

## General comparison and long-time test: Helium/mix gas computers

Parameter	VR3	EMC-20H	Aladin TEC 2G	Rem.
				according to manuals
# gases	10	3	1	
max. depth [m]	150	130	120	
max. time	9999 min. (166 h)	9 h 59 min.	199 min. (3 h)	
max. deco time	9999 min.	9 h 59 min.	199 min.	
# log entries / h	100 / 22 h	1024 / 1,500 h	/ 25 h	
algorithm	conservativ	liberal	0	cf. table A / B
				according to tests:
Handbook	-	0	0	
Armstrap	-	+	+	
Transportbox	-	+	0	
Displayprotector	-	+	0	
Handling	-	0	+	
Menustructure	0	0	+	
Display	0	+	0	
Batterychange	- (!)	+	+	
Energy Consumption	--	0	0	
Support	-	+	0	
Bugs, DC Hardware	0 -> -	0	0	
Bugs, DC Software	-	0	0	
Bugs, Desktop Software	-	- (!)	+	
Data Link	0	0 -> -	++!	
Feature Richness	0	+	0	
Adaptability	-	+	+	
deep stop	--	+	+	
Price/Performance Ratio	-	+	0	
# of Points	<b>0 / 18</b>	<b>10 / 18</b>	<b>8 / 18</b>	
final remark	<b>0 -&gt; -</b>	<b>+ -&gt; ++</b>	<b>+ !</b>	Aladin: n.a.

### Explanation:

- :bad, clearly below average
- 0 :normal, average
- + :good, excellent or clearly higher-than-average
- DC: Dive Computer

### Parameters:

- Algorithm: the decompression "model": overall consequences for a dive
- Handbook: completeness, understandable, clear, precise specs, back ground infos
- Armstrap: robust, ease of use
- Transportbox: extra item, does it protect the computer
- Displayprotector: extra item, does it work
- Handling: of kobs, contacts, etc., smooth running, useability with thick glooves
- Menustructure: ease of navigation, consistent useage in all menue trees, ease of use concerning gaschanges or mixchanges
- Display: clearness & readability, contrast, background light
- Batterychange: how easy is that, loss of stored data
- Energy Consumption: required battery replacement per the last 150 dives
- Support: reactiontime, competence and helpfulness on questions per e-mail
- Bugs, DC Hardware: did the box perform well underwater
- Bugs, DC Software: problems with the desktop software
- Bugs, Desktop Software
- Data Link: how easy and reliable is the set-up and the transfer of the DC logbook to the PC
- Feature Richness: as such, # of features
- Adaptability: fitness levels, conservatism levels, adaption to temperature or workload
- deep stop calculation: how are they calculated / displayed? What happens at a violation?

- Price/Performance Ratio: the list prices of the 3 boxes in comparison of what you get, overall

**Table A: Simulation of a Dive to 42 m, Bottom Time 25 min. Mix: Heliox 20 / 80**

Type / Model / Version	time-to-surface (TTS) [min.]
VR3 3.03 aC	295
Proplanner	206
Professional Analyst 4.01.j Cochran EMC-20H	159; Cons.= 50.0
Zplan v1.03	113
M-Plan V 1.03	95; with Pyle Stops
Professional Analyst 4.01.j Cochran EMC-20H	87; Cons.= 0.0
M-Plan V 1.03	72
Deco Planner 2.0.40	70
VGM ProPlanner Beta	66 (default)
Multilevel 1.6	65
GAP 2.1	63; ZH-L 16 C
Heliox A	54, J- & GF-Factors: ZH-L 16 (as per "C")
GAP 2.1	53; RGBM

Rem.: here we put deliberately this, somewhat unusual and maybe too expensive mix for sports-diving. The rationale is to make clear the sole difference due to Helium, that's why we put the inertgasfraction to 80 %. The average TTS is approx. 108, the standarddeviation +/- 70!!!

