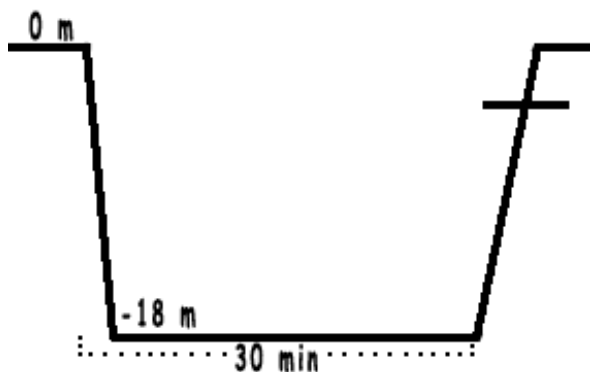




# Open Water Diver

Part 6 (III)  
Decompression exercises

We are going to do some exercises to acquire practice in the use of tables. At the same time, we will give some useful safety tips. We recommend that you print the tables that we offer you in image format or that you have them active on the screen, to follow the exercises with us, using a paper, drawing the sketches and filling in the data as we find it. You will see how doing it, it seems easier.



Let's calculate a simple dive to 18 metres of depth for 30 minutes. The first thing is to make our dive sketch with the data that we already know: Surface line, both at the entrance and the exit, inclined line (it took a while) for the descent, straight line indicating the bottom at 18 metres which is the maximum depth we said we will reach, inclined line that indicates the ascent to the safety or decompression stop (we still do not know which), a small horizontal line that indicates a time to stop, a sloping line that indicates the ascent to the surface and the surface line

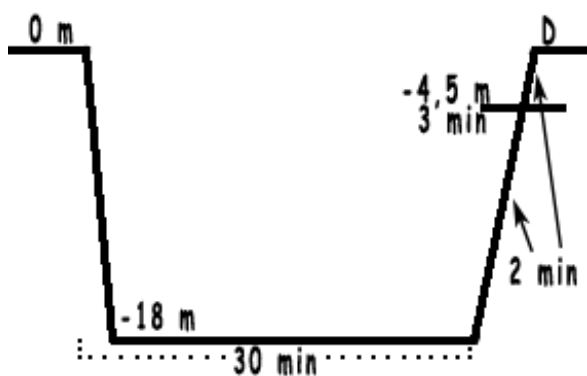
after the dive. We have indicated that from the moment we start the dive until we begin the direct ascent, 30 minutes will pass, which is our bottom time.

Now we look in the decompression table (table A) our dive. We went to the column on the left to find the depth of 18 metres. We see that they show, then in their file, we look for the 30 minutes, we see that they show and have the decompression code "S". This means that it is not necessary to do mandatory decompression stops, but it is highly recommended to do a safety stop, which as the table indicates, is of 3 minutes at 4.5 metres. In addition, we see that our dive is in the column of the letter D, which is our group in case we want to do a successive dive. We already have all the data requested, so we write them in our sketch. We have also indicated that we must take two minutes to reach the safety stop and then use two minutes to climb from the safety stop to the surface.



