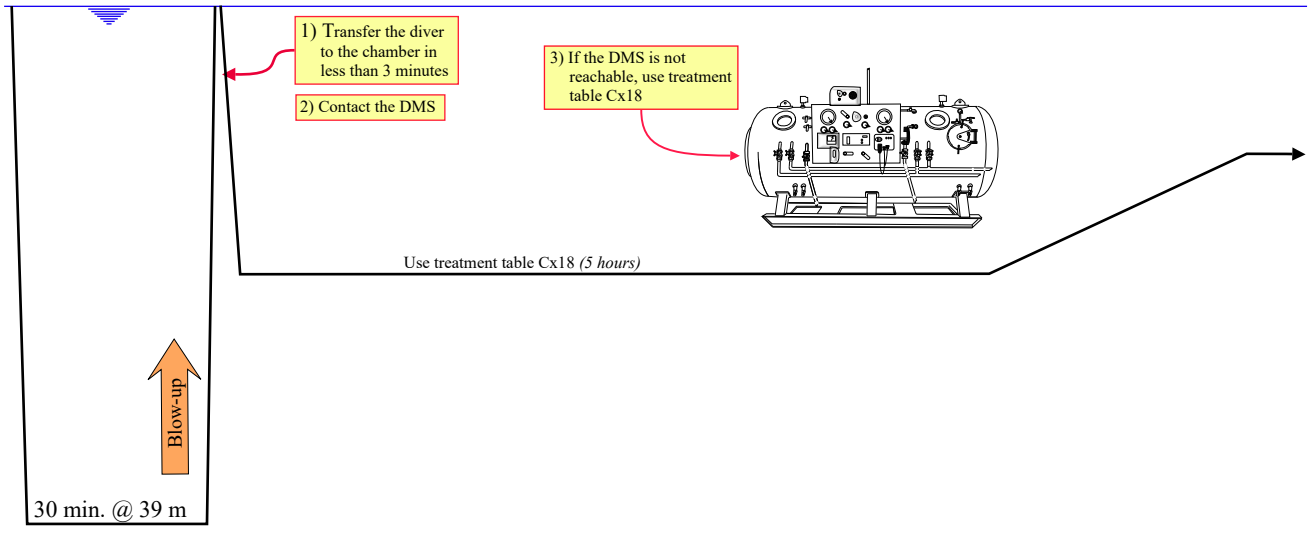
- *If the decompression chamber is not at direct proximity:*

- If the condition of the diver allows it, return to half depth in less than 3 minutes, carry out a 5 minute stop. Decompression is renewed, based on the total diving time, including re-descent and the five minute stop at half depth. If there is no stop scheduled, perform a stop 3 minutes at 3 m. When the diver is at the surface, give 100% O2 and transfer him to the chamber. Observe for signs of decompression sickness, and pulmonary barotrauma, and contact the diving medical specialist.
  When in the chamber, follow the instructions from the diving medical specialist. If the communication with the diving medical specialist cannot be established (and only in this case), apply the rule below:
  - Use treatment table Cx12 Comex if the depth of the dive is less than 9 m.
  - Use treatment table Cx18 Comex if the depth of the dive is more than 9 m.



- *If the decompression chamber is at direct proximity:*

- Transfer to the chamber as soon possible. Observe for signs of decompression sickness, and pulmonary barotrauma, and contact the diving medical specialist.
  Follow the instructions from the diving medical specialist. If the communication with the diving medical specialist cannot be established (and only in this case), apply the rule below:
  - Use treatment table Cx12 Comex if the depth of the dive is less than 9 m.
  - Use treatment table Cx18 Comex if the depth of the dive is more than 9 m.



2.1.8.5 - Important note regarding treatments of uncontrolled ascents and omitted decompressions

- Contact the Diving Medical Specialist as soon as possible. If the communication cannot be established, apply the preventive treatment tables that are indicated the procedures, and try to contact him.
  Note that the treatment tables indicated in the procedure are COMEX tables. Nevertheless, it may happen that the diving medical specialist prefers using USN treatment tables. In this case, table 5 USN can be used in place of Cx12 and table 6 USN can be used in place of Cx18. The selection of the treatment tables is the responsibility of the diving medical specialist and should be decided before starting the project.
- Examination for decompression illness and pulmonary barotrauma must performed before and during the preventive treatment.

- If there is suspicion of decompression illness or pulmonary barotrauma, and the diving medical specialist is not reachable, treat accordingly to "Decompression sickness", or "Pulmonary barotrauma".

2.1.8.6 - Delays in leaving a stop or between decompression stops

Remember that the last minute of the stop is used to ascent to the next stop.

- *When the delay happens at shallower than 12 m:*

- Ignore the delay, and complete the decompression normally.

- ***When the delay happens deeper than 12 m:***

- Recalculate the required decompression using the multilevel table (Table #8). If a new schedule is required, pick up the new schedule at the present stop or subsequent stops.
- Note that this rule is only applicable for exceptional bottom times that are beyond the "UK-HSE maximum operational limits", as there is no stop deeper than 9 m within these limits with this table. Stops at 15 m and deeper are found with the following profiles:

36 metres / 90 minutes *(UK-HSE operational limit is 35 min)*
39 metres / 70 & 80 minutes *(UK-HSE operational limit is 30 min)*
42 metres / 60 & 70 minutes *(UK-HSE operational limit is 30 min)*
45 metres / 45, 50, & 60 minutes *(UK-HSE operational limit is 25 min)*
48 metres / 40, 45, 50, & 60 minutes *(UK-HSE operational limit is 25 min)*
51 metres / 35, 40, 45, & 50 minutes *(UK-HSE operational limit for 50 metres maximum is 20 min)*
54 metres / 30, 35, 40, & 45 minutes *(UK-HSE operational limit is 50 metres)*
57 metres / 25, 30, 35, & 40 minutes *(UK-HSE operational limit is 50 metres)*
60 metres / 25, 30, & 35 minutes *(UK-HSE operational limit is 50 metres)*

2.1.8.7 - Travel rate between decompression stops too fast

The normal travel rate between two stops is 3 metres / minute *(0.5 metres /10 seconds, or 1 metre/20 seconds)*.

- If the ascent rate is faster than 3 m/min, stop the ascent, allow the chronometer to catch up, and then continue the ascent.
- MT 92 considers that the ascent to the next stop is part of the decompression of the stop that has been left: If the diver arrives early at the next decompression stop, consider the fast ascent as an omitted decompression.
- Many diving supervisors prefer spending the last minute at the stop to be left and then ascent to the next stop at a rate between 9 and 15 m/min to avoid a too-fast ascent. However, this procedure does not follow the original calculation of the table. If for any reason, such as a winch challenging to control at a continuous slow speed, the ascent rate cannot be suitably controlled at the recommended speed, the ascent to the next decompression stop can be performed by a succession of small steps every 50 cm or metre. For example, for an ascent organized with an intermediate step every metre: Wait 15 seconds before leaving the initial decompression stop, then ascent 1 metre at 12 m/min (total time = 20 seconds). Wait there 15 seconds, and ascent again 1 m using the same procedure. When at the next intermediate step, apply the same process to arrive at the next decompression stop on time. It is, of course, better to use this procedure with steps of 50 cm instead of 1 m.

2.1.8.8 - Difficulty in performing the 3 metres stop

- Perform the 3 m stop at 6 m
- Or switch to surface decompression table

2.1.8.9 - Exceeding the planned bottom time

- Use either the next bottom time, or the last bottom time that should be used only as a backup.

Note: In point 2.33 of annexe two from the decrees titled *"Procedures for diving operations with compressed air or with a nitrogen-based mixture"*, it is said: *"The diver must always have a bottom time available in the case that he exceeds the planned bottom time. For this reason, the last bottom time available in the table should not normally be used"*. Nevertheless, consider that having at least two backup bottom times is a safer option.
Also, note that the surface decompression table offer fewer bottom times than the corresponding depth of the in-water decompression table. Because before starting a diving operation using in-water decompression, the corresponding surface oxygen decompression table must be ready, make sure of the corresponding bottom times in the surface O_2 decompression table, and organise the maximum bottom time accordingly.

2.1.8.10 - Exceeding the planned depth

- Select the next depth

Note: As for the bottom times, the last depth available in the table should not normally be used. Nevertheless, this is the very minimum, and consider preferable to have at least two backup depths. As already said, note that the maximum depth of the surface decompression table is 51 m and that the surface O_2 decompression table should always be ready as a backup of the in-water decompression table.

2.2 - Air Standard with in-water oxygen decompression at 6 m

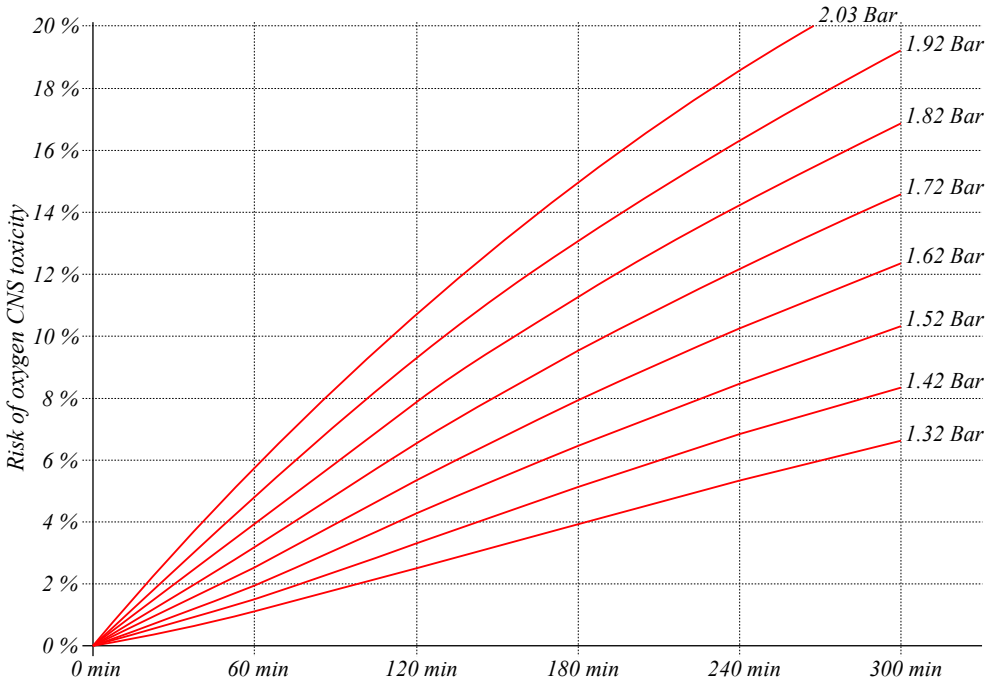
2.2.1 - Presentation

2.2.1.1 - Advantages of O2 decompression.

In-water O2 decompression is a well known procedure used to speeds up the decompression by replacing the nitrogen by oxygen during the stop at 6 m. The inhalation of pure oxygen creates a wash out which removes the nitrogen more efficiently. It has been demonstrated that systematic use of oxygen during the stops reduces the number of decompression sickness.

2.2.1.2 - Partial pressure of 1.6 bar during the stops

For a few years, there has been a consensus that 1.3 bar is the limit allowing long exposures without triggering acute oxygen poisoning. An example, in the study "Oxygen Toxicity and Special Operations Forces Diving: Hidden and Dangerous", doctors Thijs T. Wingelaar, Pieter-Jan A. M. van Ooij, & Rob A. van Hulst say that no oxygen-induced convulsions have been described with a PO2 lower than 1.3 bar in humans.
In another study called "Pulmonary effects of repeated six-hour normoxic and hyperoxic dives", doctors Barbara E. Shykoff & John P. Florian examined differential effects of immersion, elevated oxygen partial pressure, and exercise on pulmonary function after a series of five daily six-hour dives at 130 kPa (1.3 bar) that did not result in acute oxygen poisoning. Note that Barbara Shykoff did other experiments at 1.35 ata that also did not result in CNS toxicity.
These discoveries are reinforced by the publications of scientists such as Ran Arieli, the estimation curve below is extracted from his papers.



Based on these studies, the US Navy has limited the maximum partial pressure at work of surface-supplied diving operations to 1.4 ata, and those with Electronically Controlled Closed-Circuit Underwater Breathing Apparatus (EC-UBA) to 1.3 ata. However, the US Navy has kept the in-water oxygen stops at 30 and 20 feet.
A lot of organizations have also adopted the limitation at 1.4 bar, such as the Diving Medical Advisory Committee (DMAC) through the guidance "Oxygen content in open circuit bail-out bottles for heliox saturation diving", or IMCA that, in addition to recommending 1.4 bar as the upper limit for partial pressure of oxygen in the nitrox mix breathed by the diver when at depth if using surface-supplied diving techniques, says that higher partial pressures than 1.4 bar can be used for the decompression stops. Also, in its “Diving Standards & Safety manual”, NOAA (National Oceanic and Atmospheric Administration - USA) says that the PO2 of any gas mixture breathed during a dive must not exceed 1.4 absolute atmospheres (ata), except during the decompression phase when a PO2 of 1.6 is allowed. For information, this limitation of the in-water stops to 1.6 ata or bar is not new, as it was already in force with COMEX offshore since the seventies. It is the limitation adopted in this handbook.

Note that the depth of 6 metres (1.6 bar) is usually selected for oxygen decompression instead of 3 metres (1.3 bar) as it provides a better oxygen intake and so a more efficient decompression.
Also, the oxygen stops times at 20ft/6m of these tables are not long enough to to trigger acute oxygen poisoning. This is particularly true if the recommended UK-HSE operational limits (from doctors Shield & Lee) are implemented.
To comply with good practices, the air standard should be always available on panel.

2.2.2 - Procedure

The in-water O2 decompression procedure, consists of replacing the air supply to the diver with pure oxygen when he is at his 6 m stop. As described previously in this document the use of pure oxygen imply precautions, and backups to be in place to avoid or solve quickly the problems that may arise.

2.2.2.1 - Before the 6 m stop

The O2 supply must be kept physically disconnected from the diving panel during the dive and the air stops.

The procedure to calculate the stops is the same as for the air standard table, the only change is the stops at 6 m (20 fsw) and 3 m (10 fsw) to be performed at 6 m (20 fsw) using oxygen instead of air.

At completion of the 9 m (30 ft) stop (if there was one), the diver ascends at normal speed to the 6 m (20 fsw) stop. If there is no stop at 9 m, the diver ascent at normal speed (9 to 15 m/min) to the stop at 6 m.

2.2.2.2 When the diver is at the 6 m (20 fsw) stop

1. The supervisor ensures that the diver is at 6 m and is secured at this depth. The Clump weight should be adjusted one or two metres below the basket to prevent it from dropping in case the primary wire fails.
2. When the diver is secured at 6 m, the supervisor connects the oxygen supply hose onto the diving panel, or depending on the panel, closes the vent valve and opens the the isolation valve. So that the panel is connected to the oxygen supply (Refer to point 2.28 - “Diving panels”).
3. When the line is connected, the supervisor closes the air supply and asks the diver to flush his hat. A common procedure is to wait for the pressure to come down around 5 bars and open smoothly the O2 valve. Another procedure is to close the air supply, open the O2 valve, then ask the diver to flush this hat. This procedure can be applied instead of the points 3 & 4.
1. When the valve is opened, the oxygen fills the umbilical. The supervisor must ensure of a maximum fill rate of 5 bar (70 psi) per minute, as indicated in point 3.1.2 *“Methods used for gas transfer, and precautions to be in place”* in this document. The supervisor must always remember that:
    - When oxygen flows from high to low pressure through an orifice, such as when a valve is opened quickly, it often reaches sonic velocity and compresses the oxygen downstream against an obstruction, such as the seat of the next closed valve or regulator. The gas temperature can reach the auto-ignition point of plastics, organic contaminants, or small metal particles.
    - Small particles carried by flowing gas in the oxygen system strike surfaces of the system, such as piping intersections or valve seats. The kinetic energy of the particle creates heat at the point of impact, which can ignite either the particle or the target material.
2. When the oxygen fills the umbilical, the analyser registers, but does not indicate 100% O2 immediately, even if the air has been already purged. Up to 2 minutes is needed to have an accurate reading.
3. Oxygen has a particular taste, and makes a tickling sensation on the lips: If the diver omit to indicates that he is on O2, the supervisor should ask him to confirm it. That is the 2nd indicator
4. When the diver has confirmed he is on O2, the supervisor checks the analyser again: It should indicate 99.5 % O2 minimum.
5. When the supervisor has confirmation that the diver is on pure O2, he starts the stopwatch.
6. The diver is decompressed according to the stop time indicated in the table.
7. At completion of the 6 m (20 fsw) oxygen stop, the diver ascends to surface at a maximum rate of 3 m/ Min. Slow rates are recommended. The supervisor keeps the diver on oxygen during the ascent and the transfer to deck.

2.2.2.3 - When the diver is back on deck

1. When the helmet is removed, the supervisor closes the oxygen supply (separated O2 panel)
2. The diver flushes the helmet and lets the free flow open
3. The supervisor disconnects the oxygen line from the diving panel or, depending on the panel, closes both isolation valves and opens the vent located in between these valves (So accidental oxygen supply is not possible).
4. The supervisor opens the air, and flushes the line using air. (So, there is no risk of remaining oxygen in the line)
5. The supervisor checks the analyser (it should go down…)
6. The supervisor closes and secures the air valve.
7. The supervisor Installs the tags on the diving panel, and on the separated O2 supply panel.
8. The supervisor asks the lead diver to check and report the pressures in the quads. If necessary, the bottles are changed. If another dive is planned; the team prepares the next check list.
9. The helmet is disconnected and disinfected. It is replaced by a new unit in case of continuous diving operation.

2.2.3 - Contingencies (linked to O2 stops)

Note: Because the contingencies during "air standard in-water decompression" and "in-water O_2 decompression" are the same except for the problems linked to the use of oxygen in the water. Only the problems linked to O_2 are explained here.

2.2.3.1 - Oxygen supply breakdown

- For temporary loss of oxygen supply:
  - Switch the diver on air. Return the divers to oxygen breathing when the supply is reestablished. Consider any time spent on air as dead time (The valid decompression is the time spent on O_2).
- If the loss of the oxygen supply is permanent:
  - Multiply oxygen stop time by two and perform it on air
  - Or decompress the divers on air using the standard air table.
  - Or switch to surface oxygen decompression: Because the Air stops, and a part of the O2 stops have normally been completed, switching from the in water or wet bell O_2 decompression at 6 m to the surface O_2 decompression table is easy and does not pose any problems.

Example:
Dive at 42 m with 25 min bottom time.
The surface decompression table selected calls for 3 minutes at 9 m, and 15 min O_2 at 6 m.
Following a breakdown of the oxygen supply, decision to complete the decompression on Air after 5 min O2 at 6 m

Multiply the oxygen stop by 2 and perform it on air

Depth 42 metres ***In-water Oxygen 6 m***

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
10	3:00	-	-	-	-	-	3	6:00	Possible
15	3:00	-	-	-	-	-	5	8:00	Possible
20	3:00	-	-	-	-	-	10	13:00	Possible
25	2:45	-	-	-	-	3	15	20:45	Possible
30	2:45	-	-	-	-	5	20	27:45	Possible
Maximum operational limit UK-HSE									
35	2:30	-	-	-	3	7	25	37:30	Possible
40	2:30	-	-	-	3	10	30	45:30	Possible
45	2:30	-	-	-	3	12	35	52:30	Possible
50	2:15	-	-	-	5	15	40	62:15	Possible
60	2:15	-	-	3	10	17	50	82:15	Possible
70	2:15	-	-	5	12	25	60	104:15	Non
80	2:00	-	3	7	15	25	70	122:00	Non
90	2:00	-	3	12	20	30	80	147:00	Non

OR decompress using the standard air table

Depth 42 metres ***In-water standard air***

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
7	3:30	-	-	-	-	-	-	3:30	Possible
10	3:15	-	-	-	-	-	3	6:15	Possible
15	3:00	-	-	-	-	3	5	11:00	Possible
20	3:00	-	-	-	-	3	12	18:00	Possible
25	2:45	-	-	-	3	7	17	29:45	Possible
30	2:45	-	-	-	5	10	25	42:45	Possible
Maximum operational limit UK-HSE									
35	2:30	-	-	3	7	15	30	57:30	Possible
40	2:30	-	-	3	10	20	35	70:30	Possible
45	2:30	-	-	5	12	25	40	84:30	Possible
50	2:30	-	-	5	15	25	45	92:30	Possible
60	2:15	-	3	10	17	30	60	122:15	Possible
70	2:15	-	5	12	25	40	75	159:15	No

Or switch to surface decompression table

Depth 42 metres ***Surface O2 decompression table***

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
10	3:30	-	-	-	3	10	6	22:30	12h00
15	3:30	-	-	-	3	10	6	22:30	12h00
20	3:30	-	-	-	3	15	6	27:30	12h00
25	2:45	-	-	3	3	25	6	39:45	12h00
30	2:45	-	-	5	3	30	6	46:45	12h00
Maximum operational limit UK-HSE									
35	2:30	-	3	7	3	35	6	56:30	12h00
40	2:30	-	3	10	3	40	6	64:30	12h00

2.2.3.2 - Acute oxygen poisoning

Acute Oxygen poisoning at 6 m is unusual. Nevertheless, it may happen to extremely sensitive people.

