AiR FiLL stations

The noisy gadgets that give you the stuff to breathe underwater! By Keith Cardwell

The cost of a good fill

One of the first interesting things I ever had to do when getting into the recreational dive industry was how to cost a diving course. The biggest challenge as it turned out was to make sure the course didn't cost more than what we charged for it. Smaller challenges did present themselves though – like getting the customers! - and really, really tricky, fiddly problems like working out how much air fills cost.

Even today it's a mystery to me. I guess if I really set my stall out to do the number-crunching, I'd get close, but I'd love to hear from anyone who can show me a solid set of calculations other than the 'wet thumb in the wind' approach that is usually followed by a statement something like 'Aww about five bucks a pop'.

At this point and present costs, it really doesn't matter much, I'm sure we'll all still pay it! As long as it's a safe (and full) fill.

But exactly how does the air get stuffed into a diving cylinder? What is so special about how it's done? Who fills them and, in our ever increasingly complicated society of red tape, are there any legal requirements restricting this process?

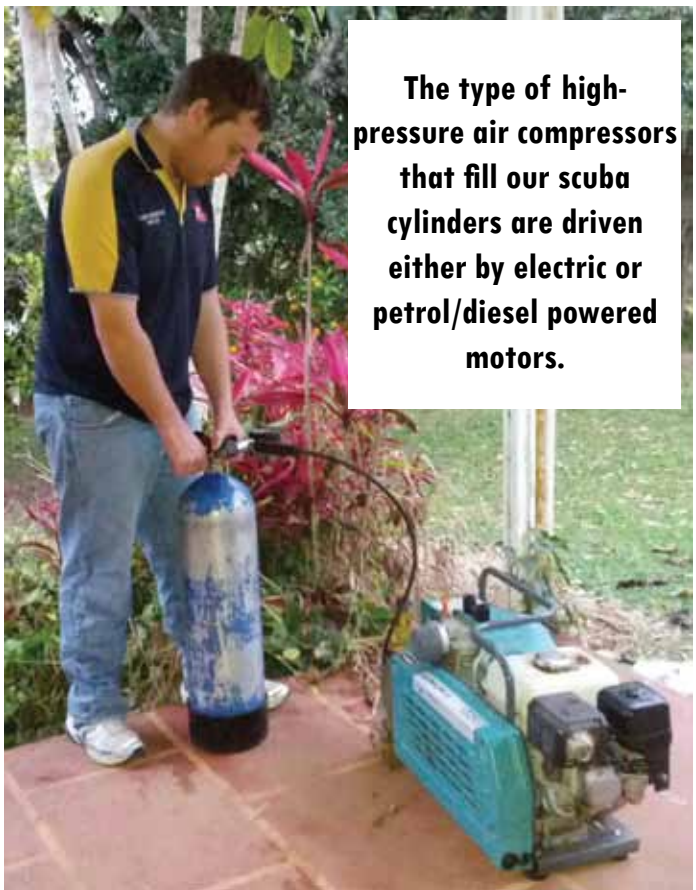
Where the filling takes place

Those of us who own cylinders usually drop them off at a dive shop when empty and either get them filled while we wait or pop back just before we plan to go diving. We expect something like 200 bars of pressure and a cap or tape around the tank valve orifice to keep in the o-ring and help prevent spiders getting in. It also helps to remind the air station operator that the taped cylinder is already filled so don't waste time coupling it up again. Okay, I was just joking about the spiders.

There are some however, that have the advantage of owning their own portable compressors and can fill their own cylinders. I can personally vouch for how handy this is when wanting to go to remote locations where access to air fills is otherwise difficult or impossible. Even so, this still requires care and concern about how the cylinder is filled and that legal requirements are observed.

Fills, pressures and standards

The type of high-pressure air compressors that fill our scuba cylinders are driven either by electric or petrol/diesel powered motors. Noisy beasties that often stop conversation when wandering too close to them but it's not just the noise that can be