Table A: ar

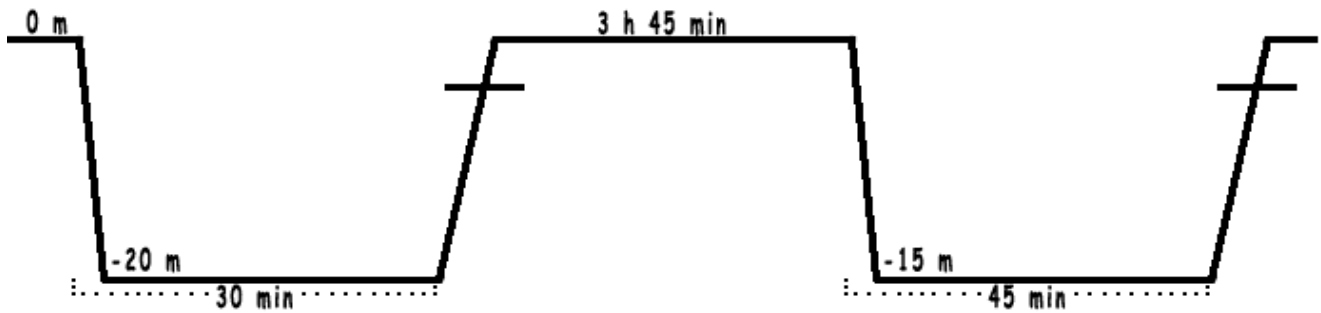
Depth	Dive I				
6 m	30	60	90	120	
9 m	30	45	60	90	
12 m	22 (S)	30 (S)	40 (S)	60 (S)	
15 m	18 (S)	25 (S)	30 (S)	40 (S)	
18 m	14 (S)	20 (S)	25 (S)	30 (S)	
21 m	12 (S)	15 (S)	20 (S)	25 (S)	
24 m	10 (S)	13 (S)	15 (S)	20 (S)	
27 m	9 (S)	12 (S)	15 (S)	20 (S)	
30 m	7 (S)	10 (S)	12 (S)	15 (S)	18 (1)
33 m	6 (S)	10 (S)	12 (S)	15 (1)	
36 m	6 (S)	8 (S)	10 (S)	12 (1)	
39 m	5 (S)	8 (S)	10 (1)	13 (2)	
42 m	5 (S)	7 (S)	9 (1)	11 (2)	
RNG	A	B	C	D	



As we see it is very simple. If instead of 30 minutes, our dive lasted 60 minutes, consulting the tables we would see that we would have to do a mandatory decompression stop, in the water, at 3 metres deep for 5 minutes (we see that we get into the red zone of the table). This dive would be totally inadvisable.

Let's now do an example of successive dives. We go down to 20 metres deep for 30 minutes, 3 hours and 45 minutes after leaving the surface, we want to go down to 15 metres for 45 minutes. The first thing is to draw

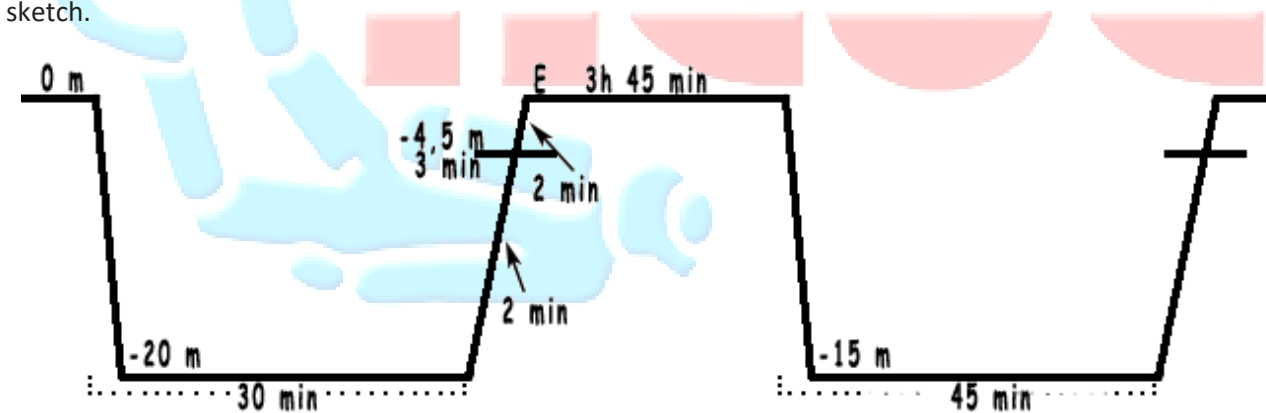
the sketch with the data that we already know to later fill it with the data we find out. As we have already indicated, it is the simplest way to do it and it reduces errors.



Now it is necessary to go to the tables looking for data to put in the sketch. We go to table A to find our first dive. In the left column we look for our 20 metres. As they do not appear, we have to go to the 21 metres row. In this row we look for our 30 minutes, which do not appear either so we have to go to the next higher time, which is 35 minutes. We see that our decompression code is "S" and it places us in the yellow zone of the table (caution), then we do not have to do mandatory decompression, but we do have a safety stop of 3 minutes at 4.5 metres. We also see that our dive is in the column of the E, then we pass all this data to our sketch.