- Resolution during the in water stop (minor cases only):
  - The O_2 supply must be stopped, and the helmet flushed with air.
  - For minor symptoms, when the diver is supplied on air, wait for the symptoms to subside, then wait 15 more minutes , and recommence O_2 at the point of interruption. Or switch immediately to the standard air table and resume the decompression using this table. The procedure to move from "in water O_2 decompression procedure" to "in-water air procedure" is explained in the previous point
  - Important: If the symptoms are too severe, the diver must be removed from the water and surface decompression procedure must be applied.

- Switch to surface decompression:
  - Surface decompression must be considered instead switching to air, even for trivial cases.
    It must be organized for all cases which could become more serious: In the eventuality that the diver is vomiting in his helmet, or has an acute crisis, the things can become very quickly unmanageable with additional risks like drowning or injuries in addition to the problems posed by the O_2 poisoning... Prudence must be the rule.
  - Because the Air stops, and a part of the O_2 stops have normally been completed, switching from the in water or in-wet bell O_2 decompression at 6 m to surface O_2 decompression procedure is easy and does not pose any problems: The in water air stops 9 m prior the deco time in the chamber are the same with "Air in-water O_2 deco at 6 m " or "in wet bell O_2 at 6 m" . It allows to jump from one table to the other. What is important is to be sure that the deco time corresponding to the air stops 9 m of the surface decompression table are fully completed before ordering the transfer to the chamber. It is the case with acute O_2 poisoning at 6 m.

2.2.4 - Make sure of the corresponding bottom times in the surface O2 decompression table

Before starting a diving operation using in-water decompression, the corresponding surface oxygen decompression table must be ready.
The study of MT 92/2019 tables shows that the surface decompression table offers fewer bottom times and depths than the in-water O_2 decompression table. For this reason, before launching the in-water decompression dive, the supervisor must make sure that the decompression selected can be performed using the surface oxygen decompression table.

The table below shows a comparison of the bottom times of in-water O_2 and surface O_2 decompression tables.
It is considered good practice to have at least 2 recovery tables. Also note that the safety procedure should be applied.

Depth	*Bottom times Standard air table*	*Bottom times Surface Oxygen deco. table*	*IOGP/HSE bottom time limits*	*Comments*
12 m	165 to 360 min	180 to 360 min	240 min	
15 m	80 to 300 min	90 to 180 min	180 min	The surface O2 deco table is limited to 180 min that is also the UK-HSE bottom time limit. Manage to have at least 1 recovery table as the last time is 30 min. Nevertheless 2 recovery tables is better. Also, take this problem into consideration if the safety procedure selected is one additional bottom time.
18 m	50 to 240 min	60 to 150 min	120 min	5 bottom times are missing in the surface deco. table. Nevertheless there are 3 bottom times after the UK-HSE bottom time limit.
21 m	35 to 210 min	40 to 120 min	90 min	5 bottom times are missing in the surface deco. table. Nevertheless there is 3 bottom times after the UK-HSE bottom time limit.
24 m	25 to 180 min	30 to 90 min	70 min	7 bottom times are missing in the surface deco. table. Only 2 bottom times after the UK-HSE bottom time limit. Take this problem into consideration if the safety procedure selected is one additional bottom time.
27 m	20 to 150 min	25 to 70 min	60 min	8 bottom times are missing in the surface deco. Table. Only 1 bottom time after the IOGP bottom time limit. Take this problem into consideration if the safety procedure selected is one additional bottom time.
30 m	15 to 140 min	20 to 60 min	50 min	8 bottom times are missing in the surface deco. table. Only 1 bottom time after the UK-HSE bottom time limit. Take this problem into consideration if the safety procedure selected is one additional bottom time.
33 m	12 to 120 min	15 to 60 min	40 min	6 bottom times are missing in the surface deco. table.
36 m	10 to 110 min	15 to 50 min	35 min	6 bottom times are missing in the surface deco. table.
39 m	8 to 100 min	10 to 40 min	30 min	7 bottom times are missing in the surface deco. table. Only 2 bottom times after the UK-HSE bottom time limit.

Depth	*Bottom times Standard air table*	*Bottom times Surface Oxygen deco. table*	*IOGP/HSE bottom time limits*	*Comments*
42 m	7 to 90 min	10 to 40 min	30 min	6 bottom times are missing in the surface deco. able. Only 2 bottom times after the UK-HSE bottom time limit.
45 m	6 to 80 min	10 to 30 min	25 min	6 bottom times are missing in the surface deco. table. Only 1 bottom time after the UK-HSE bottom time limit. Take this problem into consideration if the safety procedure selected is one additional bottom time.
48 m	5 to 70 min	10 to 30 min	25 min	6 bottom times are missing in the surface deco. table. Only 1 bottom time after the UK-HSE bottom time limit. Take this problem into consideration if the safety procedure selected is one additional bottom time.
51 m	5 to 70 min	10 to 30 min	20 min	6 bottom times are missing in the surface deco. table. Only 2 bottom times after the UK-HSE bottom time limit. There is no surface decompression table below this level: Limit the depth to have at least 1 recovery table. Take this problem into consideration if the safety procedure selected is one additional depth.
54 m	5 to 45 min	No table	Beyond the limit	No surface O2 decompression table.
57 m	5 to 40 min	No table	Beyond the limit	No surface O2 decompression table.
60 m	5 to 35 min	No table	Beyond the limit	No surface O2 decompression table.

2.2.5 - Tables in-water oxygen decompression at 6 m

Depth 12 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
180	0:30	-	-	-	-	-	3	3:30	Possible
210	0:30	-	-	-	-	-	5	5:30	Non
240	0:30	-	-	-	-	-	10	10:30	Non
Maximum operational limit UK-HSE									
270	0:30	-	-	-	-	-	15	15:30	Non
300	0:30	-	-	-	-	-	20	20:30	Non
330	0:30	-	-	-	-	-	20	20:30	Non
360	0:30	-	-	-	-	-	25	25:30	Non

Depth 15 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
90	0:45	-	-	-	-	-	3	3:45	Possible
100	0:45	-	-	-	-	-	3	3:45	Possible
110	0:45	-	-	-	-	-	5	5:45	Possible
120	0:45	-	-	-	-	-	7	7:45	Possible
130	0:45	-	-	-	-	-	7	7:45	Possible
140	0:45	-	-	-	-	-	10	10:45	Possible
150	0:45	-	-	-	-	-	15	15:45	Possible
180	0:45	-	-	-	-	-	20	20:45	Non
Maximum operational depth UK-HSE is 50 m									
210	0:45	-	-	-	-	-	25	25:45	Non
240	0:45	-	-	-	-	-	30	30:45	Non
270	0:45	-	-	-	-	-	35	35:45	Non
300	0:45	-	-	-	-	-	45	45:45	Non

WARNING:
The corresponding surface decompression table is limited to 180 min. bottom time. **Do not select bottom times beyond 160 min** to have at least 1 recovery table available in the surface decompression table (surf. deco table last bottom times are 150 and 180 min).
Note that it is wiser to plan for two recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 18 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
60	1:00	-	-	-	-	-	3	4:00	Possible
70	1:00	-	-	-	-	-	5	6:00	Possible
80	1:00	-	-	-	-	-	7	8:00	Possible
90	1:00	-	-	-	-	-	10	11:00	Possible
100	1:00	-	-	-	-	-	15	16:00	Possible
110	1:00	-	-	-	-	-	15	16:00	Possible
120	1:00	-	-	-	-	-	20	21:00	Possible
Maximum operational limit UK-HSE									
130	1:00	-	-	-	-	-	25	26:00	Possible
140	1:00	-	-	-	-	-	30	31:00	Possible
150	1:00	-	-	-	-	-	35	36:00	Possible
180	1:00	-	-	-	-	-	40	41:00	Non
210	1:00	-	-	-	-	-	50	51:00	Non
240	1:00	-	-	-	-	-	60	61:00	Non

Depth 21 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
40	1:15	-	-	-	-	-	3	4:15	Possible
45	1:15	-	-	-	-	-	3	4:15	Possible
50	1:15	-	-	-	-	-	5	6:15	Possible
60	1:15	-	-	-	-	-	7	8:15	Possible
70	1:15	-	-	-	-	-	10	11:15	Possible
80	1:15	-	-	-	-	-	15	16:15	Possible
90	1:15	-	-	-	-	-	20	21:15	Possible
Maximum operational limit UK-HSE									
100	1:15	-	-	-	-	-	25	26:15	Possible
110	1:15	-	-	-	-	-	25	26:15	Possible
120	1:15	-	-	-	-	-	30	31:15	Possible
130	1:15	-	-	-	-	-	35	36:15	Possible
140	1:15	-	-	-	-	-	40	41:15	Possible
150	1:00	-	-	-	-	3	45	49:00	Non
180	1:00	-	-	-	-	5	60	66:00	Non
210	1:00	-	-	-	-	5	70	76:00	Non

Depth 24 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
30	1:30	-	-	-	-	-	3	4:30	Possible
35	1:30	-	-	-	-	-	3	4:30	Possible
40	1:30	-	-	-	-	-	5	6:30	Possible
45	1:30	-	-	-	-	-	5	6:30	Possible
50	1:30	-	-	-	-	-	7	8:30	Possible
60	1:30	-	-	-	-	-	15	16:30	Possible
70	1:30	-	-	-	-	-	20	21:30	Possible
Maximum operational limit UK-HSE									
80	1:30	-	-	-	-	-	25	26:30	Possible
90	1:30	-	-	-	-	-	30	31:30	Possible
100	1:15	-	-	-	-	3	35	39:15	Possible
110	1:15	-	-	-	-	3	40	44:15	Possible
120	1:15	-	-	-	-	3	45	49:15	Possible
130	1:15	-	-	-	-	5	50	56:15	Possible
140	1:15	-	-	-	-	10	55	66:15	Non
150	1:15	-	-	-	-	10	60	71:15	Non
180	1:00	-	-	-	3	20	75	99:00	Non

Depth 27 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
25	1:45	-	-	-	-	-	3	4:45	Possible
30	1:45	-	-	-	-	-	3	4:45	Possible
35	1:45	-	-	-	-	-	5	6:45	Possible
40	1:45	-	-	-	-	-	7	8:45	Possible
45	1:45	-	-	-	-	-	10	11:45	Possible
50	1:45	-	-	-	-	-	15	16:45	Possible
60	1:45	-	-	-	-	-	20	21:45	Possible
Maximum operational limit UK-HSE									
70	1:30	-	-	-	-	3	25	29:30	Possible
80	1:30	-	-	-	-	3	30	34:30	Possible
90	1:30	-	-	-	-	5	40	46:30	Possible
100	1:30	-	-	-	-	10	45	56:30	Possible
110	1:30	-	-	-	-	12	50	63:30	Possible
120	1:30	-	-	-	-	15	55	71:30	Possible
130	1:00	-	-	-	3	20	60	84:00	Non
140	1:00	-	-	-	3	25	65	94:00	Non
150	1:00	-	-	-	3	25	70	99:00	Non

WARNING:
The corresponding surface decompression table is limited to 70 min bottom time. **Do not select bottom times beyond 50 min** to have at least 1 recovery table available in the surface decompression table.
Note that it is wiser to plan for two recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 30 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
20	2:00	-	-	-	-	-	3	5:00	Possible
25	2:00	-	-	-	-	-	3	5:00	Possible
30	2:00	-	-	-	-	-	5	7:00	Possible
35	2:00	-	-	-	-	-	7	9:00	Possible
40	2:00	-	-	-	-	-	15	17:00	Possible
45	2:00	-	-	-	-	-	15	17:00	Possible
50	2:00	-	-	-	-	-	20	22:00	Possible
Maximum operational limit UK-HSE									
60	1:45	-	-	-	-	3	30	34:45	Possible
70	1:45	-	-	-	-	5	35	41:45	Possible
80	1:45	-	-	-	-	10	40	51:45	Possible
90	1:30	-	-	-	3	12	45	61:30	Possible
100	1:30	-	-	-	3	17	50	71:30	Possible
110	1:30	-	-	-	3	20	60	84:30	Non
120	1:30	-	-	-	5	25	65	96:30	Non
130	1:30	-	-	-	7	30	70	108:30	Non
140	1:15	-	-	3	10	30	80	124:15	Non

WARNING:
The corresponding surface decompression table is limited to 60 min bottom time. **Do not select bottom times beyond 45 min** to have at least 2 recovery tables available in the surface decompression table.
Note that it is wiser to plan for two recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 33 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
15	2:15	-	-	-	-	-	3	5:15	Possible
20	2:15	-	-	-	-	-	3	5:15	Possible
25	2:15	-	-	-	-	-	5	7:15	Possible
30	2:15	-	-	-	-	-	7	9:15	Possible
35	2:15	-	-	-	-	-	10	12:15	Possible
40	2:00	-	-	-	-	3	15	20:00	Possible
Maximum operational limit UK-HSE									
45	2:00	-	-	-	-	3	20	25:00	Possible
50	2:00	-	-	-	-	5	30	37:00	Possible
60	2:00	-	-	-	-	10	35	47:00	Possible
70	1:45	-	-	-	3	12	40	56:45	Possible
80	1:45	-	-	-	3	15	45	64:45	Possible
90	1:45	-	-	-	5	20	50	76:45	Possible
100	1:45	-	-	-	10	25	60	96:45	Non
110	1:30	-	-	3	12	25	65	106:30	Non
120	1:30	-	-	3	15	30	75	124:30	Non

Depth 36 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
15	2:30	-	-	-	-	-	3	5:30	Possible
20	2:30	-	-	-	-	-	5	7:30	Possible
25	2:30	-	-	-	-	-	7	9:30	Possible
30	2:30	-	-	-	-	-	15	17:30	Possible
35	2:15	-	-	-	-	3	15	20:15	Possible
Maximum operational limit UK-HSE									
40	2:15	-	-	-	-	3	20	25:15	Possible
45	2:15	-	-	-	-	5	30	37:15	Possible
50	2:15	-	-	-	3	5	35	45:15	Possible
60	2:00	-	-	-	3	12	40	57:00	Possible
70	2:00	-	-	-	5	15	45	67:00	Possible
80	2:00	-	-	-	7	20	55	84:00	Possible
90	1:45	-	-	3	12	25	60	101:45	Non
100	1:45	-	-	3	15	30	70	119:45	Non
110	1:45	-	-	5	20	30	80	136:45	Non

Depth 39 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
10	2:45	-	-	-	-	-	3	5:45	Possible
15	2:45	-	-	-	-	-	3	5:45	Possible
20	2:45	-	-	-	-	-	7	9:45	Possible
25	2:45	-	-	-	-	-	10	12:45	Possible
30	2:30	-	-	-	-	3	15	20:30	Possible
Maximum operational limit UK-HSE									
35	2:30	-	-	-	-	5	20	27:30	Possible
40	2:15	-	-	-	3	7	25	37:15	Possible
45	2:15	-	-	-	3	10	30	45:15	Possible
50	2:15	-	-	-	3	10	35	50:15	Possible
60	2:15	-	-	-	5	15	45	67:15	Possible
70	2:00	-	-	3	10	20	50	85:00	Possible
80	2:00	-	-	3	12	25	60	102:00	Non
90	2:00	-	-	5	15	30	70	122:00	Non
100	1:45	-	3	7	20	30	80	141:45	Non

Depth 42 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
10	3:00	-	-	-	-	-	3	6:00	Possible
15	3:00	-	-	-	-	-	5	8:00	Possible
20	3:00	-	-	-	-	-	10	13:00	Possible
25	2:45	-	-	-	-	3	15	20:45	Possible
30	2:45	-	-	-	-	5	20	27:45	Possible
Maximum operational limit UK-HSE									
35	2:30	-	-	-	3	7	25	37:30	Possible
40	2:30	-	-	-	3	10	30	45:30	Possible
45	2:30	-	-	-	3	12	35	52:30	Possible
50	2:15	-	-	-	5	15	40	62:15	Possible
60	2:15	-	-	3	10	17	50	82:15	Possible
70	2:15	-	-	5	12	25	60	104:15	Non
80	2:00	-	3	7	15	25	70	122:00	Non
90	2:00	-	3	12	20	30	80	147:00	Non

Depth 45 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
10	3:15	-	-	-	-	-	3	6:15	Possible
15	3:15	-	-	-	-	-	7	10:15	Possible
20	3:00	-	-	-	-	3	10	16:00	Possible
25	3:00	-	-	-	-	3	15	21:00	Possible
Maximum operational limit UK-HSE									
30	2:45	-	-	-	3	5	20	30:45	Possible
35	2:45	-	-	-	3	7	25	37:45	Possible
40	2:45	-	-	-	5	10	35	52:45	Possible
45	2:30	-	-	3	5	12	45	67:30	Possible
50	2:30	-	-	3	7	15	50	77:30	Possible
60	2:15	-	3	5	12	20	55	97:15	Non
70	2:15	-	3	7	15	25	65	117:15	Non
80	2:15	-	3	12	20	30	75	142:15	Non

WARNING:
The corresponding surface decompression table is limited to 30 min bottom time. **Do not select bottom times beyond 20 min** to have at least 1 recovery table available in the surface decompression table. For the same reason, this depth should be the last depth as **there is no surface decompression table available beyond 51 m.**
Note that it is wiser to plan for two recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 48 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
10	3:30	-	-	-	-	-	3	6:30	Possible
15	3:30	-	-	-	-	-	7	10:30	Possible
20	3:15	-	-	-	-	3	15	21:15	Possible
25	3:15	-	-	-	-	5	20	28:15	Possible
Maximum operational limit HSE									
30	3:00	-	-	-	3	7	25	38:00	Possible
35	3:00	-	-	-	5	10	30	48:00	Possible
40	2:45	-	-	3	7	15	35	62:45	Possible
45	2:45	-	-	5	10	17	40	74:45	Possible
50	2:30	-	3	5	10	20	50	90:30	Possible
60	2:30	-	3	7	15	25	60	112:30	Non
70	2:30	-	5	10	20	30	70	137:30	Non

WARNING:
The corresponding surface decompression table is limited to 30 min bottom time. **Do not select bottom times beyond 20 min** to have at least 1 recovery table available in the surface decompression table.
Also, this depth must be the very last depth selected as there is no surface decompression table available beyond 51 metres.
Note that it is wiser to plan for two recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 51 metres

Warning: The maximum operational depth UK-HSE is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
10	3:45	-	-	-	-	-	5	8:45	Possible
15	3:30	-	-	-	-	3	10	16:30	Possible
20	3:30	-	-	-	-	3	15	21:30	Possible
Maximum operational limit UK-HSE									
25	3:15	-	-	-	3	5	20	31:15	Possible
30	3:15	-	-	-	5	7	25	40:15	Possible
35	3:00	-	-	3	5	10	30	51:00	Possible
40	3:00	-	-	5	7	15	40	70:00	Possible
45	2:45	-	3	5	10	20	45	85:45	Possible
50	2:45	-	3	7	15	20	50	97:45	Non
60	2:45	-	5	10	15	25	65	122:45	Non
70	2:30	3	7	12	20	35	80	159:30	Non

WARNING:
Do not use this depth for normal operations as there is no surface decompression table available beyond this limit. Also, consider this if the safety procedure selected is one additional bottom time.