**Table B: Testdive: air, 42 m, 25 min. bottom time**

Method:	24 m	21 m	18 m	15 m	12 m	9 m	6 m	3 m	TTS min	Rem.:
U.S.N. „old“							2	14	20	
U.S.N. 2008							26	-	31	140 feet
DECO 2000					1	4	8	16	33	
DCIEM						7	8	17	36	
VR3	2	-	2	-	-	2	8	22	40	3 m @ 4,5 m
TEC						3	n.a.	n.a.	36	L0 (Level Stop)
TEC					1	n.a.	n.a.	n.a.	40	L1
TEC					3	n.a.	n.a.	n.a.	45	L2
TEC				1	k.A.	n.a.	n.a.	n.a.	50	L3
TEC				3	n.a.	n.a.	n.a.	n.a.	57	L4
TEC			2	n.a.	n.a.	n.a.	n.a.	n.a.	65	L5
EMC					2	2	3	8	19	Conservativ = 0
EMC			2	1	3	4	8	19	41	Conservativ = 50

A couple of remarks concerning the comparison parameters:

Handling: the switches from the VR3 get stuck sometimes, therefore: -. The ALADIN is absolutely reliable, the EMC has no switches at all: the background light is switched on with a light tap on the DC.

Menu Structure: one of the tekkies wrote me an e-mail: „... the menus do look like the seminar paper of an EDP-apprentice boy!“ Clear and self-consistent structures are the default with the TEC and the EMC.

Battery Replacement: each replacement puts the VR3 into electronic oblivion: all gaslists and logbooks are away! TEC and EMC survive this procedure unrepining.

Energy Consumption: is daunting from the VR3, therefore: - -

Support: the answer of an e-mail request takes 3 – 5 workdays at DeltaP, but for all that you will get replies like „Your VR3 works just fine“. UWATEC and as well Cochran try to deliver an answer within 4 to 8 h, normally very competent. Cochran has as well an interactive help in the web.

Bugs, DC Hardware: sometimes the VR3 does not accept the gas changes. The ALADIN here, as well, very reliable! The EMC will not be reprogrammed under water: here you have to put the gas changes according to depth and time limits (so called „benchmarks“) before the dive.

Desktop Software: the ANALYST package from Cochran is, still by 11/2008, Version p, afflicted with a couple of bugs. As well the useage and the user-interface looks, in comparison to the SmartTRAK from UWATEC, antiquated.

Data Link: outstanding for the TEC: as soon as the DC detects an infrared device, it is ready for data transfer to the PC, without any annoying cables. The EMC hast to be girded with a velcro strap to connect the USB Adapter with the 3 metallic pins, therefore: 0 -> -.

Adaption: as well the level stops from UWATEC and the conservatism factors from the VR3 are undocumented. Only Cochran gives an explanation in terms of additional compartment saturation in percent.

deep stop calculations

The manufacturers normally do not disclose any parameters or details of the algorithms. So we have to rely on conjectures, subjective interpretations of the manuals, and our own tests!

VR3: ZH-L method, „by foot“.

The difference between ceiling and the deepest point in the dive is halved. If you omit this one, the box goes nuts.

EMC-20H: via super-fast compartments and adapted M-values, part of the regular deco calculation.

Aladin TEC: individual input from the diver, prior to dive. If you omit a deep stop, simply the next one is displayed.

My subjective bottom-line: if sb.likes Mobiles and PDAs and other electronic knick-knack, he/she will like the VR3 as well. As well there are not many functioning alternatives if you dive with a Helium-CCR. But the device of choice for top-professionals and open-circuit is without any question, the Cochran EMC-20 H. During the last 3 years it proofed to be 101 % reliable and with absolutely no shortcomings at harsh mix gas dives! (the Aladin TEC 2 G we put deliberately on the list: this is no Helium computer at all. But a couple of DC tinkerer can put a leaf out of this book!)

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