21 m	12 (S)	15 (S)	20 (S)	25 (S)	35 (S)
24 m	10 (S)	13 (S)	15 (S)	20 (S)	25 (S)
27 m	9 (S)	12 (S)	15 (S)	20 (S)	23 (1)
30 m	7 (S)	10 (S)	12 (S)	15 (S)	18 (1)
33 m	6 (S)	10 (S)	12 (S)	15 (1)	18 (2)
36 m	6 (S)	8 (S)	10 (S)	12 (1)	15 (2)
39 m	5 (S)	8 (S)	10 (1)	13 (2)	
42 m	5 (S)	7 (S)	9 (1)	11 (2)	
RNG	A	B	C	D	E

We see that our decompression code is "S" and it places us in the yellow zone of the table (caution), then we do not have to do mandatory decompression, but we do have a safety stop of 3 minutes at 4.5 metres. We also see that our dive is in the column of the E, then we pass all this data to our sketch.



Now we need to know what happens with our residual nitrogen, represented by the letter E, after being 3 hours and 45 minutes at the surface. For that, we go to table B, in the row above we look for our letter E, in the column on the left we look for the time interval in which 3 hours and 45 minutes are included, we cross them and we see that our E code becomes the R3 code. As we already have the data, we write it in our sketch, at the beginning of the second dive.

**ACUC**

**Table B: Surface Inte**

RNG > SIT	A	B	C	D	E
0:15-0:29	R4	R5	R6	R8	R9
0:30-0:59	R2	R3	R4	R5	R6
1:00-1:29	R1	R2	R3	R4	R5
1:30-1:59	R1	R2	R2	R3	R4
2:00-2:59	R1	R2	R2	R3	R3
3:00-3:59	R1	R1	R2	R2	R3

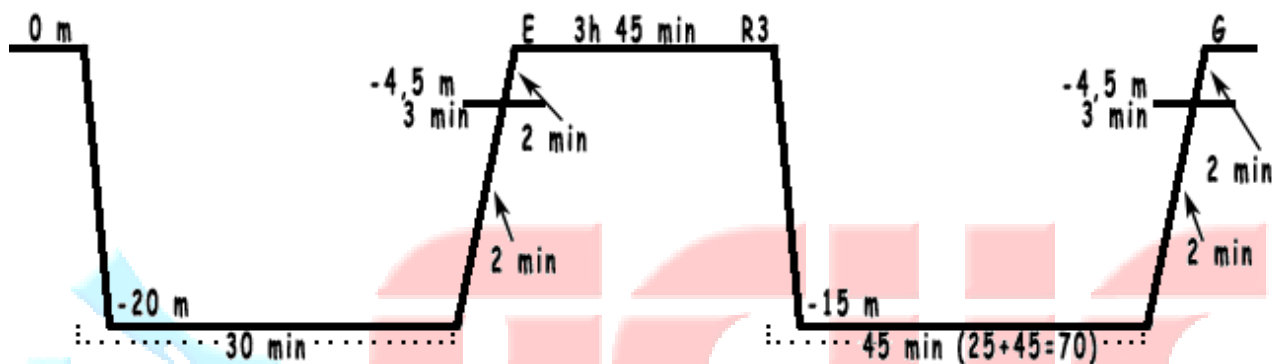
in the column on the left we look for the time interval in which 3 hours and 45 minutes are included, we cross them and we see that our E code becomes the R3 code. As we already have the data, we write it in our sketch, at the beginning of the second dive.

With this data, we go to table C to see the penalty time we have due to the previous dive, discounting the nitrogen accumulation lost during the surface interval, in order to calculate the second dive. As the dive will be 15 metres deep, we look for the 15 metres in the first row above (Real Depth) and look for our new R3 code in the left column.