Depth 54 metres

Warning: The maximum operational depth UK-HSE is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
5	4:00	-	-	-	-	-	3	7:00	No
10	4:00	-	-	-	-	-	7	11:00	No
15	3:45	-	-	-	-	3	10	16:45	No
20	3:30	-	-	-	3	5	15	26:30	No
25	3:30	-	-	-	5	7	25	40:30	No
30	3:15	-	-	3	5	10	35	56:15	No
35	3:15	-	-	3	7	12	40	65:15	No
40	3:00	-	3	5	10	15	50	86:00	No
45	3:00	-	3	7	12	20	55	100:00	No
50	3:00	-	5	10	15	25	65	123:00	No
60	2:45	3	7	10	20	30	75	147:45	No

WARNING: There is no surface decompression table available.

Depth 57 metres

Warning: The maximum operational depth UK-HSE is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
5	4:15	-	-	-	-	-	3	7:15	Non
10	4:15	-	-	-	-	-	7	11:15	Non
15	4:00	-	-	-	-	3	15	22:00	Non
20	3:45	-	-	-	3	5	20	31:45	Non
25	3:30	-	-	3	5	7	25	43:30	Non
30	3:30	-	-	3	7	10	35	58:30	Non
35	3:15	-	3	5	7	15	45	78:15	Non
40	3:15	-	3	7	10	20	50	93:15	Non
45	3:00	3	5	7	12	25	55	110:00	Non
50	3:00	3	5	10	15	25	65	126:00	Non

WARNING: There is no surface decompression table available.

Depth 60 metres

Warning: The maximum operational depth UK-HSE is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
5	4:30	-	-	-	-	-	3	7:30	Non
10	4:15	-	-	-	-	3	7	14:15	Non
15	4:00	-	-	-	3	5	15	27:00	Non
20	4:00	-	-	-	5	7	20	36:00	Non
25	3:45	-	-	3	5	10	30	51:45	Non
30	3:30	-	3	5	7	12	40	70:30	Non
35	3:30	-	3	5	10	15	45	81:30	Non
40	3:15	3	5	7	15	20	55	108:15	Non

WARNING: There is no surface decompression table available.

2.3 - Surface oxygen decompression procedures

2.3.1 - Procedures

2.3.1.1 - Presentation

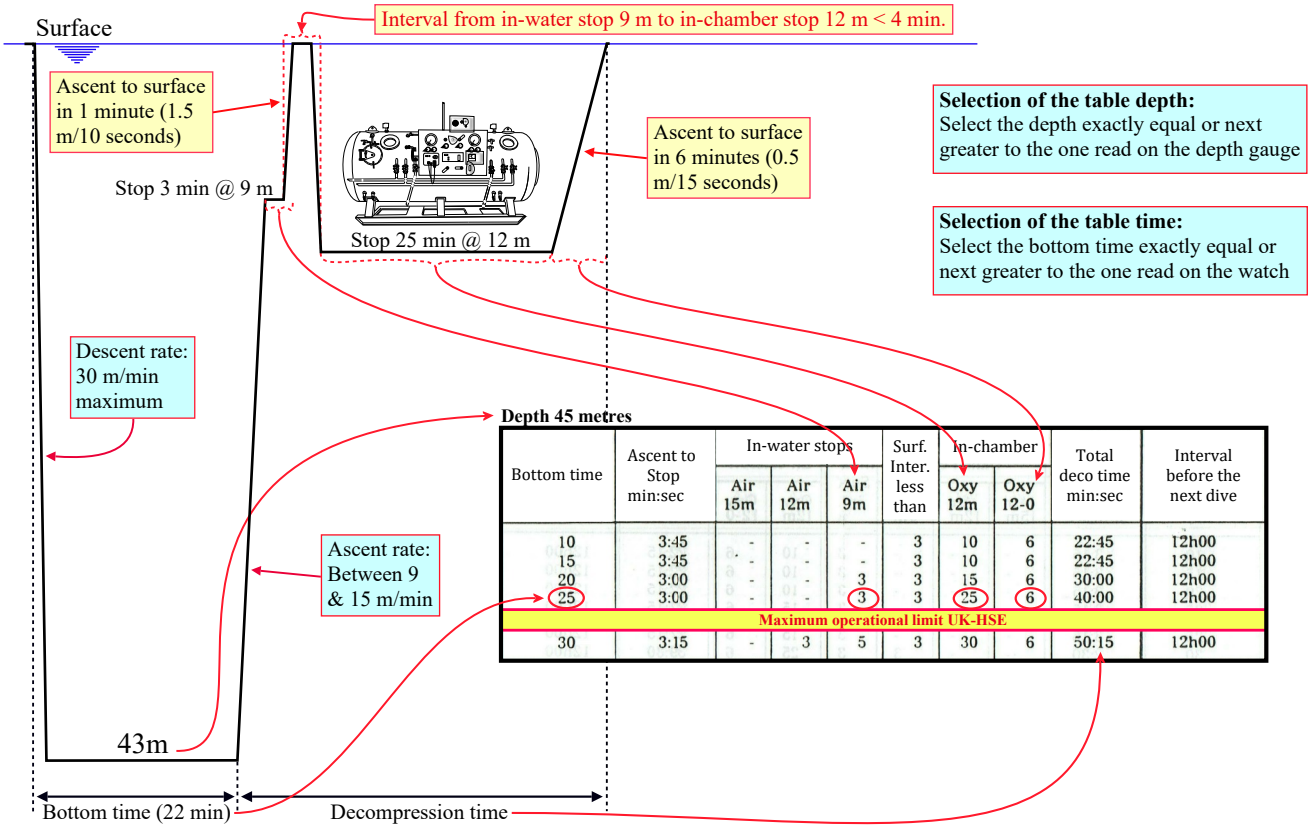
MT 92 - 2012/COMEX air surface decompression tables are only metric. This method of decompression is forbidden at altitudes higher than 300 metres.

Each table displays the following information:

- Depth of the table selected in meters
- Bottom times in minutes
- Stops depth in meters & time to be performed at the indicated depth
- The interval surface from leaving the in-water stop 9 m to the stop at 12 m in chamber
- Total deco time
- The operational limits UK-HSE have been integrated into the tables
- No repetitive dive is allowed: The post-dive interval after a dive using a surface decompression table is at least twelve hours.

2.3.1.2 - Calculate the decompression

- The depth to select is exactly equal to or next greater than the one read on the depth gauge.
- The bottom time to select is exactly equal to or greater than the one indicated on the watch.
- The in-water and in-chamber decompression depths are indicated in the ribbon. The duration of the stops are in the columns below.
- The "Total deco time" is the addition of the ascent and the stops.
- The descent has to be performed at 130 m/min maximum.
- The ascent rate to the in-water stops is between 9 and 15 m/min.
- The last minute of the in-water stops is used accent to the next stop.
- The interval from leaving the in water stop at 9 m (30 ft) to the stop in chamber at 12 m (40 ft) must not be longer than four minutes: 1 minute to ascent to the surface + 3 minutes to transfer into the chamber. It is recommended to minimise the as much as possible the time of transfer.
- The diver must be on O_2 immediately upon his arrival into the chamber.
- There is no O_2 breathing periods, the diver is continuously under oxygen
- Oxygen must be breathed during the ascent to surface from 12 m in chamber. The ascent time indicated is 6 minutes.



Depth 45 metres

Bottom time	Ascent to Stop min:sec	In-water stops Air 15m	Air 12m	Air 9m	Surf. Inter. less than	In-chamber Oxy 12m	Oxy 12-0	Total deco time min:sec	Interval before the next dive
10	3:45	-	-	-	3	10	6	22:45	12h00
15	3:45	-	-	-	3	10	6	22:45	12h00
20	3:00	-	-	3	3	15	6	30:00	12h00
25	3:00	-	-	3	3	25	6	40:00	12h00
Maximum operational limit UK-HSE									
30	3:15	-	3	5	3	30	6	50:15	12h00

Note: The implementation of the "UK HSE maximum operating limits" and of the "Decompression safety procedure (Jesus procedure)" is similar to "Standard air tables". However, repetitive dives are forbidden before 12 h interval.

2.3.2 - Contingencies

Some contingency procedures are missing in the original table. They have been covered by well known procedures that are agreed by competent bodies, and easy to remember. Reinforcements have been added for safety reasons.

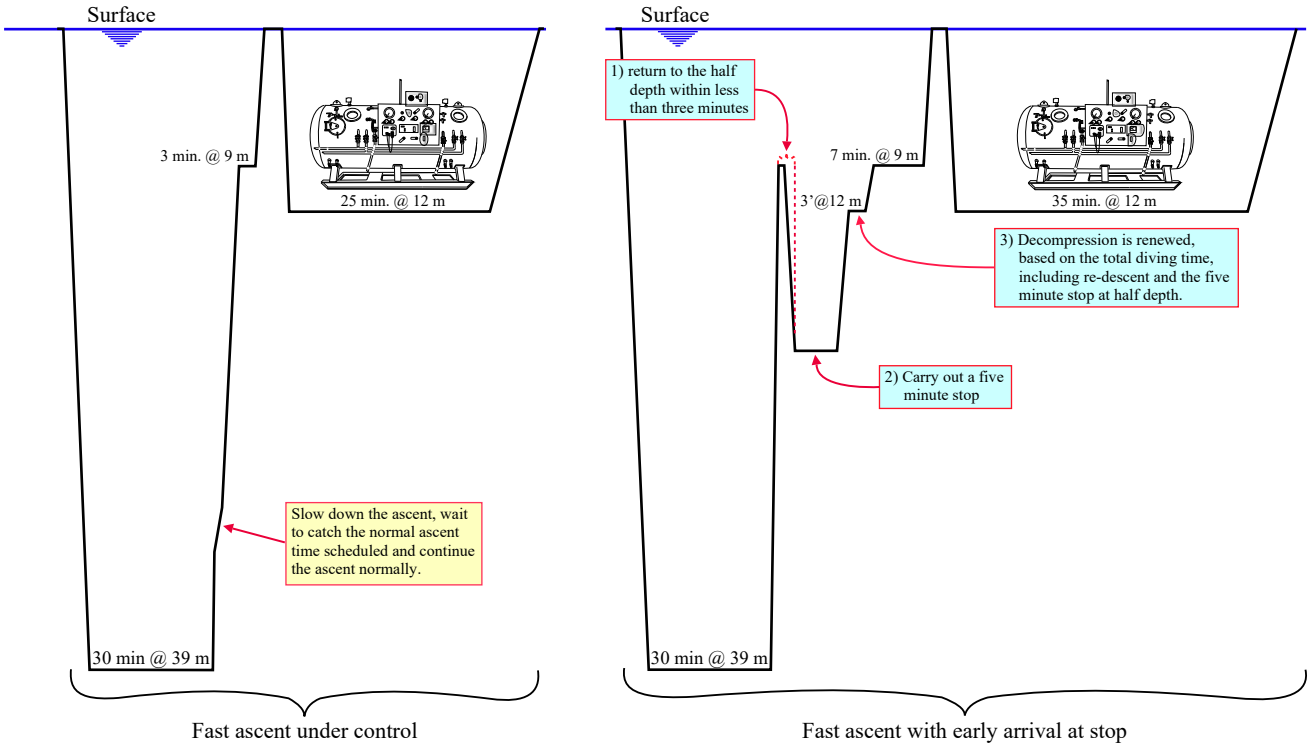
2.3.2.1 - Ascent speed too slow

Add the delay to the bottom time and decompress in accordance with the new bottom time

2.3.2.2 - Ascent speed to 1st stop too fast

Apply the procedure described for air in-water decompression using the surface O2 table:

- If of a short duration and detected sufficiently early, slow down the ascent, wait to catch the normal ascent time scheduled and continue the ascent normally.
- If the fast ascent has not been stopped sufficiently early, the diver returns to the half depth within less than three minutes and carries out a five minute stop. Decompression is renewed, based on the total diving time, including re-descent and the five minute stop at half depth. Upon diver arrival in the chamber, observe for signs of decompression sickness (DCS) and pulmonary barotrauma, and complete the new decompression scheduled normally. When the decompression is completed, keep the diver in direct proximity of the chamber for two hours and observe for signs of DCS and pulmonary barotrauma.



2.3.2.3 - Omitted decompression (not associated with a blow-up)

- If only one stop is omitted

- Return the diver to the stop where the omission occurred in less than 3 minutes, perform this stop from the beginning and continue the decompression using the original schedule. Observe the diver for signs of decompression sickness upon his arrival on deck.

- If more than one stop is omitted

- If the stop at 9 m is completed and no previous decompression omitted, or the stops below 6 m not scheduled, recompress the diver at 12 m in the chamber in less than 3 min and decompress him using the surface O2. decompression table.
- If the stop at 9 m or deeper is not completed, return the diver to the deeper omitted stop in less than 3 minutes. Perform all the omitted stops from the beginning and complete the in water decompression normally. Then transfer the diver in less than 4 minutes from the 9 m stop to 12 m in the chamber. Contact the diving specialist and observe the diver for decompression sickness. When the diver is in the chamber, follow the instructions from the diving medical specialist. If the communication with the diving medical specialist cannot be established (and only in this case), apply the procedure COMEX for omitted decompression that consists of using treatment table Cx18 Comex. See in Book #1 “Description and prevention of diving accidents”

2.3.2.4 - Blow up

Transfer to the chamber in less than 3 minutes. Observe for signs of decompression sickness, and pulmonary barotrauma, contact the diving medical specialist and follow his instructions.

If the communication with the diving medical specialist cannot be established (and only in this case), apply the procedure COMEX for blow-up (See in Book #1 "Description and prevention of diving accidents") and use treatment table Cx18.

2.3.2.5 - Decompression stress during the surface interval (diver experiencing DCS symptoms)

During the surface interval, the diver is exposed to a higher level of decompression stress than would be encountered if in-water decompression only had been executed. Therefore, the diver may experience signs and/or symptoms of decompression stress.
When symptoms do occur during the surface interval, they are almost always very mild and late into the surface interval. In addition, the symptoms usually completely resolve during the pressurization to 12 m in the chamber. Experimental dives have demonstrated that the divers who experienced surface interval symptoms had the same incidence of decompression sickness after the completion of the dive as those divers who did not experience signs or symptoms during the surface interval.
Therefore, during surface oxygen decompression diving, when all signs and symptoms of surface interval stress have been completely resolved by the time, the diver is confirmed on oxygen at 12 m in the chamber and the decompression profile is to be completed as planned.
The diver should be treated for decompression sickness if the signs and symptoms of the surface interval stress have not been completely resolved when he is confirmed on oxygen at 12 m in the chamber. In this case, the diving medical specialist must be contacted and his instructions followed. If the diving medical specialist is not reachable, the chamber should be compressed to 18 m and the treatment table Cx18 (or table 6 USN).

2.3.2.6 - Interval from in water stop 9 m to in-chamber stop 12 m exceeding four minutes

If the surface interval exceeds four minutes but does not exceed five minutes, switch to the next longer table time.
If the surface interval exceeds five minutes, consider the dive as a shortened decompression, and apply emergency procedure planned for a type 1 decompression accident.
The diving medical specialist must be contacted and his recommendations applied.

2.3.2.7 - Important note regarding treatments of uncontrolled ascents, omitted decompressions, and violation of the interval surface

Contact the Diving Medical Specialist as soon as possible. If the communication cannot be established, apply the preventive treatment tables that are indicated the procedures, and try to contact him.
Note that the treatment tables indicated in the procedure are COMEX tables. Nevertheless, it may happen that the diving medical specialist prefers using USN treatment tables. In this case, table 5 USN can be used in place of Cx12 and table 6 USN can be used in place of Cx18. The selection of the treatment tables is the responsibility of the diving medical specialist and should be decided before starting the project.
Examination for decompression illness and pulmonary barotrauma must be performed before and during the preventive treatment.
If there is suspicion of decompression illness or pulmonary barotrauma, and the diving medical specialist is not reachable, treat accordingly to "Decompression sickness", or "Pulmonary barotrauma" (See in Book #1 "Description and prevention of diving accidents").

2.3.2.8 - Delays in leaving an in-water stop or between in-water stops

When the delay happens at and shallower than 12 m: Ignore the delay, and complete the decompression normally.
When the delay happens deeper than 12 m: Recalculate the required decompression using the multilevel table (Table #8). Nevertheless, there is no in-water stop deeper than 12 m in this table. It is due to the fact that the surface O_2 decompression table offers fewer bottom times and depths than the in-water decompression table.

2.3.2.9 - Travel rate between the in-water stops too fast

If the ascent rate is faster than 3 m/min, stop the ascent, allow the chronometer to catch up, and then continue the ascent. In case of difficulties to maintain the ascent rate apply the procedure indicated in point 4.1.8.7.
MT92 considers the ascent as a part of the of the stop that has been left: If the diver arrives early at the next decompression stop, consider the fast ascent as an omitted decompression.

2.3.2.10 - Delay when travelling from the in-water stop 9 m to the surface

Ignore the delay and continue the ascent at the normal rate. DO NOT try to recover the delay. When arrived at the surface, make sure that the diver is transferred to the chamber in less than 4 minutes after leaving the 9 m stop.
If the surface interval is more than 4 minutes, apply the procedures described in point 4.3.2.6.

2.3.2.11 - Travel rate from the in-water stop 9 m to the surface too fast

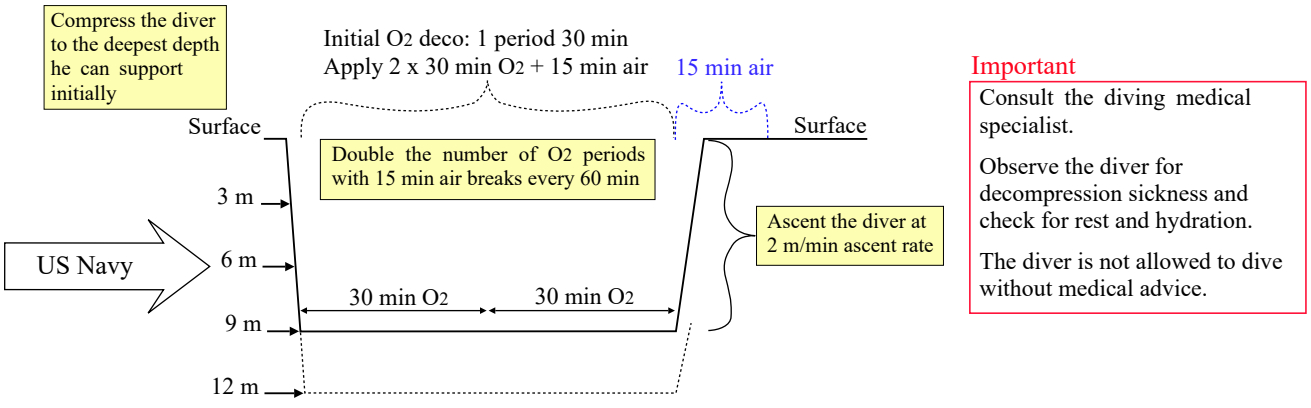
If the rate of ascent is faster than 9 m/min, stop the ascent, allow the chronometer to catch up, and then continue the ascent.
Note that an early arrival at the surface should be considered as an omitted decompression.