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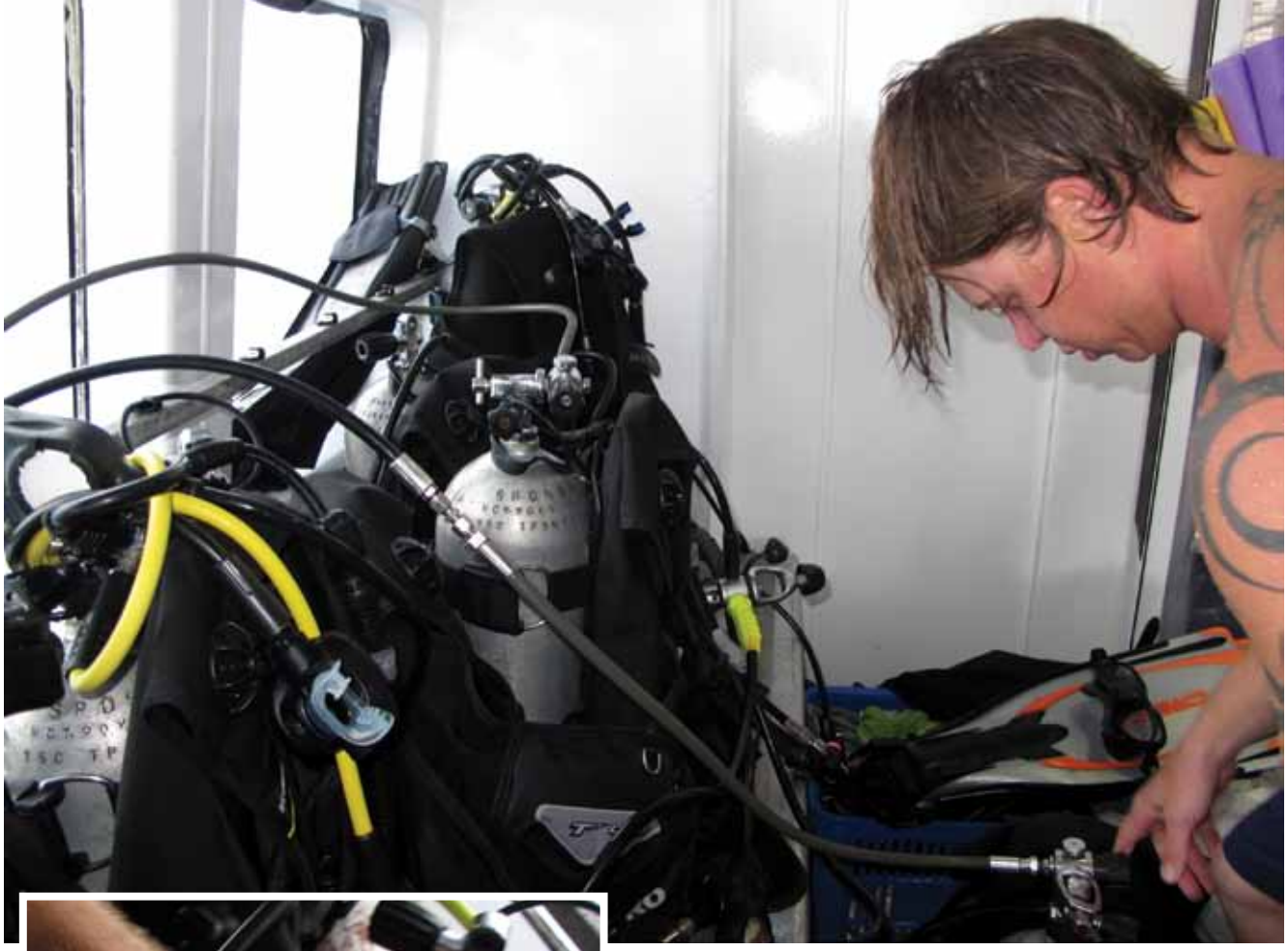
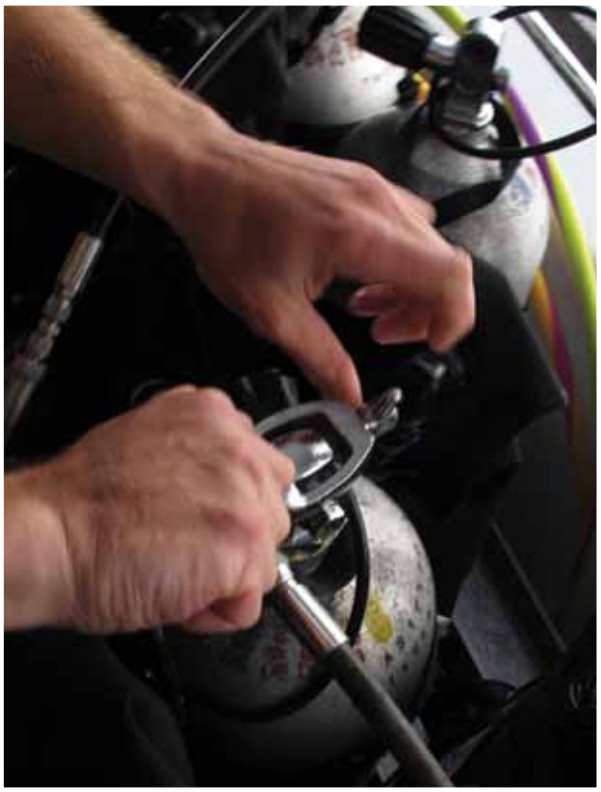