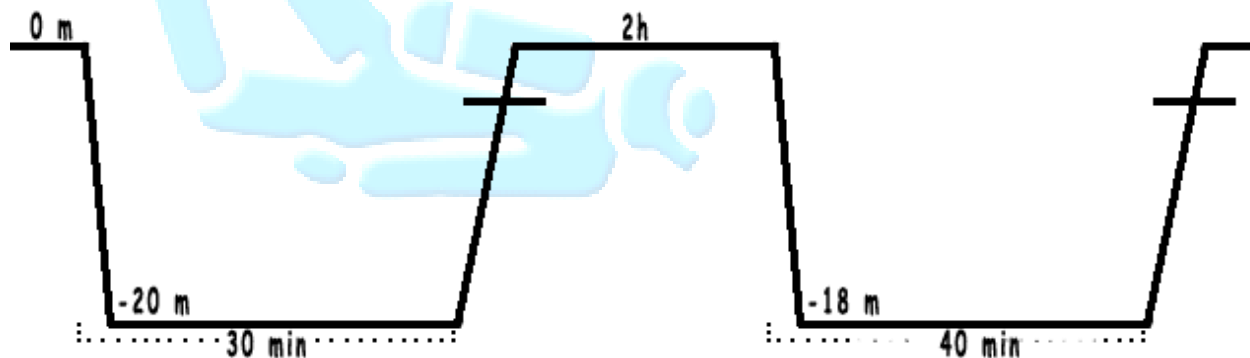
We go across the R3 row and down the 15m column and where they meet we find that the first number (green column), gives us a maximum time of 50 minutes so as not to enter into decompression and the second figure (yellow column) gives us a penalty time of 25 minutes to add to the real time of the dive, data which we take to table A. We already know that we do not have to do decompression stop in the water, because we have a maximum of 50 minutes and we will be 45 minutes only, but we have a safety stop of 3 minutes at 4.5 metres. In any case, we add the penalty time (25 minutes) to our real bottom time (45 minutes) and it gives us a total time of 70 minutes. With this data we go to table A and we see that at 15 metres for 70 minutes (we go to 75 minutes as there are no 70 minutes), we do not have to do mandatory decompression stops, but we do have a safety stop, finishing this dive in the column of the letter G, which is our code in case we want to do a third successive dive. We pass all the data to our sketch (NOTE, you should pass each item of data to the sketch as you find it).

Maximum No

ACUC		Table C:			
		6 m	9 m	12 m	15 m
RD →	SIG ↓				
R1		665 55	272 28	136 14	60 15
R2		600 120	250 50	125 25	55 20
R3		554 100	230 70	115 30	50 25



Well, we hope that the use of decompression tables is becoming clearer. Let's reinforce with a new example: We are going to propose a dive to 20 metres of depth during 30 minutes and, two hours after leaving, we will start a second dive to 18 metres of depth during 40 minutes. As always, the first thing is to make the sketch with the data we have.



First we look in table A for the data of our first dive to know how we should ascend:

We see that our dive is within the safety curve but in the limit (yellow), since 20 metres do not show we have to go to 21 metres.

21 m	12 (S)	15 (S)	20 (S)	25 (S)	35 (S)
24 m	10 (S)	13 (S)	15 (S)	20 (S)	25 (S)
27 m	9 (S)	12 (S)	15 (S)	20 (S)	23 (1)
30 m	7 (S)	10 (S)	12 (S)	15 (S)	18 (1)
33 m	6 (S)	10 (S)	12 (S)	15 (1)	18 (2)
36 m	6 (S)	8 (S)	10 (S)	12 (1)	15 (2)
39 m	5 (S)	8 (S)	10 (1)	13 (2)	
42 m	5 (S)	7 (S)	9 (1)	11 (2)	
RNG	A	B	C	D	E

As in the row of the 21 metres there are not 30 minutes, we have to go to 35 minutes. Our decompression code is S then no need to do mandatory decompression stops, but we do a safety stop. Our exit Residual Nitrogen Group (RNG) is E. We pass all these data to our sketch. Do it in yours, since we will only show the final sketch.

Our exit Residual Nitrogen Group (RNG) is E. We pass all these data to our sketch. Do it in yours, since we will only show the final sketch.

We know that we have come out with the letter E and we will be two hours on the surface, so Table B allows us to know what code our E becomes after two hours of Surface Interval Time (SIT). We look in table B for the two hours in the column on the left and in its row, we look for the data that is in the column of the letter E. We see that it is R3, what this means is that because we have been two hours on the surface, our code E has become a Surface Interval Group (SIG) of R3. We write it down in our sketch and now, with this new code, we go to table C to see what penalty time we have to apply, that is, what time we have to add to the real bottom time of our second dive to be able to go to table A.