2.3.2.12 - Diver unable to reach the 12 m (40 ft) stop

Apply the safe way out procedure:
MT-92/2012 does not propose any "safe way out procedure". Two procedures can be used to solve this problem:
- The procedure US Navy indicated in the US Navy manual.
- The procedure US Navy "reinforced" from Dr Massimelli *(DMAC)* which is the original procedure USN that is reinforced by additional O2 stops at 3 m (10 ft).

US Navy	***US Navy reinforced***
Compress the diver to the deepest depth he can attain initially	Compress the diver to the deepest depth he can attain initially
Begin oxygen breathing at that depth. Continue attempts to gradually compress the diver deeper. - If the corresponding in-water deco schedule requests a stop at 6 m (20 ft), attempt to compress the diver to 6 m. - If the corresponding in-water deco schedule requests a stop at 9 m (30 ft), attempt to compress to this depth.	Begin oxygen breathing at that depth. Continue attempts to gradually compress the diver deeper. - If the corresponding in-water deco schedule requests a stop at 6 m (20 ft), attempt to compress the diver to 6 m. - If the corresponding in-water deco schedule requests a stop at 9 m (30 ft), attempt to compress to this depth.
Double the number of O2 periods indicated in the surface decompression table. Interrupt the O2 breathing every 60 min with 15 min air breaks. Note that the air breaks do not count toward the total oxygen time.	Double the number of O2 periods indicated in the surface decompression table. Interrupt the O2 breathing every 60 min with 15 min air breaks. Note that the air breaks do not count toward the total oxygen time.
At completion, ascent the diver at the rate indicated in the table (2 m/min)	Ascent the diver to 3 m at the rate indicated in the table (2 m/min). Stop the ascent at 3 m (10 ft) and start another stop with the double of O2 periods requested for the stop at 12 m (40 ft) with air breaks 5 min every 30 min.
	At completion, ascent the diver at the rate indicated in the table (2 m/min).

To compare the 2 procedures see below an example for a dive at 42 m and 30 min bottom time.
The decompression requested is initially:
- In-water stop 5 min at 9 m using air
- in-chamber stop 30 minutes O2

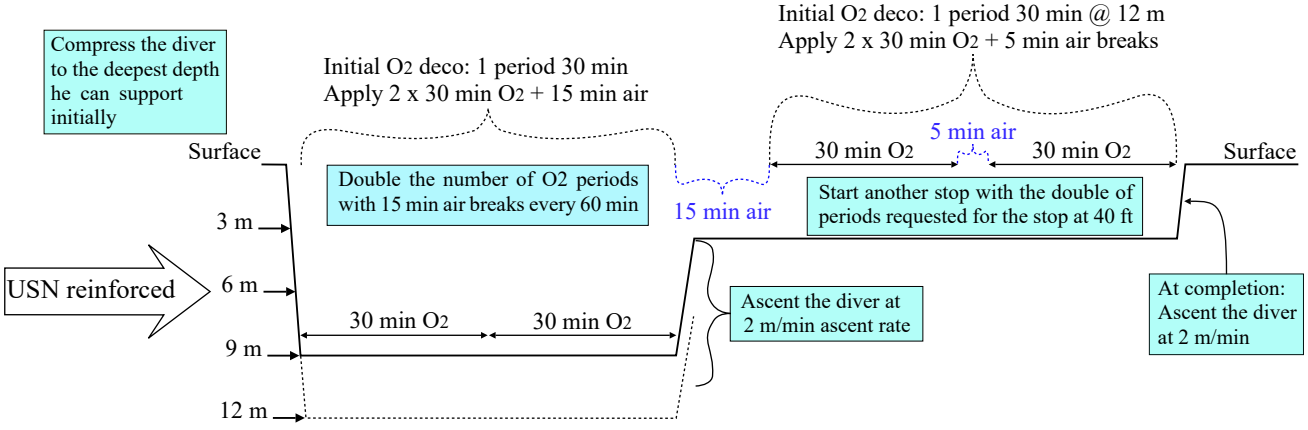


Important

Consult the diving medical specialist.

Observe the diver for decompression sickness and check for rest and hydration.

The diver is not allowed to dive without medical advice.



2.3.2.13 - Oxygen supply breakdown

- For temporary loss of oxygen supply:

The divers breathe chamber air. Return the divers to oxygen breathing when the supply is reestablished. Consider any time spent on air as dead time (The valid decompression is the time spent on O_2).

- If the loss of the oxygen supply is permanent:

MT-92/2019 says: Decompress the divers on air using the standard air table for the same depth. Use the maximum bottom time available for safety.
Also, Contact the diving medical specialist, and follow his recommendations.

Example:
Dive at 42 m with 25 min bottom time.
The surface decompression table selected calls for 5 minutes at 9 m in-water and 25 min on O_2 in-chamber
Following a breakdown of the oxygen supply, decision to complete the decompression on Air after 19 min O2 at 12 m

Depth 42 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
10	3:30	-	-	-	3	10	6	22:30	12h00
15	3:30	-	-	-	3	10	6	22:30	12h00
20	3:30	-	-	-	3	15	6	27:30	12h00
25	2:45	-	-	3	3	25	6	39:45	12h00
30	2:45	-	-	5	3	30	6	46:45	12h00
Maximum operational limit UK-HSE									
35	2:30	-	3	7	3	35	6	56:30	12h00
40	2:30	-	3	10	3	40	6	64:30	12h00

1 - Select the corresponding depth in the “standard air table”
2 - Select the maximum bottom time
3 - Resume the decompression using the standard air table.

Depth 42 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
7	3:30	-	-	-	-	-	-	3:30	Possible
10	3:15	-	-	-	-	-	3	6:15	Possible
15	3:00	-	-	-	-	3	5	11:00	Possible
20	3:00	-	-	-	-	3	12	18:00	Possible
25	2:45	-	-	-	3	7	17	29:45	Possible
30	2:45	-	-	-	5	10	25	42:45	Possible
Maximum operational limit UK-HSE									
35	2:30	-	-	3	7	15	30	57:30	Possible
40	2:30	-	-	3	10	20	35	70:30	Possible
45	2:30	-	-	5	12	25	40	84:30	Possible
50	2:30	-	-	5	15	25	45	92:30	Possible
60	2:15	-	3	10	17	30	60	122:15	Possible
70	2:15	-	5	12	25	40	75	159:15	No

2.3.2.14 - Acute oxygen poisoning during the decompression

Apply the procedure explained in chapter “Acute O2 poisoning” of the module “diving accidents”:

Remove the O2 mask, breathe air for 15 minutes, then resume the decompression at the point of interruption. Generally the crisis will not happen again but the incident must be reported to the diving medical specialist. In the case that a 2nd crisis starts, the decompression will have to be completed on air.

In the case of convulsions, the attendant must prevent the casualty from injuring himself, check the airways and make sure that the tongue will not be be swallowed (A padded mouth piece may be gently placed between the teeth to protect the tongue). After the convulsion, the patient may be unconscious for a short time.

Important: DO NOT attempt to decompress a diver during a convulsion: The casualty will be unable to exhale with the high risk to create a pulmonary barotrauma. The ascent to the next step must begin only after full recovery and the patient is relaxed.

If the decompression has to be completed on air use the procedure indicated in point 1.2.13 above: Decompress the divers on air using standard air table for the same depth of dive. Use the maximum table time available for safety.

2.3.2.15 - Exceeding the planned bottom time

Use either the next bottom time, or the last bottom time that should be used only as a backup.

If there is no bottom time available, switch to in-water decompression table and complete the decompression in the water. If the in-water stops are not possible due to adverse weather conditions, perform the in-water stops until 9 m then, transfer the diver to the chamber in less than 4 minutes. Contact the diving medical specialist and follow his recommendations. If the diving medical specialist cannot be contacted, treat using the treatment table Cx18.

Note that the use of a medical table is not considered a normal procedure and will be reported as an incident. Similarly, a bottom time beyond the operational limit UK-HSE will also be reported as an incident.

Note:

In point 2.33 of annexe two from decrees of 15/05/92 and 30/10/2019 "Procedures for diving operations with compressed air or with a nitrogen-based mixture", it is said:

"The diver must always have a bottom time available in the case that he exceeds the planned bottom time. For this reason, the last bottom time available in the table should not normally be used".

Nevertheless, it is considered that having at least two bottom times as backup is a safer option.

Except at 12 m, the surface decompression table offer fewer bottom times than the corresponding depth of the in-water decompression table. Thus, precautions must be in place to limit the bottom time and have some recovery tables.

2.3.2.16 - Exceeding the planned depth

Select the next depth, or the last depth that should be used only as a backup

If there is no depth available, switch to in-water decompression table, select the depth attained by the diver and complete the decompression in the water.

If the in-water stops are not possible due to adverse weather conditions, perform the in-water stops until 9 m then transfer the diver to the chamber in less than 4 minutes. Contact the diving medical specialist and follow his recommendations. If the diving medical specialist cannot be contacted, treat using the treatment table Cx18.

Note that the use of a medical table is not considered a normal procedure and will be reported as an incident. Similarly, a dive beyond the operational limit UK-HSE will also be reported as an incident.

2.3.3 - Surface decompression tables

Depth 12 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
180	1:00	-	-	-	3	10	6	20:00	12h00
210	1:00	-	-	-	3	10	6	20:00	12h00
240	1:00	-	-	-	3	10	6	20:00	12h00
Maximum operational limit UK-HSE									
270	1:00	-	-	-	3	20	6	30:00	12h00
300	1:00	-	-	-	3	25	6	35:00	12h00
330	1:00	-	-	-	3	25	6	35:00	12h00
360	1:00	-	-	-	3	30	6	40:00	12h00

Depth 15 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
90	1:15	-	-	-	3	10	6	20:15	12h00
100	1:15	-	-	-	3	10	6	20:15	12h00
110	1:15	-	-	-	3	10	6	20:15	12h00
120	1:15	-	-	-	3	10	6	20:15	12h00
130	1:15	-	-	-	3	10	6	20:15	12h00
140	1:15	-	-	-	3	15	6	25:15	12h00
150	1:15	-	-	-	3	20	6	30:15	12h00
180	1:15	-	-	-	3	25	6	35:15	12h00
Maximum operational limit UK-HSE									

Warning:

This table is limited to 180 min that is also the UK-HSE bottom time limit.

Consider this to have at least 1 recovery table (last bottom time allows 30 min), particularly if the safety procedure selected is one additional bottom time.

Depth 18 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
60	1:30	-	-	-	3	10	6	20:30	12h00
70	1:30	-	-	-	3	10	6	20:30	12h00
80	1:30	-	-	-	3	10	6	20:30	12h00
90	1:30	-	-	-	3	15	6	25:30	12h00
100	1:30	-	-	-	3	20	6	30:30	12h00
110	1:30	-	-	-	3	25	6	35:30	12h00
120	1:30	-	-	-	3	25	6	35:30	12h00
Maximum operational limit UK-HSE									
130	1:30	-	-	-	3	30	6	40:30	12h00
140	1:30	-	-	-	3	40	6	50:30	12h00
150	1:30	-	-	-	3	40	6	50:30	12h00

Depth 21 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
40	1:45	-	-	-	3	10	6	20:45	12h00
45	1:45	-	-	-	3	10	6	20:45	12h00
50	1:45	-	-	-	3	10	6	20:45	12h00
60	1:45	-	-	-	3	10	6	20:45	12h00
70	1:45	-	-	-	3	15	6	25:45	12h00
80	1:45	-	-	-	3	20	6	30:45	12h00
90	1:45	-	-	-	3	25	6	35:45	12h00
Maximum operational limit UK-HSE									
100	1:45	-	-	-	3	35	6	45:45	12h00
110	1:45	-	-	-	3	40	6	50:45	12h00
120	1:45	-	-	-	3	45	6	55:45	12h00

Depth 24 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
30	2:00	-	-	-	3	10	6	21:00	12h00
35	2:00	-	-	-	3	10	6	21:00	12h00
40	2:00	-	-	-	3	10	6	21:00	12h00
45	2:00	-	-	-	3	10	6	21:00	12h00
50	2:00	-	-	-	3	10	6	21:00	12h00
60	2:00	-	-	-	3	15	6	26:00	12h00
70	2:00	-	-	-	3	25	6	36:00	12h00
Maximum operational limit UK-HSE									
80	2:00	-	-	-	3	35	6	46:00	12h00
90	2:00	-	-	-	3	40	6	51:00	12h00

Depth 27 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
25	2:15	-	-	-	3	10	6	21:15	12h00
30	2:15	-	-	-	3	10	6	21:15	12h00
35	2:15	-	-	-	3	10	6	21:15	12h00
40	2:15	-	-	-	3	10	6	21:15	12h00
45	2:15	-	-	-	3	15	6	26:15	12h00
50	2:15	-	-	-	3	20	6	31:15	12h00
60	2:15	-	-	-	3	30	6	41:15	12h00
Maximum operational limit UK-HSE									
70	1:30	-	-	3	3	40	6	53:30	12h00

Warning: There is only one bottom time available after the UK-HSE bottom time limit.

Depth 30 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
20	2:30	-	-	-	3	10	6	21:30	12h00
25	2:30	-	-	-	3	10	6	21:30	12h00
30	2:30	-	-	-	3	10	6	21:30	12h00
35	2:30	-	-	-	3	15	6	26:30	12h00
40	2:30	-	-	-	3	20	6	31:30	12h00
45	2:30	-	-	-	3	20	6	31:30	12h00
50	2:30	-	-	-	3	25	6	36:30	12h00
Maximum operational limit UK-HSE									
60	1:45	-	-	3	3	40	6	53:45	12h00

Warning: There is only one bottom time available after the UK-HSE bottom time limit.

Depth 33 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
15	2:45	-	-	-	3	10	6	21:45	12h00
20	2:45	-	-	-	3	10	6	21:45	12h00
25	2:45	-	-	-	3	10	6	21:45	12h00
30	2:45	-	-	-	3	15	6	26:45	12h00
35	2:45	-	-	-	3	20	6	31:45	12h00
40	2:45	-	-	-	3	25	6	36:45	12h00
Maximum operational limit UK-HSE									
45	2:00	-	-	3	3	30	6	44:45	12h00
50	2:00	-	-	5	3	35	6	51:00	12h00
60	2:00	-	-	10	3	45	6	66:00	12h00

Depth 36 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
15	3:00	-	-	-	3	10	6	22:00	12h00
20	3:00	-	-	-	3	10	6	22:00	12h00
25	3:00	-	-	-	3	15	6	27:00	12h00
30	3:00	-	-	-	3	20	6	32:00	12h00
35	2:15	-	-	3	3	25	6	39:15	12h00
Maximum operational limit UK-HSE									
40	2:15	-	-	3	3	30	6	44:15	12h00
45	2:15	-	-	5	3	35	6	51:15	12h00
50	2:00	-	3	7	3	40	6	61:15	12h00

Depth 39 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
10	3:15	-	-	-	3	10	6	22:15	12h00
15	3:15	-	-	-	3	10	6	22:15	12h00
20	3:15	-	-	-	3	10	6	22:15	12h00
25	3:15	-	-	-	3	15	6	27:15	12h00
30	2:30	-	-	3	3	25	6	39:30	12h00
Maximum operational limit UK-HSE									
35	2:30	-	-	5	3	30	6	46:30	12h00
40	2:15	-	3	7	3	35	6	56:15	12h00

Depth 42 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
10	3:30	-	-	-	3	10	6	22:30	12h00
15	3:30	-	-	-	3	10	6	22:30	12h00
20	3:30	-	-	-	3	15	6	27:30	12h00
25	2:45	-	-	3	3	25	6	39:45	12h00
30	2:45	-	-	5	3	30	6	46:45	12h00
Maximum operational limit UK-HSE									
35	2:30	-	3	7	3	35	6	56:30	12h00
40	2:30	-	3	10	3	40	6	64:30	12h00

Depth 45 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
10	3:45	-	-	-	3	10	6	22:45	12h00
15	3:45	-	-	-	3	10	6	22:45	12h00
20	3:00	-	-	3	3	15	6	30:00	12h00
25	3:00	-	-	3	3	25	6	40:00	12h00
Maximum operational limit UK-HSE									
30	3:15	-	3	5	3	30	6	50:15	12h00

Warning: There is only one bottom time available after the UK-HSE bottom time limit.

Depth 48 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
10	4:00	-	-	-	3	10	6	23:00	12h00
15	4:00	-	-	-	3	10	6	23:00	12h00
20	3:15	-	-	3	3	20	6	35:15	12h00
25	3:15	-	-	5	3	25	6	42:15	12h00
Maximum operational limit UK-HSE									
30	3:00	-	3	7	3	35	6	57:00	12h00

Warning: There is only one bottom time available after the UK-HSE bottom time limit.

Depth 51 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
10	4:15	-	-	-	3	10	6	23:15	12h00
15	3:30	-	-	3	3	15	6	30:30	12h00
20	3:30	-	-	5	3	25	6	42:30	12h00
Maximum operational limit HSE									
25	3:15	-	3	5	3	30	6	50:15	12h00
30	3:15	-	5	7	3	40	6	64:15	12h00

Warning: This is the last table available

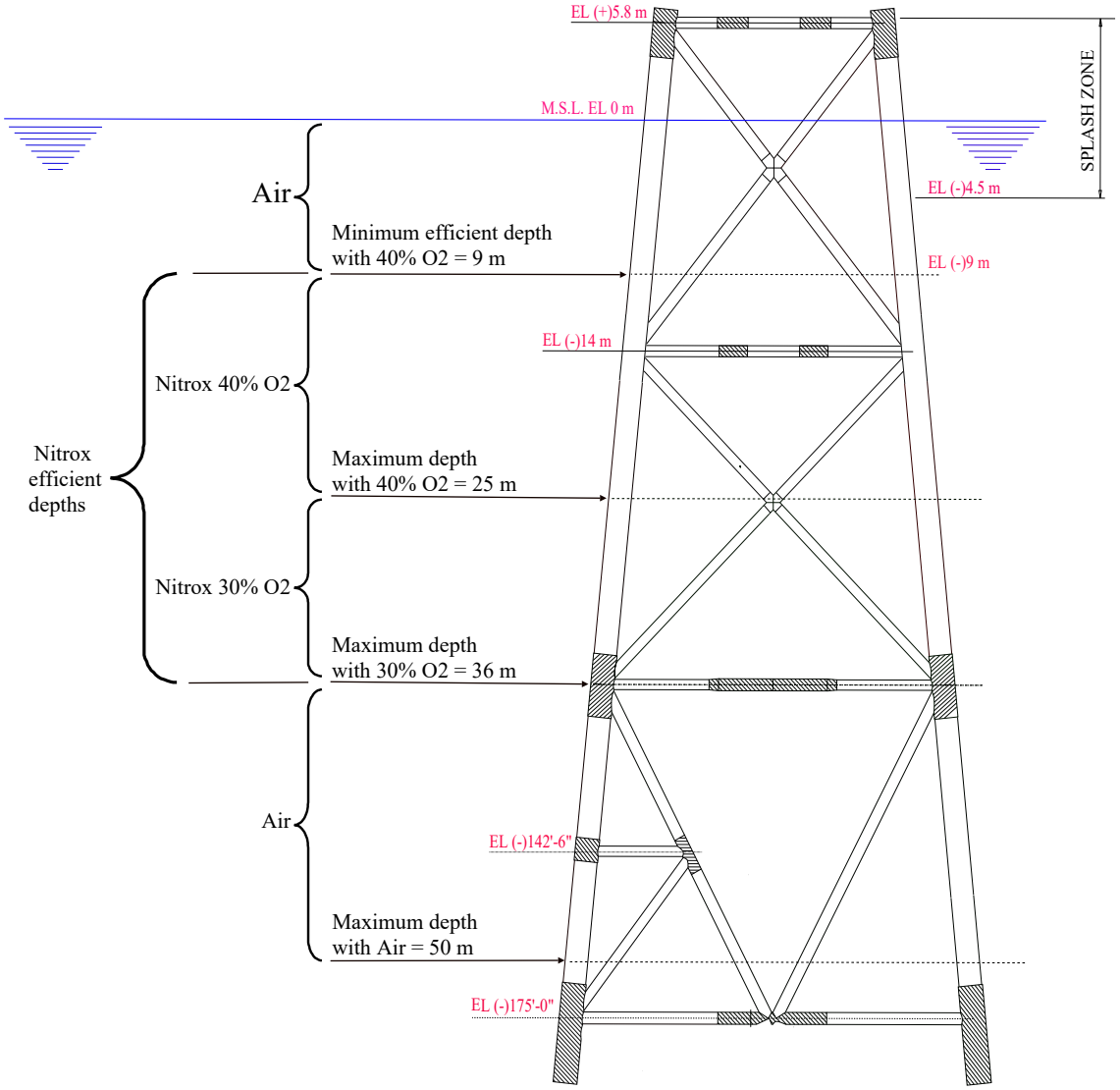
2.4 - Nitrox diving procedures

2.4.1 - Purpose

In theory, “Nitrox” is a mix of nitrogen with oxygen. Thus, the “natural air” is a “Nitrox”. What is commonly called “Nitrox”, or “enriched air” in the diving industry is nitrogen-oxygen breathing gas mixtures with an oxygen percentage higher than natural air.