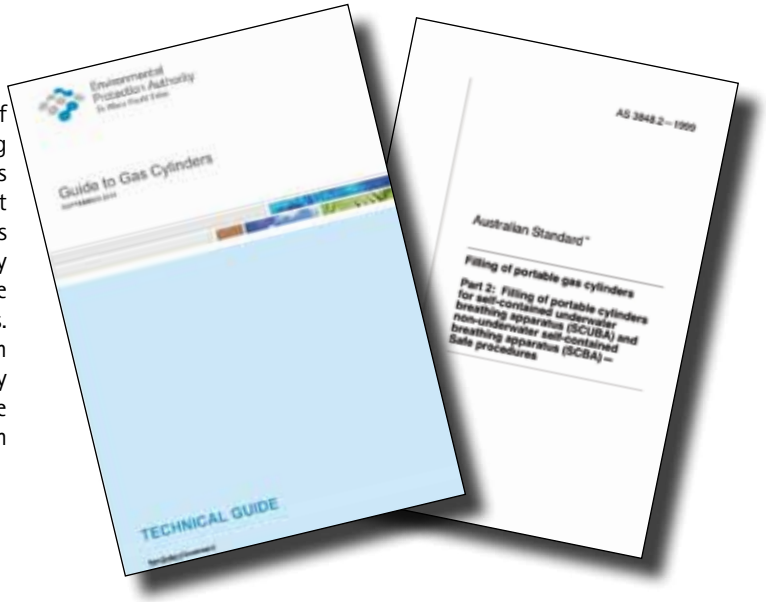
'off-putting'. In beginner dive courses, mention is often made of pressures up to two, three or four atmospheres when descending and the disastrous effects that unchecked increasing pressure has on elastic volumes like eardrums and lungs. But the pressures that are stuffed into a dive cylinder are equivalent to 50 to 100 times these figures and represent an incredible amount of stored energy and power. Any sudden release would be catastrophic - as some unfortunate folk have found out when filling problem cylinders. Thank goodness this is an extreme rarity! The rarity comes from dive operators following solid guidelines establishing the integrity of cylinders prior to filling and ensuring those that do require attention are tested according to law. More on this was written in issue 108 of this magazine (buy a copy!) or check out the articles section of my web site at www.fnqdive.com. For those curious about the technicalities of how clean the air you breathe must be, and who does the stuffing (filling) then:

These requirements (for Kiwis) are found in the Environmental protection agency (EPA) Guide for gas cylinders September 2011 and (for Aussies) by reviewing AS 3848.2-1999 Filling of portable gas cylinders – Filling of portable cylinders for self-contained underwater breathing apparatus (SCUBA) and non-underwater self-contained breathing apparatus (SCBA).

The fillers

No doubt if you review the above guidelines you will see that air filling isn't as cut and dried as it seems. The air fill station operator should have a good handle on what he/she is filling, what pressure to fill to, and that all filtration and other required maintenance procedures are followed so that your sometime raptures of the deep don't develop into headaches from nasty exhaust gas or other contaminants getting to you!

That's why it is a very safe precaution to only get your air fills from a reputable air fill station where there is little doubt about whether the job's being performed correctly or not.



Professional stuffers are certified by the following approved authorities in New Zealand – International Accreditation New Zealand (IANZ), NZ Underwater or SAI Global. Other short courses are also available through the various diver training agencies but these are designed as introduction and awareness programmes for divers such as the one I compiled as a PADI distinctive specialty in air fill station operation (wouldn't you know!) Any PADI instructor who wishes to use it is welcome to it. Just email me at keith@fnqdive.com and I'll send a copy to you.

Back to costing an air fill

I really would like someone to do a job on this. Come on! There are some really smart people out there diving that have the know-it-all to come up with a good blueprint for this. And I'll bet that the editor of this magazine will be one of the first to want to publish your calculations! In the meantime, I'm going to use up some more compressed air....

WHAT TO LEARN FROM THIS

- A good template for costing would be good as there doesn't appear to be any sound calculation available to find out what an airfill does really cost!
- Compressors used for filling scuba are noisy and pump high and potentially dangerous pressures. Take care using and wear ear muffs.
- Commercial users are required to adhere to certain safety precautions whilst filling and common sense should suggest that amateurs should also conform to those guidelines.
- There's an opening for a good number cruncher to produce a follow-up article!