**Table B: Surface Inte**

RNG >	A	B	C	D	E
SIT					
0:15-0:29	R4	R5	R6	R8	R9
0:30-0:59	R2	R3	R4	R5	R6
1:00-1:29	R1	R2	R3	R4	R5
1:30-1:59	R1	R2	R2	R3	R4
2:00-2:59	R1	R2	R2	R3	R3

**Table C: Maximum No Decom and Nit**

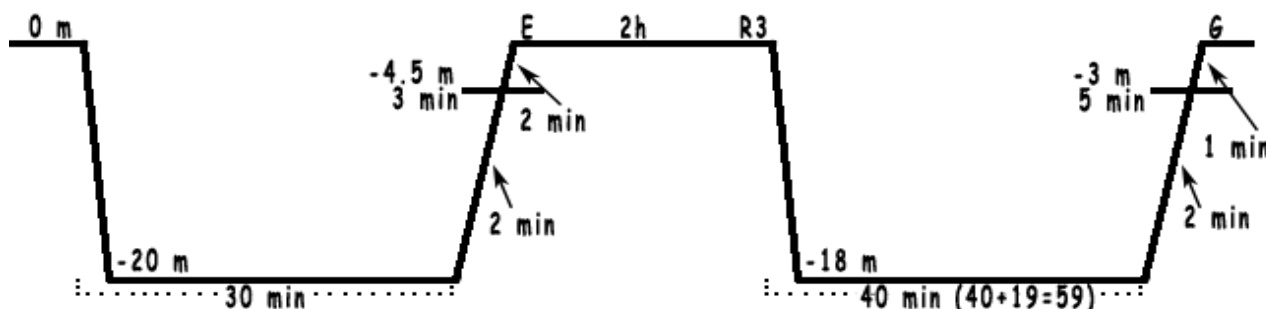
RD →	6 m		9 m		12 m		15 m		18 m	
SIG ↓										
R1	665	55	272	28	136	14	60	15	40	10
R2	600	120	250	50	125	25	55	20	35	15
R3	334	188	230	70	115	35	50	20	31	19

As we can see, in green it indicates a maximum no decompression time of 31 minutes, which means that if we want to dive for 40 minutes, we must do mandatory decompression stops.

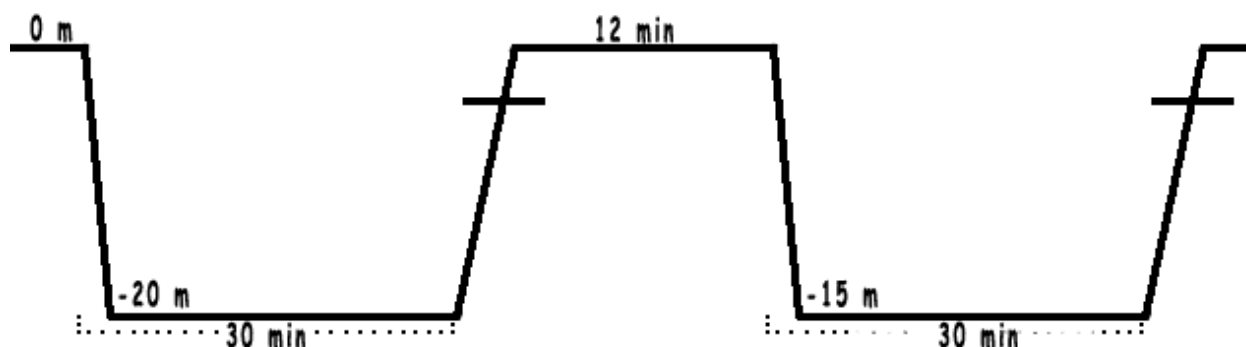
Of course, this dive is totally inadvisable, but let's see how we would have to do the ascent in the case of doing it. For that, we have to take the 19-minute data in the yellow column, which is the so-called nitrogen penalty time. Those 19 minutes we have to add them to the time we really are going to be in the bottom, which we said is going to be 40 minutes, which gives us a total of 40 + 19 = 59 minutes, which is the time we should look in table A, to the depth of 18 metres that we are going to dive. As the 59 minutes do not show, we have to go to the next higher, which is 60 minutes and we see that the decompression code is 1.