Using “Nitrox” significantly increases the time a diver can spend at depth without decompressing. It also decreases the required decompression time compared to a similar dive made at the same depth using air.
Another advantage is that the UK-HSE maximum exposure limit applicable is calculated according to the “Equivalent Air Depth” (EAD), which increases the bottom time allowable at a depth. As an example, for a dive at 24 m using a mix with 40% O_2, the “equivalent air depth” is 18 m: The UK-HSE maximum exposure limit at 18 m is 120 minutes, instead of 70 minutes at 24 m. That gives a gain of 50 minutes bottom time compared to an air dive at this depth.

The main safety risk not normally present when breathing compressed air is the increased risk of oxygen toxicity. For this reason, based on the scientific studies mentioned in the chapter *“Adverse effects of hyperbaric oxygen”* of Book #1 *“Description and prevention of diving accidents”*, the maximum allowable oxygen partial pressure for nitrox diving is limited to 1.4 bar, which is also the limit adopted by NOAA (National Oceanic and Atmospheric Administration - USA) in their operational requirement, and by other professional organizations. As a result, depending on the percentage of oxygen in the mix selected, the maximum depth allowable is limited by this partial pressure. In addition to this limit, it is admitted that a mix with an oxygen percentage below 30% is beneficial, but does not give efficient gain of decompression reduction. As an example, the scheme below shows the operational limits and efficient depths for mixes with 30 and 40 % Oxygen.



The mix used can be provided by gas manufacturers, mixed onsite using a blending panel, or also fabricated using membrane systems that selectively separate nitrogen and oxygen from the air, or pressure swing absorption oxygen generators. Note that these machines, and the compressors designed for oxygen are described in point 2.12 *“Compressors”,* and the procedures for gas mixing are discussed in point 3.2 “Gas blending”.

Note that mixes above 22% oxygen are considered pure oxygen in this handbook. Also, for operational reasons, limiting the mixes in use to two or three percentages is advisable. For example, mixes with 30%, 40%, and 50% oxygen.

2.4.2 - Equivalent air depth calculation for nitrogen/oxygen breathing mixture using MT92/2019 Table 7

2.4.2.1 - Mixes promoted by MT92/2019 and means of calculation provided

There is no specific decompression tables for nitrogen-oxygen breathing mixtures. The diver is decompressed using an air table according to the "Equivalent Air Depth" (EAD).

The principle of the Equivalent Air Depth is that the partial pressure of nitrogen in the breathing mixture at the actual depth of the dive is used to determine the depth of a dive on air (i.e., the EAD) with the same partial pressure of nitrogen. The decompression requirement for the dive using the nitrogen-oxygen mixture is then determined from an air diving table for that EAD. Thus, a dive on 60% nitrogen & 40% oxygen at 15 m has approximately the same partial pressure of nitrogen *[2.5 x 60 / 100 = 1.5 bar]* as a dive to 9 m on air with 79% nitrogen *[1.9 x 79 / 100 = 1.5 bar]*.
The "equivalent air depth" EAD for 15 m on 60% N_2/40% O_2 is therefore 9 m. Because the EAD is shallower than the actual dive depth, the decompression required for the nitrogen-oxygen dive is less than would be required for an air dive to the same actual depth.

MT92/2019 promotes six nitrogen-oxygen mixtures:

- 50% N_2 / 50% O_2
- 55% N_2 / 45% O_2
- 60% N_2 / 40% O_2
- 65% N_2 / 35% O_2
- 70% N_2 / 30% O_2
- 75% N_2 / 25% O_2

Table 7 shows the equivalent air depths (EAD) adjusted to the appropriate decompression schedule depth, and the partial pressure of oxygen (PPO_2) for these mixtures. It is designed to be used with the following MT92/2019 procedures:

- Standard air table (in-water decompression)
- In-water oxygen decompression at 6 m
- In-wet bell decompression at 12 and 6 m
- Surface Oxygen decompression.

2.4.2.2 - Adjustment of table 7 to the new recommended maximum partial pressure of oxygen

Regarding the maximum partial pressure of oxygen in the mixes, it must be mentioned that in their study "Oxygen Toxicity and Special Operations Forces Diving: Hidden and Dangerous", doctors Thijs T. Wingelaar, Pieter-Jan A. M. van Ooij, & Rob A. van Hulst say that no oxygen-induced convulsions have been described with a PO_2 lower than 1.3 bar in humans, even though susceptibility to oxygen toxicity has a high interpersonal and intra-individual variability. Also, doctor Barbara Shykoff (US Navy) did experiments at 1.35 ata that did not result in central nervous system toxicity. Based on such studies, the US Navy has limited the maximum partial pressure at work of surface-supplied diving operations to 1.4 ata. However, the US Navy has kept the in-water oxygen stops at 30 and 20 feet.
A lot of organizations have also adopted the limitation at 1.4 bar, such as the Diving Medical Advisory Committee (DMAC), or IMCA that, in addition to recommending 1.4 bar as the upper limit for partial pressure of oxygen in the nitrox mix breathed by the diver when at depth if using surface-supplied diving techniques, says that higher partial pressures than 1.4 bar can be used for the decompression stops. Also, in its *"Diving Standards & Safety manual"*, NOAA (National Oceanic and Atmospheric Administration - USA) says that the PO_2 of any gas mixture breathed during a dive must not exceed 1.4 absolute atmospheres (ata), except during the decompression phase when a PO_2 of 1.6 is allowed. These are the limitations also adopted in this handbook.

MT92/2019 Table 7 was initially designed for a maximum partial pressure of 1.6 bar, considered safe during the eighties and the nineties. To comply with the latest scientific studies mentioned above that are explained in the chapter *"Adverse effects of hyperbaric oxygen"* of Book #1 *"Description and prevention of diving accidents"*, the maximum partial pressures available in this table have been adjusted to 1.4 bar maximum.

2.4.2.3 - Procedure for selecting the equivalent air depth using MT92/2019 Table 7

MT 92/2019 Table 7 is designed to avoid calculation, thus limit the mistakes due to miscalculation. It indicates the real depth and the equivalent depths for the pre-calculated mixes mentioned above (see on the next page), so no calculation is necessary to find the equivalent depth and the table to select for this depth.

The method for using it is the following:

1. Determine the actual depth of the dive.
2. Select the Nitrox mix.
3. Use table 7 to determine the corresponding equivalent depth
4. Use this equivalent depth to select the decompression table

Example: For a dive at 27 m with 50 minutes bottom time.

1. The actual depth is 27 m (See in the table on the next page)
2. The mixes that can be used at 27 m are 35/65, 30/70, and 25/75. In this example the mix available is 30/70 (See the corresponding column in the table on the next page)
3. The equivalent depth using 30/70 at 27 m is 24 m (See in the table on the next page).

Real depth	Nitrox mix					
	25/75	30/70	35/65	40/60	45/55	50/50
9 m	9 m	9 m	6 m	6 m	6 m	3 m
10 m	9 m	9 m	9 m	6 m	6 m	3 m
11 m	12 m	9 m	9 m	6 m	6 m	6 m
12 m	12 m	12 m	9 m	9 m	6 m	6 m
13 m	12 m	12 m	9 m	9 m	9 m	6 m
14 m	15 m	12 m	12 m	9 m	9 m	6 m
15 m	15 m	15 m	12 m	9 m	9 m	6 m
16 m	15 m	15 m	12 m	12 m	9 m	9 m
17 m	18 m	15 m	15 m	12 m	9 m	9 m
18 m	18 m	15 m	15 m	12 m	12 m	9 m
19 m	18 m	18 m	15 m	15 m	12 m	
20 m	21 m	18 m	15 m	15 m	12 m	
21 m	21 m	18 m	18 m	15 m	12 m	
22 m	21 m	21 m	18 m	15 m		
23 m	24 m	21 m	18 m	18 m		
24 m	24 m	21 m	18 m	18 m		
25 m	24 m	24 m	21 m	18 m		
26 m	27 m	24 m				
27 m	27 m	24 m				
28 m	27 m	24 m	24 m			
29 m	30 m	27 m	24 m			
30 m	30 m	27 m	24 m			
31 m	30 m	27 m				
32 m	30 m	30 m				
33 m	33 m	30 m				
34 m	33 m	30 m				
35 m	33 m	30 m				
36 m	36 m	33 m				
37 m	36 m					
38 m	36 m					
39 m	39 m					
40 m	39 m					
41 m	39 m					
42 m	42 m					
43 m	42 m					

1 2 3 Equivalent depth

4. Select the table 24 m to perform the decompression

Depth 27 metres

Actual depth

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
20	2:15	-	-	-	-	-	-	2:15	Possible
25	2:00	-	-	-	-	-	3	5:00	Possible
30	2:00	-	-	-	-	-	5	7:00	Possible
35	2:00	-	-	-	-	-	10	12:00	Possible
40	1:45	-	-	-	-	3	12	16:45	Possible
45	1:45	-	-	-	-	3	15	19:45	Possible
50	1:45	-	-	-	-	5	20	26:45	Possible
60	1:45	-	-	-	-	7	30	38:45	Possible
Maximum operational limit UK-HSE									
70	1:45	-	-	-	3	12	35	51:45	Possible

10 minutes

Depth 24 metres

Deco. table

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
25	2:00	-	-	-	-	-	-	2:00	Possible
30	1:45	-	-	-	-	-	3	4:45	Possible
35	1:45	-	-	-	-	-	5	6:45	Possible
40	1:45	-	-	-	-	-	7	8:45	Possible
45	1:45	-	-	-	-	-	10	11:45	Possible
50	1:45	-	-	-	-	-	15	16:45	Possible
60	1:30	-	-	-	-	3	20	24:30	Possible
70	1:30	-	-	-	-	5	30	36:30	Possible
Maximum operational limit UK-HSE									
80	1:30	-	-	-	-	10	35	46:30	Possible

2.4.3 - Calculate the "Equivalent Air Depth" (EAD)

As explained point 4.4.1, the decompression table to use for a nitrox dive is found by calculating the "equivalent air depth" (EAD). MT92/2019 Table 7 promotes six mixes with 25%; 30%; 35%; 40%; 45%; and 50% oxygen to cover the range between 9 m and 43 m. Nevertheless it can happen that the "ideal mixes" recommended by MT 92/2019 are not available, and that other mixes are proposed. In this case the equivalent air depth can be calculated.

2.4.3.1 - Using the metric system, the formula is:

$$EAD = \frac{(\text{nitrogen \% x absolute depth})}{79} - 10 \text{ msw}$$

Example: Equivalent air depth (EAD) of a mix 40% oxygen + 60% nitrogen at 25 metres depth
- Nitrogen = 60%
- Absolute depth = 25 msw + 10 msw = 35 msw *(Note: 10 msw is the depth for a pressure of 1 bar, which is the pressure of the atmosphere)*
- Equivalent air depth = 60 x 35 / 79 - 10 = 26.6 - 10 = 16.6 msw

2.4.3.2 - Using the imperial system, the formula is:

$$EAD = \frac{(\text{nitrogen \% x absolute depth})}{79} - 33 \text{ fsw}$$

Example: Equivalent air depth (EAD) of a mix 30% oxygen + 70% nitrogen at 100 feet depth
- Nitrogen = 70%
- Absolute depth = 100 fsw + 33 fsw = 133 fsw *(Note: 33 fsw is the depth for a pressure of 1 ATA, which is the pressure of the atmosphere)*
- Equivalent air depth = 70 x 133 / 79 - 33 = 117.8 - 33 = 84.8 fsw

2.4.3.2 - Make the calculation more stringent

Competent bodies recommend to compute the EAD for the worst case value, and to round it up to the next greater value.

2.4.4 - Calculate the "Partial Pressure" (PP)

1.4 bar is the maximum partial pressure agreed underwater with nitrox mixes.
The basic formula to calculate the partial pressure is: *abs pressure x % = PP*
Partial pressure can be also calculated using "absolute depth" value, which is sometimes more convenient.

2.4.4.1 - For calculation in "metric"

Absolute depth /10 x % = Partial Pressure (bar)

Example: What is the oxygen partial pressure of a mix 20/80 at 10 msw?
- Absolute depth: 10 msw + 10 msw = 20 msw
- Partial pressure: (20 /10) x 20% = 2 x 20% = 0.4 bar

2.4.4.2 - For calculation in "imperial"

Absolute depth /33 x % = Partial pressure (atmosphere)

Example: What is the oxygen partial pressure of a mix 20/80 at 33 msw?
- Absolute depth: 33 fsw + 33 fsw = 66 fsw
- Partial pressure: (66 /33) x 20% = 2 x 20% = 0.4 atmosphere

2.4.4.3 - Make the calculation more stringent

Some competent bodies recommend to compute the PPO_2 for the worst case value and to round it up to the next greater first decimal value (e.g., 1.32 to 1.4, 1.45 to 1.5).

2.4.5 - Breathing mix during the stops and successive dives

2.4.5.1 - Breathing mix during the stops

The bottom mix can be used during the stops and gives the advantage to be richer in oxygen than air. Thus, improve the decompression. Nevertheless, based on the fact that the equivalent air depth is corresponding to the depth the diver is supposed have reached using air, the stops can be performed using air.
Decompression using in-water oxygen or surface oxygen decompression is allowed.

2.4.5.1 - Successive dives

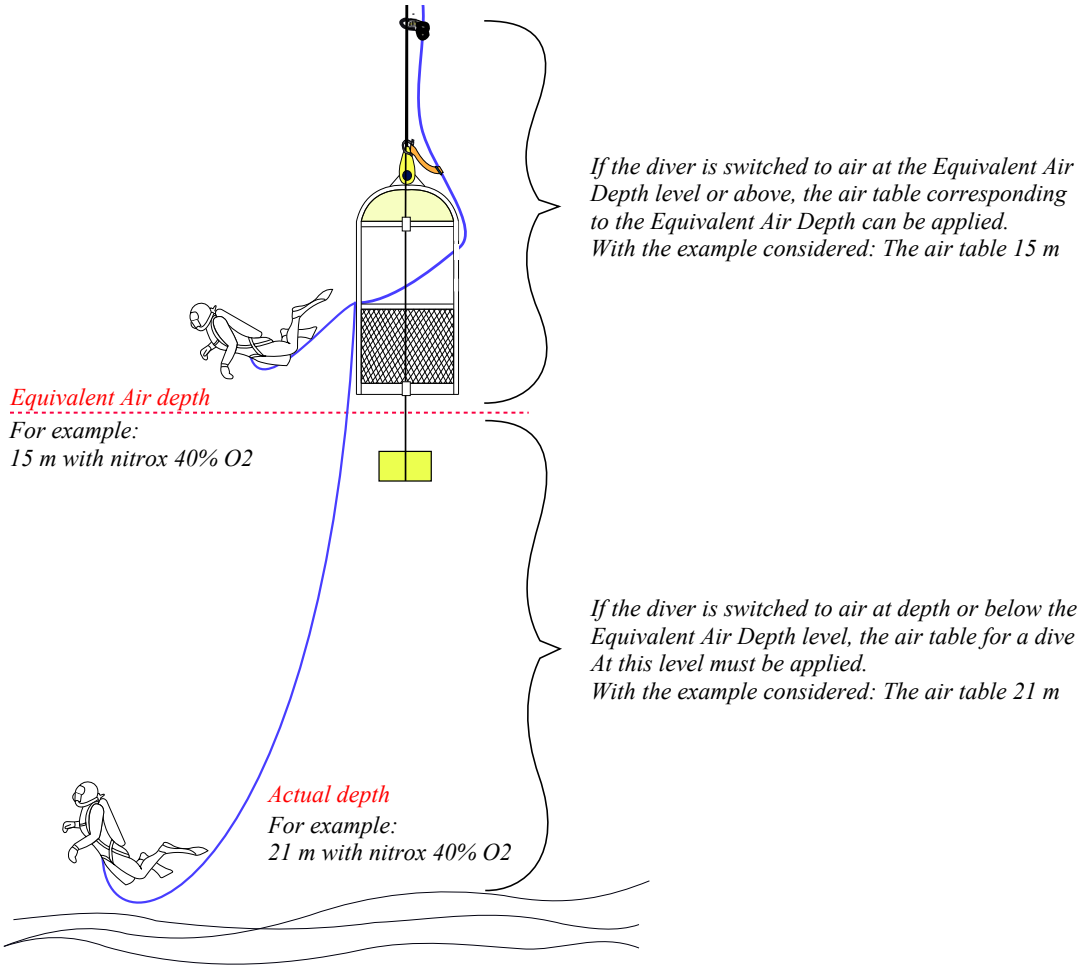
The procedure to be used is exactly the one used for the standard air.

2.4.6 - Control of acute oxygen poisoning

The contingencies for “air standard in-water decompression” and “Nitrox diving” are the same except for the problems linked to using elevated partial pressures of oxygen. For this reason, and as for the use of oxygen for the stops, this point focuses only on those related to this gas, as acute oxygen poisoning may affect people sensitive to oxygen despite the limited partial pressures and times of exposure.
The procedure is the one to apply for every acute oxygen poisoning case and consists of removing the diver from the elevated oxygen partial pressure and controlling the side effects.

2.4.6.1 - Minor symptoms during the dive

- The nitrox supply must be stopped, and the helmet flushed with air.
- The divers ascent to the basket which should be stored above him (that should reduce the partial pressure of O2). Example: At 25 msw with a mix 40% O2 the PPO2 is 1.4 bar. If the diver ascent to 17 msw, the PPO2 is 1.08 bar.
- The stand by diver must be sent to assist the diver.
- The decompression table to apply is the air decompression table for the actual depth of the diver, if the diver has been passed on air when at depth.
- If the diver has been passed on air when the “equivalent air dive” level has been reached or passed, the decompression to apply is the one corresponding to the equivalent air dive level .



2.4.7.2 - Serious symptoms during the dive

- If the symptoms are too severe, but the epileptic crisis not yet started, the diver must be passed on air, removed from water and surface decompression procedure should be applied. Surface decompression must be considered even for trivial cases, and must be organized for all cases that could become more serious. The advantage of decompression in chamber is that the casualty can be easily controlled, which is not the case if the casualty is wearing his helmet and is underwater.
- The selection of the decompression table is to be done according to what is explained in the point above.
- If the epileptic crisis is started, the diver cannot be ascended as he is not able to exhale; ascent could trigger pulmonary barotrauma. In this case, the solution is to wait until the end of the crisis and ascent later on. However, during such a crisis, the diver can swallow his tongue or vomit in his helmet, which may result in suffocation or vomit swallowed by the lungs. In both cases, the final result can be a fatality.
  For these reasons, an epileptic crisis in the water must be avoided, and the diver must inform the diving supervisor of any symptom/bad feeling instead of waiting for the start of the crisis: Prudence must be the rule!

3 - After the dive

3.2 - Chamber proximity, activities on deck, and clearance from risks of a decompression accident

3.2.1 - Proximity of chamber and activities following a dive

MT 92/2019 says that When the symptoms of a decompression accident occur, they generally appear within 30 minutes following a return to atmospheric pressure. However, there are situations where symptoms of decompression illness have arisen 10 hours after surfacing. A decompression chamber must thus be accessible to the diver for 12 hours following his decompression.

This point is confirmed by the recommendations from DMAC 022, which says the following:

1. On completion of oxy-helium or other saturation decompression; after surface-orientated dives requiring decompression stops; and after dives within the no-stop limits but with multiple ascents (‘yo-yo’ diving) the divers should remain in the vicinity (within 20 minutes) of a suitable chamber for 4 hours. They should then remain within two hours travelling time of a two-compartment chamber until 12 hours post-surfacing.
2. Shallower than 10 m and for one or two dives within accepted no-stop limits, the divers should remain in the vicinity of a suitable chamber (within 20 minutes) for one hour. The diving contractor's diving rules should make provision for any subsequent emergency procedures after these intervals.

It should be emphasised to all divers that:

- Any symptom should be reported before departure from a dive location.
- Treatment begun soon after the onset of symptoms is often relatively straightforward but treatment which has been delayed for a while after the onset of symptoms may be difficult because the condition has become less responsive.

During the two hours following decompression, it is recommended that divers limit their activities to tasks which do not involve sustained physical effort, and in particular, it is recommended that they avoid running, climbing stairs or participating in intense sports exercises.

3.2.2 - Clearance from risks of a decompression accident

MT92/2019 decompression tables specify a compulsory interval of 12 hours between dives. This period is mandatory before undertaking a second dive with air or nitrox. The only exception to this rule concerns dives using air or nitrox as a breathing mix and with the decompression stops performed in water when the method for successive (repetitive) dives indicated in point 4.1.4 is implemented (this exception does not apply to "surface decompression").
After completing his interval following a dive, the diver is, in principle, free from all remaining phenomena from his last dive and may commence another one.
Regarding this point, it must be taken into account that other organizations consider that this interval should be extended to 18 hours.
Note that if the diver has to go to a dive site situated in altitude after a dive at sea level, the recommendations for flying after diving, discussed in the next point, apply.

3.3 - Flying after diving

3.3.1 - Consequences of a diver developing a decompression accident during a flight

When the diver arrives at the sea's surface at the end of a dive, the table allows him to stay at this level, but not above. Still, immediate transfer to a higher altitude is prohibited without applying a relevant stand-by procedure because exposure to a diminished atmospheric pressure than at the sea's surface may trigger uncontrolled off-gassing. As the cabin altitude of a pressurized passenger aircraft is usually 8000 ft (2440 metres), The diver traveling home after diving operations may be subject to a decompression accident if the precautions described in the next points are not implemented. The following potential consequences of such a scenario should be taken into consideration:

- Most divers returning home after diving operations are alone during the entire flight or a part of their journey. For this reason, the victim may not be able to explain he has a decompression accident for several reasons, such as loss of consciousness, the inability to speak clearly, or the inability of the people surrounding him to understand what he says. Thus, the cabin attendants, unaware of decompression problems, may not treat him appropriately.
- Note that even though the diver is conscious and can explain he is affected by decompression sickness, the medical kit of the plane cabin is not designed to treat such accidents. According to specialized websites, these kits have been thought to treat the following health problems that are the most encountered:
    - Gastrointestinal/Nausea
    - Neurological, such as fainting or seizures
    - Respiratory
    - Cardiovascular
    - Dermatological

  Also, basic emergency kits such as those required by the US Federal Aviation Administration are not provided with an oxygen breathing kit. Some companies include it in addition to defibrillators and medical communication headsets, but it is not the case for all transporters.
- As a result of the conditions above, the pilots may be obliged to reorganize their flight, so lower the altitude to increase the cabin's pressure and look for an airfield where the plane can land to transfer the victim to an adequate facility. In addition to the numerous reports resulting from such a decision, the expenses resulting from such an emergency landing may be charged to the person or the company responsible if appropriate post-dive precautions have not been applied. This point applies, of course, to diving companies, but also the divers, as they are not supposed to ignore this.

3.3.2 - Flying following dives without decompression illness problems or any symptoms

We have explained the reasons for applying the guideline from the Diving Medical Advisory Committee (DMAC) in place of the one published in the decree of 14 May 2019 in point 3.4.5 of chapter “A” of “Book #1”.

The last revision of DMAC 7, displayed below and published in November 2017, should be applied to all flights. Also, a scenario with an aircraft cabin altitude of 8000 ft (2440 metres) should be the norm.

Flights with a cabin altitude below 600 m are usually short flights and helicopter transfers. The cabins of these aircraft are often not pressurized. As a result, unless the pilot is instructed not to fly above this limit, he may decide to position the aircraft above it for safety reasons or because he has been asked to proceed this way. Thus, except for specific flights where the pilot is instructed not to expose his passengers to an altitude above 600 m, the procedure from DMAC 7 for “all flights” should be applied.

Table 1:
Diving without decompression illness problems or any symptoms

	Minimum times before flying at cabin altitude	
	2000 feet (600 m)	***All other flights***
1.1 - No stop dives. Total time under pressure less than 60 minutes within the last 12 hours	2 hours	18 hours (24 hours)*
1.2 - All other air and nitrox diving, heliox and mixed gas bounce diving *(less than 4 hours under pressure)*	12 hours	24 hours
1.3 - Heliox saturation *(more than 4 hours under pressure)*		
1.4 - Air, nitrox or trimix saturation *(more than 4 hours under pressure)*	24 hours	48 hours

** 18 hour time applies to short flights (less than 3 hours). For longer flights the time is extended to 24 hours*

In addition, the DMAC says the following:

The times given below are minimum times: longer time intervals are recommended, in particular if the planned journey

involves a number of take-offs. Journeys involving multiple flights are common and are likely to carry an increased risk. Shorter times may be considered but only after the advice of a qualified medical diving physician.
Flying (or any altitude exposure including road travel) in the presence of even minor symptoms of decompression illness carries a considerable risk of provoking serious neurological illness.

3.3.3 - Flying following therapy for decompression illness

The transfer of a diver following therapy for decompression illness or arterial gas embolism should not be organized without the authorization of the diving medical specialists. Thus, the guidelines indicated in the section "Decompression accidents" of Book #1, "Description and prevention of diving accidents", should be considered by the people involved in the treatment to decide whether the casualty transfer is possible and desirable and how this person can be transferred. The document DMAC 7 provides specific guidelines regarding this particular point, which are discussed in this section with other procedures.

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4 - MT92 decompression tables set ready for use in the dive control

4.1 - Table #1 - Air table for decompression without stops

Table 1

Depth	Surface interval		
	12 h 00	6 h 00	4 h 00
7,5 m	No limit	No limit	No limit
9,0 m	360 min	330 min	300 min
10,5 m	270 min	250 min	240 min
12 m	165 min	150 min	135 min
13,5 m	100 min	90 min	90 min
15 m	80 min	70 min	60 min
18 m	50 min	40 min	35 min
21 m	35 min	25 min	20 min
24 m	25 min	20 min	10 min
27 m	20 min	15 min	10 min
30 m	15 min	10 min	5 min
33 m	12 min	7 min	2 min
36 m	10 min	5 min	-
39 m	8 min	3 min	-
42 m	7 min	2 min	-
45 m	6 min	-	-
48 m	5 min	-	-
51 m	5 min	-	-

Reminder:

- The maximum UK-HSE bottom time above 12 m is limited to 240 minutes

- The maximum depth UK-HSE is 50 m

4.2 - Table #2 - Simplified standard air table

Table 2

Depth	Maximum bottom times in minutes														IOGP limits
12 m	165	170	180	195	210	240	-	-	-	-	-	-	-	-	240 min.
15 m	80	90	100	110	115	130	-	-	-	-	-	-	-	-	180 min.
18 m	50	55	60	70	75	80	-	-	-	-	-	-	-	-	120 min.
21 m	35	40	45	50	55	60	-	-	-	75	-	-	-	-	90 min.
24 m	25	30	35	40	45	50	-	-	55	60	-	-	-	-	70 min.
27 m	20	25	30	33	35	-	-	40	45	48	-	55	-	-	60 min.
30 m	15	20	25	28	30	-	-	35	38	42	-	47	55	-	50 min.
33 m	12	15	20	23	-	-	25	30	32	37	-	40	47	-	40 min.
36 m	10	15	17	20	-	-	22	25	27	32	-	34	40	43	35 min.
39 m	8	10	15	17	-	-	20	22	24		27	30	35	38	30 min.
42 m	7	10	13	14	-	-	18	20	-	-	24	27	30	33	30 min.
45 m	6	10	12	13	-	-	15	18	-	-	22	25	28	30	25 min.
48 m	5	8	10	12	-	-	15	-	-	-	20	23	26	28	25 min.
51 m	5	7	8	-	-	-	12	-	-	-	18	21	24	25	20 min.
54 m	-	5	7	-	-	-	10	-	-	-	16	19	-	23	
57 m	-	5	6	-	-	-	10	-	-	-	14	17	-	21	
60 m	-	-	5	-	-	-	8	-	-	-	12	-	-	18	
Stops	**Ascent to first stop** (ascent at 12 m/min)														The UK-HSE maximum depth is 50 m
12m	-	-	-	-	-	-	-	-	-	-	-	-	-	3	
9m	-	-	-	-	-	-	-	-	-	-	3	3	5	5	
6m	-	-	-	-	-	-	3	3	3	3	5	7	10	12	
3m	-	3	5	7	10	15	7	12	15	20	15	20	25	25	

4.3 - Table #3 - Standard air tables

Depth 12 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
165	1:00	-	-	-	-	-	-	1:00	Possible
170	0:45	-	-	-	-	-	3	3:45	Possible
180	0:45	-	-	-	-	-	5	5:45	Possible
210	0:45	-	-	-	-	-	10	10:45	No
240	0:45	-	-	-	-	-	15	15:45	No
Maximum operational limit UK-HSE									
270	0:45	-	-	-	-	-	25	25:45	No
300	0:45	-	-	-	-	-	30	30:45	No
330	0:45	-	-	-	-	-	35	35:45	No
360	0:45	-	-	-	-	-	40	40:45	No

Depth 15 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
80	1:15	-	-	-	-	-	-	1:15	Possible
90	1:00	-	-	-	-	-	3	4:00	Possible
100	1:00	-	-	-	-	-	5	6:00	Possible
110	1:00	-	-	-	-	-	7	8:00	Possible
120	1:00	-	-	-	-	-	12	13:00	Possible
130	1:00	-	-	-	-	-	15	16:00	Possible
140	1:00	-	-	-	-	-	20	21:00	Possible
150	1:00	-	-	-	-	-	25	26:00	Possible
160	1:00	-	-	-	-	-	25	26:00	No
170	1:00	-	-	-	-	-	30	31:00	No
180	1:00	-	-	-	-	-	35	36:00	No
Maximum operational limit UK-HSE									
210	1:00	-	-	-	-	-	45	46:00	No
240	1:00	-	-	-	-	-	60	61:00	No
270	1:00	-	-	-	-	-	70	71:00	No

WARNING:
The corresponding surface decompression table is limited to 180 minutes of bottom time. Do not select bottom times beyond 170 min to have at least 1 recovery table available in the surface decompression table (surf. deco table last bottom times are 150 and 180 min)
Note that it is wiser to have 2 recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 18 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
50	1:30	-	-	-	-	-	-	1:30	Possible
55	1:15	-	-	-	-	-	3	4:15	Possible
60	1:15	-	-	-	-	-	5	6:15	Possible
70	1:15	-	-	-	-	-	7	8:15	Possible
80	1:15	-	-	-	-	-	15	16:15	Possible
90	1:15	-	-	-	-	-	20	21:15	Possible
100	1:15	-	-	-	-	-	25	26:15	Possible
110	1:15	-	-	-	-	-	30	31:15	Possible
120	1:15	-	-	-	-	-	35	36:15	Possible
Maximum operational limit UK-HSE									
130	1:00	-	-	-	-	3	40	44:00	Possible
140	1:00	-	-	-	-	5	45	51:00	Possible
150	1:00	-	-	-	-	7	50	58:00	Possible
160	1:00	-	-	-	-	10	50	61:00	Possible
170	1:00	-	-	-	-	12	55	68:00	Possible
180	1:00	-	-	-	-	15	60	76:00	Non
210	1:00	-	-	-	-	20	70	91:00	Non

Depth 21 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
35	1:45	-	-	-	-	-	-	1:45	Possible
40	1:30	-	-	-	-	-	3	4:30	Possible
45	1:30	-	-	-	-	-	5	6:30	Possible
50	1:30	-	-	-	-	-	7	8:30	Possible
60	1:30	-	-	-	-	-	15	16:30	Possible
70	1:30	-	-	-	-	-	20	21:30	Possible
80	1:15	-	-	-	-	3	25	29:15	Possible
90	1:15	-	-	-	-	5	30	36:15	Possible
Maximum operational limit UK-HSE									
100	1:15	-	-	-	-	7	35	43:15	Possible
110	1:15	-	-	-	-	10	40	51:15	Possible
120	1:15	-	-	-	-	15	45	61:15	Possible
130	1:15	-	-	-	-	20	50	71:15	Possible
140	1:15	-	-	-	-	25	55	81:15	Possible
150	1:00	-	-	-	3	25	60	89:00	No
180	1:00	-	-	-	5	40	75	121:00	No

Depth 24 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
25	2:00	-	-	-	-	-	-	2:00	Possible
30	1:45	-	-	-	-	-	3	4:45	Possible
35	1:45	-	-	-	-	-	5	6:45	Possible
40	1:45	-	-	-	-	-	7	8:45	Possible
45	1:45	-	-	-	-	-	10	11:45	Possible
50	1:45	-	-	-	-	-	15	16:45	Possible
60	1:30	-	-	-	-	3	20	24:30	Possible
70	1:30	-	-	-	-	5	30	36:30	Possible
Maximum operational limit UK-HSE									
80	1:30	-	-	-	-	10	35	46:30	Possible
90	1:30	-	-	-	-	15	40	56:30	Possible
100	1:15	-	-	-	3	20	45	69:15	Possible
110	1:15	-	-	-	3	25	50	79:15	Possible
120	1:15	-	-	-	3	30	60	94:15	Possible
130	1:15	-	-	-	5	30	65	101:15	Possible
140	1:15	-	-	-	10	35	70	116:15	No
150	1:15	-	-	-	10	40	75	126:15	No

Depth 27 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
20	2:15	-	-	-	-	-	-	2:15	Possible
25	2:00	-	-	-	-	-	3	5:00	Possible
30	2:00	-	-	-	-	-	5	7:00	Possible
35	2:00	-	-	-	-	-	10	12:00	Possible
40	1:45	-	-	-	-	3	12	16:45	Possible
45	1:45	-	-	-	-	3	15	19:45	Possible
50	1:45	-	-	-	-	5	20	26:45	Possible
60	1:45	-	-	-	-	7	30	38:45	Possible
Maximum operational limit UK-HSE									
70	1:45	-	-	-	3	12	35	51:45	Possible
80	1:30	-	-	-	3	17	40	61:30	Possible
90	1:30	-	-	-	5	25	50	81:30	Possible
100	1:30	-	-	-	10	30	55	96:30	Possible
110	1:30	-	-	-	12	30	65	108:30	Possible
120	1:30	-	-	-	15	35	70	121:30	Possible
130	1:15	-	-	3	20	40	75	139:15	No

WARNING:
The corresponding surface decompression table is limited to 70 min bottom time. Do not select bottom times beyond 60 min to have at least 1 recovery table available in the surface decompression procedure.
Note that it is wiser to have 2 recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 30 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
15	2:30	-	-	-	-	-	-	2:30	Possible
20	2:15	-	-	-	-	-	3	5:15	Possible
25	2:15	-	-	-	-	-	5	7:15	Possible
30	2:15	-	-	-	-	-	10	12:15	Possible
35	2:00	-	-	-	-	3	12	17:00	Possible
40	2:00	-	-	-	-	5	17	24:00	Possible
45	2:00	-	-	-	-	7	20	29:00	Possible
50	2:00	-	-	-	-	10	25	37:00	Possible
Maximum operational limit UK-HSE									
60	1:45	-	-	-	3	15	35	54:45	Possible
70	1:45	-	-	-	5	20	40	66:45	Possible
80	1:45	-	-	-	10	25	50	86:45	Possible
90	1:30	-	-	3	12	30	60	106:30	Possible
100	1:30	-	-	3	17	35	65	121:30	Possible
110	1:30	-	-	3	20	40	75	139:30	No

WARNING:
The corresponding surface decompression table is limited to 60 min bottom time. Do not select bottom times beyond 50 min to have at least 1 recovery table available in the surface decompression procedure.
Note that it is wiser to have 2 recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 33 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
12	2:45	-	-	-	-	-	-	2:45	Possible
15	2:30	-	-	-	-	-	3	5:30	Possible
20	2:30	-	-	-	-	-	5	7:30	Possible
25	2:15	-	-	-	-	3	7	12:15	Possible
30	2:15	-	-	-	-	3	12	17:15	Possible
35	2:15	-	-	-	-	5	15	22:15	Possible
40	2:00	-	-	-	3	7	20	32:00	Possible
Maximum operational limit UK-HSE									
45	2:00	-	-	-	3	10	25	40:00	Possible
50	2:00	-	-	-	5	15	30	52:00	Possible
60	2:00	-	-	-	10	20	40	72:00	Possible
70	1:45	-	-	3	12	25	50	91:45	Possible
80	1:45	-	-	3	15	30	60	109:45	Possible
90	1:45	-	-	5	20	35	65	126:45	Possible
100	1:45	-	-	10	25	40	75	151:45	No

Depth 36 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
10	3:00	-	-	-	-	-	-	3:00	Possible
15	2:45	-	-	-	-	-	3	5:45	Possible
20	2:45	-	-	-	-	-	7	9:45	Possible
25	2:30	-	-	-	-	3	12	17:30	Possible
30	2:30	-	-	-	-	5	17	24:30	Possible
35	2:15	-	-	-	3	10	20	35:15	Possible
Maximum operational limit UK-HSE									
40	2:15	-	-	-	3	12	25	42:15	Possible
45	2:15	-	-	-	5	15	30	52:15	Possible
50	2:00	-	-	3	7	20	35	67:00	Possible
60	2:00	-	-	3	12	25	45	87:00	Possible
70	2:00	-	-	5	15	30	55	107:00	Possible
80	2:00	-	-	7	20	35	65	129:00	Possible
90	1:45	-	3	12	25	40	75	156:45	No

Depth 39 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
8	3:15	-	-	-	-	-	-	3:15	Possible
10	3:00	-	-	-	-	-	3	6:00	Possible
15	3:00	-	-	-	-	-	5	8:00	Possible
20	2:45	-	-	-	-	3	7	12:45	Possible
25	2:45	-	-	-	-	5	15	22:45	Possible
30	2:30	-	-	-	3	7	20	32:30	Possible
Maximum operational limit UK-HSE									
35	2:30	-	-	-	5	10	25	42:30	Possible
40	2:15	-	-	3	7	15	30	57:15	Possible
45	2:15	-	-	3	10	20	35	70:15	Possible
50	2:15	-	-	3	10	25	45	85:15	Possible
60	2:15	-	-	5	15	30	55	107:15	Possible
70	2:00	-	3	10	20	35	65	135:00	Possible
80	2:00	-	3	12	25	40	75	157:00	No

Depth 42 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
7	3:30	-	-	-	-	-	-	3:30	Possible
10	3:15	-	-	-	-	-	3	6:15	Possible
15	3:00	-	-	-	-	3	5	11:00	Possible
20	3:00	-	-	-	-	3	12	18:00	Possible
25	2:45	-	-	-	3	7	17	29:45	Possible
30	2:45	-	-	-	5	10	25	42:45	Possible
Maximum operational limit UK-HSE									
35	2:30	-	-	3	7	15	30	57:30	Possible
40	2:30	-	-	3	10	20	35	70:30	Possible
45	2:30	-	-	5	12	25	40	84:30	Possible
50	2:30	-	-	5	15	25	45	92:30	Possible
60	2:15	-	3	10	17	30	60	122:15	Possible
70	2:15	-	5	12	25	40	75	159:15	No

Depth 45 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total décomp. min:sec	Repetitive dive
6	3:45	-	-	-	-	-	-	3:45	Possible
10	3:30	-	-	-	-	-	3	6:30	Possible
15	3:15	-	-	-	-	3	7	13:15	Possible
20	3:00	-	-	-	3	5	12	23:00	Possible
25	3:00	-	-	-	3	7	20	33:00	Possible
Maximum operational limit UK-HSE									
35	2:45	-	-	3	7	15	30	57:45	Possible
40	2:45	-	-	5	10	20	40	77:45	Possible
45	2:30	-	3	5	12	25	45	92:30	Possible
50	2:30	-	3	7	15	30	55	112:30	Possible
60	2:15	3	5	12	20	35	65	142:15	No

WARNING:
The corresponding surface decompression table is limited to 30 min bottom time. Do not select bottom times beyond 20 min to have at least 1 recovery table available in the surface decompression procedure.
There is no surface decompression table available beyond 51 m.
Note that it is wiser to have 2 recovery tables.