18 m	14 (S)	20 (S)	25 (S)	30 (S)	40 (S)	50 (S)	60 (1)
21 m	12 (S)	15 (S)	20 (S)	25 (S)	35 (S)	40 (1)	50 (2)
24 m	10 (S)	13 (S)	15 (S)	20 (S)	25 (S)	29 (1)	35 (2)
27 m	9 (S)	12 (S)	15 (S)	20 (S)	23 (1)	27 (2)	35 (5)
30 m	7 (S)	10 (S)	12 (S)	15 (S)	18 (1)	21 (2)	25 (5)
33 m	6 (S)	10 (S)	12 (S)	15 (1)	18 (2)	22 (5)	28 (6)
36 m	6 (S)	8 (S)	10 (S)	12 (1)	15 (2)	19 (5)	25 (6)
39 m	5 (S)	8 (S)	10 (1)	13 (2)		16 (5)	21 (6)
42 m	5 (S)	7 (S)	9 (1)	11 (2)		14 (5)	19 (6)
<b>RNG</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
Deco code		(S)		(1)	(2)		(3)
Minutes:		3		5	10		15
Deco depth		4,5 m		3 m	3 m		3 m

Below, in the column of code 1, we see that it indicates a decompression stop of 5 minutes at 3 metres of depth; we have to use 2 minutes to go up to the decompression stop, to stay at 3 metres deep during 5 minutes and after 5 minutes, go up to the surface using one minute for the ascent. Also, in the table we can see that we exit this second dive with the letter G in case we wanted to calculate a third successive dive. This example is only to see the use of the tables, since this dive would be inadvisable. Let's transfer all the data to our sketch and see the final result.



We hope that yours looks the same. Let's go with another example: We're going to do a dive to 20 metres deep for 30 minutes, we exit the water, change equipment and 12 minutes later we do a second dive to 15 metres deep for 30 minutes too. Well, the first thing is to draw our sketch with the data we know and then fill it with the new data as we find it.



We go to table A to see how our ascent should be from the first dive. Now we are not going to show the graphic, because it coincides with the previous example, so we invite you to see the previous graphic again. As we see, it is not necessary to do decompression stops in the water, but do a safety stop, for 3 minutes at 4.5 metres, we must use two minutes to go up to 4.5 metres and after the stop, two minutes to go up from 4.5 metres to the surface, where we arrived with the letter E.

We go to table B to see what our letter E becomes after 12 minutes of SIT and we find ourselves with the surprise that there are not those twelve minutes. The minimum surface time for a successive dive in this table starts after 15 minutes (see graphic in the margin), therefore, what we want to do, is not a successive dive but a continuous dive.

RNG >	
SIT	
0:15-0:29	
0:30-0:59	
1:00-1:29	
1:30-1:59	
2:00-2:59	
3:00-3:59	
4:00-5:59	
6:00-8:59	
9:00-11:59	
12:00-14:59	
15:00-18:00	

In this case we no longer need to consult table B or table C, since to calculate a continuous dive, we only need table A. The time of the second dive is the sum of the bottom times of the two dives and the depth, is the maximum depth reached in either of the two. The sum of the times is 60 minutes (30 min in the first dive plus 30 min in the second dive) and the depth is 20 metres, since it is the maximum reached in the two dives (the depth of the first dive). In table A we look for the depth of 20 metres and the time of 60 minutes. As 20 metres does not appear in the column of depths of the left, we have to go to 21 metres. We follow the row of 21 metres to look for our 60 minutes and find the data is outside the safety curve, in red, which indicates a decompression code (5) and our exit letter is H.

21 m	12 (S)	15 (S)	20 (S)	25 (S)	35 (S)	40 (1)	50 (2)	60 (5)	63 (5)	66 (6)
24 m	10 (S)	13 (S)	15 (S)	20 (S)	25 (S)	29 (1)	35 (2)	48 (5)	52 (6)	
27 m	9 (S)	12 (S)	15 (S)	20 (S)	23 (1)	27 (2)	35 (5)	40 (6)	43 (6)	
30 m	7 (S)	10 (S)	12 (S)	15 (S)	18 (1)	21 (2)	25 (5)	29 (5)	36 (6)	
33 m	6 (S)	10 (S)	12 (S)	15 (1)	18 (2)	22 (5)	26 (6)	30 (6)		
36 m	6 (S)	8 (S)	10 (S)	12 (1)	15 (2)	19 (5)	25 (6)			
39 m	5 (S)	8 (S)	10 (1)	13 (2)		16 (5)	21 (6)			
42 m	5 (S)	7 (S)	9 (1)	11 (2)		14 (5)	18 (6)			
RNG	A	B	C	D	E	F	G	H	I	J
Deco code	(S)		(1)	(2)	(3)	(4)	(5)			
Minutes:	3		5	10	15	20		5	10	
Deco depth	4,5 m		3 m	3 m	3 m	3 m		6 m	3 m	