Depth 48 metres

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
5	4:00	-	-	-	-	-	-	4:00	Possible
10	3:45	-	-	-	-	-	5	8:45	Possible
15	3:30	-	-	-	-	3	7	13:30	Possible
20	3:15	-	-	-	3	7	15	28:15	Possible
25	3:15	-	-	-	5	10	20	38:15	Possible
Maximum operational limit UK-HSE									
30	3:00	-	-	3	7	15	30	58:00	Possible
35	3:00	-	-	5	10	20	35	73:00	Possible
40	2:45	-	3	7	15	25	45	97:45	Possible
45	2:45	-	5	10	17	30	50	114:45	Possible
50	2:30	3	5	10	20	30	60	130:30	Possible
60	2:30	3	7	15	25	40	75	167:30	No

WARNING:
The corresponding surface decompression table is limited to 30 min bottom time. Do not select bottom times beyond 25 min to have at least 1 recovery table available in the surface decompression table.
Also, there is no surface decompression table available beyond 51 metres.
Note that it is wiser to have 2 recovery tables

Depth 51 metres

Warning: The maximum operational depth HSE/IOGP is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
5	4:15	-	-	-	-	-	-	4:15	Possible
10	3:45	-	-	-	-	3	5	11:45	Possible
15	3:30	-	-	-	3	5	12	23:30	Possible
20	3:30	-	-	-	5	7	17	32:30	Possible
Maximum operational limit UK-HSE									
25	3:15	-	-	3	5	12	25	48:15	Possible
30	3:15	-	-	5	7	15	35	65:15	Possible
35	3:00	-	3	5	10	20	40	81:00	Possible
40	3:00	-	5	7	15	25	50	105:00	Possible
45	2:45	3	5	10	17	30	55	122:45	Possible
50	2:45	3	7	12	20	35	65	144:45	No

WARNING:
There is no surface decompression table available beyond this limit.
Also, consider this if the safety procedure selected is one additional depth.

Depth 54 metres

Warning: The maximum operational depth UK-HSE is 50 m

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
5	4:15	-	-	-	-	-	3	7:15	No
10	4:00	-	-	-	-	3	7	14:00	No
15	3:45	-	-	-	3	5	12	23:45	No
20	3:30	-	-	3	5	10	17	38:30	No
25	3:30	-	-	5	7	15	30	60:30	No
30	3:15	-	3	5	10	20	35	76:15	No
35	3:15	-	5	7	12	25	45	97:15	No
40	3:00	3	5	10	15	30	55	121:00	No
45	3:00	5	7	12	20	35	60	142:00	No

WARNING: There is no surface decompression table available for this depth.

Depth 57 metres

Warning: The maximum operational depth UK-HSE is 50 m

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
5	4:30	-	-	-	-	-	3	7:30	No
10	4:15	-	-	-	-	3	7	14:15	No
15	4:00	-	-	-	3	7	15	29:00	No
20	3:45	-	-	3	5	10	20	41:45	No
25	3:30	-	3	5	7	15	30	63:30	No
30	3:30	-	3	7	10	20	40	83:30	No
35	3:15	3	5	7	15	25	50	108:15	No
40	3:15	3	7	10	20	30	60	133:15	No

WARNING: There is no surface decompression table available for this depth.

Depth 60 metres

Warning: The maximum operational depth UK-HSE is 50 m

Bottom time	Ascent to Stop Min:sec	Air 18m	Air 15m	Air 12m	Air 9m	Air 6m	Air 3m	Total decomp. min:sec	Repetitive dive
5	4:45	-	-	-	-	-	5	9:45	No
10	4:15	-	-	-	3	5	7	19:15	No
15	4:00	-	-	3	5	7	15	34:00	No
20	4:00	-	-	5	7	12	25	53:00	No
25	3:45	-	3	5	10	20	35	76:45	No
30	3:30	3	5	7	12	25	45	100:30	No
35	3:30	3	5	10	15	30	55	121:30	No

WARNING: There is no surface decompression table available for this depth.

4.4 - Table #4 - Air in-water oxygen decompression at 6 m

Depth 12 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
180	0:30	-	-	-	-	-	3	3:30	Possible
210	0:30	-	-	-	-	-	5	5:30	Non
240	0:30	-	-	-	-	-	10	10:30	Non
Maximum operational limit UK-HSE									
270	0:30	-	-	-	-	-	15	15:30	Non
300	0:30	-	-	-	-	-	20	20:30	Non
330	0:30	-	-	-	-	-	20	20:30	Non
360	0:30	-	-	-	-	-	25	25:30	Non

Depth 15 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
90	0:45	-	-	-	-	-	3	3:45	Possible
100	0:45	-	-	-	-	-	3	3:45	Possible
110	0:45	-	-	-	-	-	5	5:45	Possible
120	0:45	-	-	-	-	-	7	7:45	Possible
130	0:45	-	-	-	-	-	7	7:45	Possible
140	0:45	-	-	-	-	-	10	10:45	Possible
150	0:45	-	-	-	-	-	15	15:45	Possible
180	0:45	-	-	-	-	-	20	20:45	Non
Maximum operational depth UK-HSE is 50 m									
210	0:45	-	-	-	-	-	25	25:45	Non
240	0:45	-	-	-	-	-	30	30:45	Non
270	0:45	-	-	-	-	-	35	35:45	Non
300	0:45	-	-	-	-	-	45	45:45	Non

WARNING:
The corresponding surface decompression table is limited to 180 min. bottom time. Do not select bottom times beyond 160 min to have at least 1 recovery table available in the surface decompression table (surf. deco table last bottom times are 150 and 180 min).
Note that it is wiser to plan for two recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 18 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
60	1:00	-	-	-	-	-	3	4:00	Possible
70	1:00	-	-	-	-	-	5	6:00	Possible
80	1:00	-	-	-	-	-	7	8:00	Possible
90	1:00	-	-	-	-	-	10	11:00	Possible
100	1:00	-	-	-	-	-	15	16:00	Possible
110	1:00	-	-	-	-	-	15	16:00	Possible
120	1:00	-	-	-	-	-	20	21:00	Possible
Maximum operational limit UK-HSE									
130	1:00	-	-	-	-	-	25	26:00	Possible
140	1:00	-	-	-	-	-	30	31:00	Possible
150	1:00	-	-	-	-	-	35	36:00	Possible
180	1:00	-	-	-	-	-	40	41:00	Non
210	1:00	-	-	-	-	-	50	51:00	Non
240	1:00	-	-	-	-	-	60	61:00	Non

Depth 21 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
40	1:15	-	-	-	-	-	3	4:15	Possible
45	1:15	-	-	-	-	-	3	4:15	Possible
50	1:15	-	-	-	-	-	5	6:15	Possible
60	1:15	-	-	-	-	-	7	8:15	Possible
70	1:15	-	-	-	-	-	10	11:15	Possible
80	1:16	-	-	-	-	-	15	16:15	Possible
90	1:15	-	-	-	-	-	20	21:15	Possible
Maximum operational limit UK-HSE									
100	1:15	-	-	-	-	-	25	26:15	Possible
110	1:15	-	-	-	-	-	25	26:15	Possible
120	1:15	-	-	-	-	-	30	31:15	Possible
130	1:15	-	-	-	-	-	35	36:15	Possible
140	1:15	-	-	-	-	-	40	41:15	Possible
150	1:00	-	-	-	-	3	45	49:00	Non
180	1:00	-	-	-	-	5	60	66:00	Non
210	1:00	-	-	-	-	5	70	76:00	Non

Depth 24 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
30	1:30	-	-	-	-	-	3	4:30	Possible
35	1:30	-	-	-	-	-	3	4:30	Possible
40	1:30	-	-	-	-	-	5	6:30	Possible
45	1:30	-	-	-	-	-	5	6:30	Possible
50	1:30	-	-	-	-	-	7	8:30	Possible
60	1:30	-	-	-	-	-	15	16:30	Possible
70	1:30	-	-	-	-	-	20	21:30	Possible
Maximum operational limit UK-HSE									
80	1:30	-	-	-	-	-	25	26:30	Possible
90	1:30	-	-	-	-	-	30	31:30	Possible
100	1:15	-	-	-	-	3	35	39:15	Possible
110	1:15	-	-	-	-	3	40	44:15	Possible
120	1:15	-	-	-	-	3	45	49:15	Possible
130	1:15	-	-	-	-	5	50	56:15	Possible
140	1:15	-	-	-	-	10	55	66:15	Non
150	1:15	-	-	-	-	10	60	71:15	Non
180	1:00	-	-	-	3	20	75	99:00	Non

Depth 27 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
25	1:45	-	-	-	-	-	3	4:45	Possible
30	1:45	-	-	-	-	-	3	4:45	Possible
35	1:45	-	-	-	-	-	5	6:45	Possible
40	1:45	-	-	-	-	-	7	8:45	Possible
45	1:45	-	-	-	-	-	10	11:45	Possible
50	1:45	-	-	-	-	-	15	16:45	Possible
60	1:45	-	-	-	-	-	20	21:45	Possible
Maximum operational limit UK-HSE									
70	1:30	-	-	-	-	3	25	29:30	Possible
80	1:30	-	-	-	-	3	30	34:30	Possible
90	1:30	-	-	-	-	5	40	46:30	Possible
100	1:30	-	-	-	-	10	45	56:30	Possible
110	1:30	-	-	-	-	12	50	63:30	Possible
120	1:30	-	-	-	-	15	55	71:30	Possible
130	1:00	-	-	-	3	20	60	84:00	Non
140	1:00	-	-	-	3	25	65	94:00	Non
150	1:00	-	-	-	3	25	70	99:00	Non

WARNING:
The corresponding surface decompression table is limited to 70 min bottom time. Do not select bottom times beyond 50 min to have at least 1 recovery table available in the surface decompression table.
Note that it is wiser to plan for two recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 30 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
20	2:00	-	-	-	-	-	3	5:00	Possible
25	2:00	-	-	-	-	-	3	5:00	Possible
30	2:00	-	-	-	-	-	5	7:00	Possible
35	2:00	-	-	-	-	-	7	9:00	Possible
40	2:00	-	-	-	-	-	15	17:00	Possible
45	2:00	-	-	-	-	-	15	17:00	Possible
50	2:00	-	-	-	-	-	20	22:00	Possible
Maximum operational limit UK-HSE									
60	1:45	-	-	-	-	3	30	34:45	Possible
70	1:45	-	-	-	-	5	35	41:45	Possible
80	1:45	-	-	-	-	10	40	51:45	Possible
90	1:30	-	-	-	3	12	45	61:30	Possible
100	1:30	-	-	-	3	17	50	71:30	Possible
110	1:30	-	-	-	3	20	60	84:30	Non
120	1:30	-	-	-	5	25	65	96:30	Non
130	1:30	-	-	-	7	30	70	108:30	Non
140	1:15	-	-	3	10	30	80	124:15	Non

WARNING:
The corresponding surface decompression table is limited to 60 min bottom time. Do not select bottom times beyond 45 min to have at least 2 recovery tables available in the surface decompression table.
Note that it is wiser to plan for two recovery tables.

Depth 33 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
15	2:15	-	-	-	-	-	3	5:15	Possible
20	2:15	-	-	-	-	-	3	5:15	Possible
25	2:15	-	-	-	-	-	5	7:15	Possible
30	2:15	-	-	-	-	-	7	9:15	Possible
35	2:15	-	-	-	-	-	10	12:15	Possible
40	2:00	-	-	-	-	3	15	20:00	Possible
Maximum operational limit UK-HSE									
45	2:00	-	-	-	-	3	20	25:00	Possible
50	2:00	-	-	-	-	5	30	37:00	Possible
60	2:00	-	-	-	-	10	35	47:00	Possible
70	1:45	-	-	-	3	12	40	56:45	Possible
80	1:45	-	-	-	3	15	45	64:45	Possible
90	1:45	-	-	-	5	20	50	76:45	Possible
100	1:45	-	-	-	10	25	60	96:45	Non
110	1:30	-	-	3	12	25	65	106:30	Non
120	1:30	-	-	3	15	30	75	124:30	Non

Depth 36 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
15	2:30	-	-	-	-	-	3	5:30	Possible
20	2:30	-	-	-	-	-	5	7:30	Possible
25	2:30	-	-	-	-	-	7	9:30	Possible
30	2:30	-	-	-	-	-	15	17:30	Possible
35	2:15	-	-	-	-	3	15	20:15	Possible
Maximum operational limit UK-HSE									
40	2:15	-	-	-	-	3	20	25:15	Possible
45	2:15	-	-	-	-	5	30	37:15	Possible
50	2:15	-	-	-	3	5	35	45:15	Possible
60	2:00	-	-	-	3	12	40	57:00	Possible
70	2:00	-	-	-	5	15	45	67:00	Possible
80	2:00	-	-	-	7	20	55	84:00	Possible
90	1:45	-	-	3	12	25	60	101:45	Non
100	1:45	-	-	3	15	30	70	119:45	Non
110	1:45	-	-	5	20	30	80	136:45	Non

Depth 39 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
10	2:45	-	-	-	-	-	3	5:45	Possible
15	2:45	-	-	-	-	-	3	5:45	Possible
20	2:45	-	-	-	-	-	7	9:45	Possible
25	2:45	-	-	-	-	-	10	12:45	Possible
30	2:30	-	-	-	-	3	15	20:30	Possible
Maximum operational limit UK-HSE									
35	2:30	-	-	-	-	5	20	27:30	Possible
40	2:15	-	-	-	3	7	25	37:15	Possible
45	2:15	-	-	-	3	10	30	45:15	Possible
50	2:15	-	-	-	3	10	35	50:15	Possible
60	2:15	-	-	-	5	15	45	67:15	Possible
70	2:00	-	-	3	10	20	50	85:00	Possible
80	2:00	-	-	3	12	25	60	102:00	Non
90	2:00	-	-	5	15	30	70	122:00	Non
100	1:45	-	3	7	20	30	80	141:45	Non

Depth 42 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
10	3:00	-	-	-	-	-	3	6:00	Possible
15	3:00	-	-	-	-	-	5	8:00	Possible
20	3:00	-	-	-	-	-	10	13:00	Possible
25	2:45	-	-	-	-	3	15	20:45	Possible
30	2:45	-	-	-	-	5	20	27:45	Possible
Maximum operational limit UK-HSE									
35	2:30	-	-	-	3	7	25	37:30	Possible
40	2:30	-	-	-	3	10	30	45:30	Possible
45	2:30	-	-	-	3	12	35	52:30	Possible
50	2:15	-	-	-	5	15	40	62:15	Possible
60	2:15	-	-	3	10	17	50	82:15	Possible
70	2:15	-	-	5	12	25	60	104:15	Non
80	2:00	-	3	7	15	25	70	122:00	Non
90	2:00	-	3	12	20	30	80	147:00	Non

Depth 45 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
10	3:15	-	-	-	-	-	3	6:15	Possible
15	3:15	-	-	-	-	-	7	10:15	Possible
20	3:00	-	-	-	-	3	10	16:00	Possible
25	3:00	-	-	-	-	3	15	21:00	Possible
Maximum operational limit UK-HSE									
30	2:45	-	-	-	3	5	20	30:45	Possible
35	2:45	-	-	-	3	7	25	37:45	Possible
40	2:45	-	-	-	5	10	35	52:45	Possible
45	2:30	-	-	3	5	12	45	67:30	Possible
50	2:30	-	-	3	7	15	50	77:30	Possible
60	2:15	-	3	5	12	20	55	97:15	Non
70	2:15	-	3	7	15	25	65	117:15	Non
80	2:15	-	3	12	20	30	75	142:15	Non

WARNING:
The corresponding surface decompression table is limited to 30 min bottom time. Do not select bottom times beyond 20 min to have at least 1 recovery table available in the surface decompression table. For the same reason, this depth should be the last depth as there is no surface decompression table available beyond 51 m.
Note that it is wiser to plan for two recovery tables.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 48 metres

Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
10	3:30	-	-	-	-	-	3	6:30	Possible
15	3:30	-	-	-	-	-	7	10:30	Possible
20	3:15	-	-	-	-	3	15	21:15	Possible
25	3:15	-	-	-	-	5	20	28:15	Possible
Maximum operational limit HSE									
30	3:00	-	-	-	3	7	25	38:00	Possible
35	3:00	-	-	-	5	10	30	48:00	Possible
40	2:45	-	-	3	7	15	35	62:45	Possible
45	2:45	-	-	5	10	17	40	74:45	Possible
50	2:30	-	3	5	10	20	50	90:30	Possible
60	2:30	-	3	7	15	25	60	112:30	Non
70	2:30	-	5	10	20	30	70	137:30	Non

WARNING:
The corresponding surface decompression table is limited to 30 min bottom time. Do not select bottom times beyond 20 min to have at least 1 recovery table available in the surface decompression table.
Also, this depth must be the very last depth selected as there is no surface decompression table available beyond 51 metres.
Note that it is wiser to plan for two recovery tables.

Depth 51 metres

Warning: The maximum operational depth UK-HSE is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
10	3:45	-	-	-	-	-	5	8:45	Possible
15	3:30	-	-	-	-	3	10	16:30	Possible
20	3:30	-	-	-	-	3	15	21:30	Possible
Maximum operational limit UK-HSE									
25	3:15	-	-	-	3	5	20	31:15	Possible
30	3:15	-	-	-	5	7	25	40:15	Possible
35	3:00	-	-	3	5	10	30	51:00	Possible
40	3:00	-	-	5	7	15	40	70:00	Possible
45	2:45	-	3	5	10	20	45	85:45	Possible
50	2:45	-	3	7	15	20	50	97:45	Non
60	2:45	-	5	10	15	25	65	122:45	Non
70	2:30	3	7	12	20	35	80	159:30	Non

WARNING:
Do not use this depth for normal operations as there is no surface decompression table available beyond this limit.
Also, consider this if the safety procedure selected is one additional bottom time.

Depth 54 metres

Warning: The maximum operational depth UK-HSE is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
5	4:00	-	-	-	-	-	3	7:00	No
10	4:00	-	-	-	-	-	7	11:00	No
15	3:45	-	-	-	-	3	10	16:45	No
20	3:30	-	-	-	3	5	15	26:30	No
25	3:30	-	-	-	5	7	25	40:30	No
30	3:15	-	-	3	5	10	35	56:15	No
35	3:15	-	-	3	7	12	40	65:15	No
40	3:00	-	3	5	10	15	50	86:00	No
45	3:00	-	3	7	12	20	55	100:00	No
50	3:00	-	5	10	15	25	65	123:00	No
60	2:45	3	7	10	20	30	75	147:45	No

WARNING:
Do not use this depth for normal operations as there is no surface decompression table available beyond this limit. Also, consider this if the safety procedure selected is one additional bottom time.