We go to the bottom row on a white background, to see what decompression code 5 means and we see that it forces us to do 2 decompression stops; the first at 6 metres deep for 5 minutes and the second at 3 metres deep for 10 minutes. From the 15 metres to the first stop we have to take 1 minute; we must remain at 6 metres for 5 minutes; from 6 metres to 3 metres we have to take 1 minute; we have to remain at 3 metres for 10 minutes, after which we can go to the surface but take a minute to ascend. Let's see the full graphic.



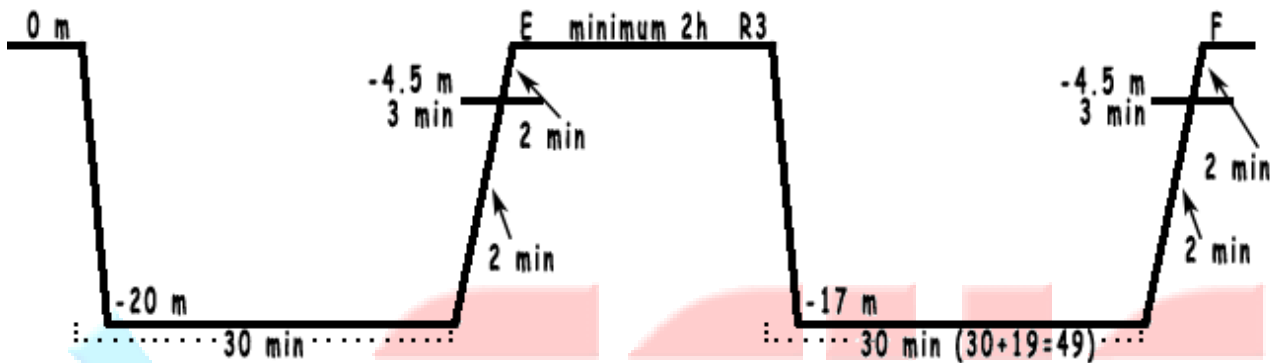


Table B: Surface Inte

RNG >	A	B	C	D	E
SIT					
0:15-0:29	R4	R5	R6	R8	R9
0:30-0:59	R2	R3	R4	R5	R6
1:00-1:29	R1	R2	R3	R4	R5
1:30-1:59	R1	R2	R2	R3	R4
2:00-2:59	R1	R2	R2	R3	R3

Now, in table B, we look in the first row for our exit Residual Nitrogen Group E from the first dive and go down in its column until we find the first R3 code. We find it and see that it is in the row of times corresponding to an interval between 2 hours and 2 hours 59 minutes. Now we

know our minimum surface interval: 2 hours. If we are 2 hours or more at the surface after the first dive, we will not need to do mandatory decompression stops in the second dive. Let's see the graph completed assuming those two hours minimum on the surface.



As we can see, we can manage the tables to obtain the data we need at each moment. With the latter, we end the examples, which hopefully have served to understand and use the decompression tables with ease.

In the next topic we propose exercises without giving any solutions, so that you solve them and, in the following, we show you those same exercises already solved so you can check if you have made an error. We also include two image files, one with table A, called TablaA\_Int.jpg and another with tables B and C, called TablaBC\_Int.jpg. These files can be printed if you find it more convenient to solve the problems raised or have them on screen for consultation during the exercises. If you wish, you can also acquire, through your instructor or directly, through our website [ACUC Products](#) these laminated tables, which are therefore submersible.

It is very important that you do all the exercises on your own, without consulting the file with the solutions, to make sure that you can do them all, since in the theory exam you will have to solve decompression problems. The theme 6\_5 that we offer you with the solutions, is for you to check by yourself if you have made an error in any exercise. Remember that for any questions you may have, you can always consult your instructor, through the contact means that he must have provided you, or even ACUC directly if for any reason you cannot contact your instructor.