Depth 57 metres

Warning: The maximum operational depth UK-HSE is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
5	4:15	-	-	-	-	-	3	7:15	Non
10	4:15	-	-	-	-	-	7	11:15	Non
15	4:00	-	-	-	-	3	15	22:00	Non
20	3:45	-	-	-	3	5	20	31:45	Non
25	3:30	-	-	3	5	7	25	43:30	Non
30	3:30	-	-	3	7	10	35	58:30	Non
35	3:15	-	3	5	7	15	45	78:15	Non
40	3:15	-	3	7	10	20	50	93:15	Non
45	3:00	3	5	7	12	25	55	110:00	Non
50	3:00	3	5	10	15	25	65	126:00	Non

WARNING: There is no surface decompression table available.

Depth 60 metres

Warning: The maximum operational depth UK-HSE is 50 m									
Bottom time	Ascent to Stop Min:sec	Air 21m	Air 18m	Air 15m	Air 12m	Air 9m	Oxy 6m	Total décomp. min:sec	Repetitive dive
5	4:30	-	-	-	-	-	3	7:30	Non
10	4:15	-	-	-	-	3	7	14:15	Non
15	4:00	-	-	-	3	5	15	27:00	Non
20	4:00	-	-	-	5	7	20	36:00	Non
25	3:45	-	-	3	5	10	30	51:45	Non
30	3:30	-	3	5	7	12	40	70:30	Non
35	3:30	-	3	5	10	15	45	81:30	Non
40	3:15	3	5	7	15	20	55	108:15	Non

WARNING: There is no surface decompression table available.

4.5 - Table #6 - Oxygen surface decompression

Note: Table #5 - Air in-water oxygen decompression at 12 m is not used for in water decompression, and for this reason, not included in this handbook.

Depth 12 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
180	1:00	-	-	-	3	10	6	20:00	12h00
210	1:00	-	-	-	3	10	6	20:00	12h00
240	1:00	-	-	-	3	10	6	20:00	12h00
Maximum operational limit UK-HSE									
270	1:00	-	-	-	3	20	6	30:00	12h00
300	1:00	-	-	-	3	25	6	35:00	12h00
330	1:00	-	-	-	3	25	6	35:00	12h00
360	1:00	-	-	-	3	30	6	40:00	12h00

Depth 15 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
90	1:15	-	-	-	3	10	6	20:15	12h00
100	1:15	-	-	-	3	10	6	20:15	12h00
110	1:15	-	-	-	3	10	6	20:15	12h00
120	1:15	-	-	-	3	10	6	20:15	12h00
130	1:15	-	-	-	3	10	6	20:15	12h00
140	1:15	-	-	-	3	15	6	25:15	12h00
150	1:15	-	-	-	3	20	6	30:15	12h00
180	1:15	-	-	-	3	25	6	35:15	12h00
Maximum operational limit UK-HSE									

Warning:
This table is limited to 180 min that is also the UK-HSE bottom time limit.
Consider this to have at least 1 recovery table (last bottom time allows 30 min), particularly if the safety procedure selected is one additional bottom time.

Depth 18 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
60	1:30	-	-	-	3	10	6	20:30	12h00
70	1:30	-	-	-	3	10	6	20:30	12h00
80	1:30	-	-	-	3	10	6	20:30	12h00
90	1:30	-	-	-	3	15	6	25:30	12h00
100	1:30	-	-	-	3	20	6	30:30	12h00
110	1:30	-	-	-	3	25	6	35:30	12h00
120	1:30	-	-	-	3	25	6	35:30	12h00
Maximum operational limit UK-HSE									
130	1:30	-	-	-	3	30	6	40:30	12h00
140	1:30	-	-	-	3	40	6	50:30	12h00
150	1:30	-	-	-	3	40	6	50:30	12h00

Depth 21 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
40	1:45	-	-	-	3	10	6	20:45	12h00
45	1:45	-	-	-	3	10	6	20:45	12h00
50	1:45	-	-	-	3	10	6	20:45	12h00
60	1:45	-	-	-	3	10	6	20:45	12h00
70	1:45	-	-	-	3	15	6	25:45	12h00
80	1:45	-	-	-	3	20	6	30:45	12h00
90	1:45	-	-	-	3	25	6	35:45	12h00
Maximum operational limit UK-HSE									
100	1:45	-	-	-	3	35	6	45:45	12h00
110	1:45	-	-	-	3	40	6	50:45	12h00
120	1:45	-	-	-	3	45	6	55:45	12h00

Depth 24 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
30	2:00	-	-	-	3	10	6	21:00	12h00
35	2:00	-	-	-	3	10	6	21:00	12h00
40	2:00	-	-	-	3	10	6	21:00	12h00
45	2:00	-	-	-	3	10	6	21:00	12h00
50	2:00	-	-	-	3	10	6	21:00	12h00
60	2:00	-	-	-	3	15	6	26:00	12h00
70	2:00	-	-	-	3	25	6	36:00	12h00
Maximum operational limit UK-HSE									
80	2:00	-	-	-	3	35	6	46:00	12h00
90	2:00	-	-	-	3	40	6	51:00	12h00

Depth 27 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
25	2:15	-	-	-	3	10	6	21:15	12h00
30	2:15	-	-	-	3	10	6	21:15	12h00
35	2:15	-	-	-	3	10	6	21:15	12h00
40	2:15	-	-	-	3	10	6	21:15	12h00
45	2:15	-	-	-	3	15	6	26:15	12h00
50	2:15	-	-	-	3	20	6	31:15	12h00
60	2:15	-	-	-	3	30	6	41:15	12h00
Maximum operational limit UK-HSE									
70	1:30	-	-	3	3	40	6	53:30	12h00

Warning:
There is only one bottom time available after the UK-HSE bottom time limit.

Depth 30 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
20	2:30	-	-	-	3	10	6	21:30	12h00
25	2:30	-	-	-	3	10	6	21:30	12h00
30	2:30	-	-	-	3	10	6	21:30	12h00
35	2:30	-	-	-	3	15	6	26:30	12h00
40	2:30	-	-	-	3	20	6	31:30	12h00
45	2:30	-	-	-	3	20	6	31:30	12h00
50	2:30	-	-	-	3	25	6	36:30	12h00
Maximum operational limit UK-HSE									
60	1:45	-	-	3	3	40	6	53:45	12h00

Warning:
There is only one bottom time available after the UK-HSE bottom time limit.

Depth 33 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
15	2:45	-	-	-	3	10	6	21:45	12h00
20	2:45	-	-	-	3	10	6	21:45	12h00
25	2:45	-	-	-	3	10	6	21:45	12h00
30	2:45	-	-	-	3	15	6	26:45	12h00
35	2:45	-	-	-	3	20	6	31:45	12h00
40	2:45	-	-	-	3	25	6	36:45	12h00
Maximum operational limit UK-HSE									
45	2:00	-	-	3	3	30	6	44:45	12h00
50	2:00	-	-	5	3	35	6	51:00	12h00
60	2:00	-	-	10	3	45	6	66:00	12h00

Depth 36 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
15	3:00	-	-	-	3	10	6	22:00	12h00
20	3:00	-	-	-	3	10	6	22:00	12h00
25	3:00	-	-	-	3	15	6	27:00	12h00
30	3:00	-	-	-	3	20	6	32:00	12h00
35	2:15	-	-	3	3	25	6	39:15	12h00
Maximum operational limit UK-HSE									
40	2:15	-	-	3	3	30	6	44:15	12h00
45	2:15	-	-	5	3	35	6	51:15	12h00
50	2:00	-	3	7	3	40	6	61:15	12h00

Depth 39 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
10	3:15	-	-	-	3	10	6	22:15	12h00
15	3:15	-	-	-	3	10	6	22:15	12h00
20	3:15	-	-	-	3	10	6	22:15	12h00
25	3:15	-	-	-	3	15	6	27:15	12h00
30	2:30	-	-	3	3	25	6	39:30	12h00
Maximum operational limit UK-HSE									
35	2:30	-	-	5	3	30	6	46:30	12h00
40	2:15	-	3	7	3	35	6	56:15	12h00

Depth 42 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
10	3:30	-	-	-	3	10	6	22:30	12h00
15	3:30	-	-	-	3	10	6	22:30	12h00
20	3:30	-	-	-	3	15	6	27:30	12h00
25	2:45	-	-	3	3	25	6	39:45	12h00
30	2:45	-	-	5	3	30	6	46:45	12h00
Maximum operational limit UK-HSE									
35	2:30	-	3	7	3	35	6	56:30	12h00
40	2:30	-	3	10	3	40	6	64:30	12h00

Depth 45 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
10	3:45	-	-	-	3	10	6	22:45	12h00
15	3:45	-	-	-	3	10	6	22:45	12h00
20	3:00	-	-	3	3	15	6	30:00	12h00
25	3:00	-	-	3	3	25	6	40:00	12h00
Maximum operational limit UK-HSE									
30	3:15	-	3	5	3	30	6	50:15	12h00

Warning:
There is only one bottom time available after the UK-HSE bottom time limit.

Depth 48 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
10	4:00	-	-	-	3	10	6	23:00	12h00
15	4:00	-	-	-	3	10	6	23:00	12h00
20	3:15	-	-	3	3	20	6	35:15	12h00
25	3:15	-	-	5	3	25	6	42:15	12h00
Maximum operational limit UK-HSE									
30	3:00	-	3	7	3	35	6	57:00	12h00

Warning:
There is only one bottom time available after the UK-HSE bottom time limit.

Depth 51 metres

Bottom time	Ascent to Stop min:sec	In-water stops			Surf. Inter. less than	In-chamber		Total deco time min:sec	Interval before the next dive
		Air 15m	Air 12m	Air 9m		Oxy 12m	Oxy 12-0		
10	4:15	-	-	-	3	10	6	23:15	12h00
15	3:30	-	-	3	3	15	6	30:30	12h00
20	3:30	-	-	5	3	25	6	42:30	12h00
Maximum operational limit HSE									
25	3:15	-	3	5	3	30	6	50:15	12h00
30	3:15	-	5	7	3	40	6	64:15	12h00

Warning:
There is only one bottom time available after the UK-HSE bottom time limit.

4.6 - Table #7 - Nitrox diving equivalent depth table

Real depth	Nitrox mix					
	25/75	30/70	35/65	40/60	45/55	50/50
9 m	9 m	9 m	6 m	6 m	6 m	3 m
10 m	9 m	9 m	9 m	6 m	6 m	3 m
11 m	12 m	9 m	9 m	6 m	6 m	6 m
12 m	12 m	12 m	9 m	9 m	6 m	6 m
13 m	12 m	12 m	9 m	9 m	9 m	6 m
14 m	15 m	12 m	12 m	9 m	9 m	6 m
15 m	15 m	15 m	12 m	9 m	9 m	6 m
16 m	15 m	15 m	12 m	12 m	9 m	9 m
17 m	18 m	15 m	15 m	12 m	9 m	9 m
18 m	18 m	15 m	15 m	12 m	12 m	9 m
19 m	18 m	18 m	15 m	15 m	12 m	
20 m	21 m	18 m	15 m	15 m	12 m	
21 m	21 m	18 m	18 m	15 m	12 m	
22 m	21 m	21 m	18 m	15 m		
23 m	24 m	21 m	18 m	18 m		
24 m	24 m	21 m	18 m	18 m		
25 m	24 m	24 m	21 m	18 m		
26 m	27 m	24 m	21 m			
27 m	27 m	24 m	21 m			
28 m	27 m	24 m	24 m			
29 m	30 m	27 m	24 m			
30 m	30 m	27 m	24 m			
31 m	30 m	27 m				
32 m	30 m	30 m				
33 m	33 m	30 m				
34 m	33 m	30 m				
35 m	33 m	30 m				
36 m	36 m	33 m				
37 m	36 m					
38 m	36 m					
39 m	39 m					
40 m	39 m					
41 m	39 m					
42 m	42 m					
43 m	42 m					

4.7 - Table #8 - Multilevel diving equivalent depth table

Time spent at the work level	Work level depth														
	9 m	12m	15m	18m	21m	24m	27m	30m	33m	36m	39m	42m	45m	48m	51m
5 min	5	6	8	9	11	12	14	15	17	18	20	21	23	24	26
10 min	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51
15 min	14	18	23	27	31	36	41	45	50	54	59	63	68	72	77
20 min	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102
25 min	23	30	38	45	52	60	68	75	83	90	98	105	113	120	128
30 min	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153
40 min	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204
50 min	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255
60 min	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306
70 min	63	84	105	126	147	168	189	210	231	252	273	294	315	336	357
80 min	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408
90 min	81	108	135	162	189	216	243	270	297	324	351	378	405	432	459
100 min	90	120	150	180	210	240	270	300	330	360	390	420	450	480	
110 min	99	132	165	198	231	264	297	330	363	396	429	462	495		
120 min	100	144	180	216	252	288	324	360	396	432	468	504			
130 min	117	156	195	234	273	312	351	390	429	468	507				
140 min	126	168	210	252	294	336	378	420	462	504					
150 min	135	180	225	270	315	360	405	450	495						
180 min	162	216	270	324	378	432	486	540							
210 min	189	252	315	378	441	504	567								
240 min	216	288	360	432	504	576									
270 min	243	324	405	486	567										
300 min	270	360	450	540											

4.8 - Table #9 - Altitude diving equivalent depth table

Real depth	Altitude & atmospheric pressure					
	300-500m	500-1000m	1000-1500m	1500-2000m	2000-2500m	2500-3000m
	950 mbar	900 mbar	850 mbar	800 mbar	750 mbar	700 mbar
5 m	9 m	9 m	9 m	9 m	12 m	12 m
6 m	9 m	9 m	9 m	12 m	12 m	15 m
7 m	9 m	9 m	12 m	12 m	15 m	15 m
8 m	9 m	12 m	12 m	15 m	15 m	18 m
9 m	12 m	12 m	15 m	15 m	18 m	18 m
10 m	12 m	15 m	15 m	15 m	18 m	21 m
11 m	15 m	15 m	15 m	18 m	18 m	21 m
12 m	15 m	15 m	18 m	18 m	21 m	24 m
13 m	15 m	18 m	18 m	21 m	21 m	24 m
14 m	18 m	18 m	21 m	21 m	24 m	27 m
15 m	18 m	18 m	21 m	24 m	24 m	27 m
16 m	18 m	21 m	21 m	24 m	27 m	30 m
17 m	21 m	21 m	24 m	24 m	27 m	30 m
18 m	21 m	24 m	24 m	27 m	30 m	30 m
19 m	21 m	24 m	27 m	27 m	30 m	33 m
20 m	24 m	24 m	27 m	30 m	30 m	33 m
21 m	24 m	27 m	27 m	30 m	33 m	36 m
22 m	24 m	27 m	30 m	30 m	33 m	36 m
23 m	27 m	27 m	30 m	33 m	36 m	39 m
24 m	27 m	30 m	30 m	33 m	36 m	39 m
25 m	27 m	30 m	33 m	36 m	39 m	42 m
26 m	30 m	30 m	33 m	36 m	39 m	42 m
27 m	30 m	33 m	36 m	39 m	42 m	45 m
28 m	30 m	33 m	36 m	39 m	42 m	45 m
29 m	33 m	36 m	36 m	39 m	45 m	48 m
30 m	33 m	36 m	39 m	42 m	45 m	48 m
31 m	36 m	36 m	39 m	42 m	45 m	51 m
32 m	36 m	39 m	42 m	45 m	48 m	51 m
33 m	36 m	39 m	42 m	45 m	48 m	54 m
34 m	39 m	39 m	42 m	45 m	51 m	54 m
35 m	39 m	42 m	45 m	48 m	51 m	57 m
36 m	39 m	42 m	45 m	48 m	54 m	57 m
37 m	42 m	45 m	48 m	51 m	54 m	60 m
38 m	42 m	45 m	48 m	51 m	54 m	60 m
39 m	42 m	45 m	48 m	54 m	57 m	60 m
40 m	45 m	48 m	51 m	54 m	57 m	
41 m	45 m	48 m	51 m	54 m	60 m	
42 m	45 m	48 m	54 m	57 m	60 m	
43 m	48 m	51 m	54 m	57 m		
44 m	48 m	51 m	54 m	60 m		
45 m	48 m	54 m	57 m	60 m		
46 m	51 m	54 m	57 m	60 m		
47 m	51 m	54 m	60 m			
48 m	54 m	57 m	60 m			
49 m	54 m	57 m	60 m			
50 m	54 m	57 m				

4.8 - Table #10 - Mud diving equivalent depth table

Depth	Liquid density			
	1.1	1.2	1. 3	1.4
5 m	6 m	6 m	9 m	9 m
6 m	9 m	9 m	9 m	9 m
7 m	9 m	9 m	12 m	12 m
8 m	9 m	12 m	12 m	12 m
9 m	12 m	12 m	12 m	15 m
10 m	12 m	12 m	15 m	15 m
11 m	15 m	15 m	15 m	18 m
12 m	15 m	15 m	18 m	18 m
13 m	15 m	18 m	18 m	21 m
14 m	18 m	18 m	21 m	21 m
15 m	18 m	18 m	21 m	21 m
16 m	18 m	21 m	21 m	24 m
17 m	21 m	21 m	24 m	24 m
18 m	21 m	24 m	24 m	27 m
19 m	21 m	24 m	27 m	27 m
20 m	24 m	24 m	27 m	30 m
21 m	24 m	27 m	30 m	30 m
22 m	27 m	27 m	30 m	33 m
23 m	27 m	30 m	30 m	33 m
24 m	27 m	30 m	33 m	36 m
25 m	30 m	33 m	33 m	36 m
26 m	30 m	33 m	36 m	39 m
27 m	30 m	33 m	36 m	39 m
28 m	33 m	36 m	39 m	42 m
29 m	33 m	36 m	39 m	42 m
30 m	33 m	36 m	39 m	42 m
31 m	36 m	39 m	42 m	45 m
32 m	36 m	39 m	42 m	45 m
33 m	39 m	42 m	45 m	48 m
34 m	39 m	42 m	45 m	48 m
35 m	39 m	42 m	48 m	51 m
36 m	42 m	45 m	48 m	51 m
37 m	42 m	45 m	51 m	54 m
38 m	42 m	48 m	51 m	54 m
39 m	45 m	48 m	51 m	57 m
40 m	45 m	48 m	54 m	57 m
41 m	48 m	51 m	54 m	60 m
42 m	48 m	51 m	57 m	60 m
43 m	48 m	54 m	57 m	
44 m	51 m	54 m	60 m	
45 m	51 m	54 m	60 m	
46 m	51 m	57 m	60 m	
47 m	54 m	57 m		
48 m	54 m	60 m		
49 m	54 m	60 m		
50 m	57 m			

4.9 - Table #11 - Successive (Repetitive) dive equivalent depth table

Depth repetitive dive	Surface interval between:									
	0h00 0h29	0h30 0h44	0h45 0h59	1h00 1h29	1h30 1h59	2h00 2h59	3h00 3h59	4h00 4h59	5h00 5h59	6h00 11h59
12–15m	110	90	80	70	60	50	40	30	20	15
15–18m	85	70	60	55	50	40	30	20	10	10
18-20m	65	55	50	45	40	30	25	15	10	10
21-23m	55	45	45	40	35	25	20	15	10	10
24-26m	50	40	35	35	25	25	15	15	10	5
27-29m	45	35	35	30	25	20	15	10	10	5
30-32m	40	30	30	25	25	20	15	10	10	5
33-35m	35	30	25	25	20	20	15	10	5	5
36-38m	30	25	25	25	20	15	15	10	5	5
39-41m	30	25	25	20	20	15	10	10	5	5
42-44m	25	25	20	20	15	15	10	10	5	5
45-47m	25	20	20	20	15	15	10	10	5	5
48-50m	25	20	20	15	15	15	10	10	5	5
51m	25	20	20	15	15	10	10	5	5	5
	Time to add to the real bottom time