

To: instructor@hotmail.co.uk

Subject: Cylinder testing

Body:

Hi Paul,

I am writing today in regards to the work that you recently undertook to service our club cylinders. We have unfortunately been made aware of several issues with them as of late.

A common issue we seem to be finding is that the bonnet nut that holds the spindle in the valve has been over tightened, and on several this has cracked the nut rendering it useless. I have kept an example of this to show to people. This is an odd issue as the torque on this nut should not be all that much, the seal is made via a barrel seal with an O ring. I have found that replacing the O ring often fixes leaking ones and in several other cases the O ring has just been absent from the assembly altogether.

We have been unfortunate recently in that poor operation of our compressor led to contamination of 12 cylinders connected to it in one particular filling run. Though it turned out that little contamination was put into the cylinders, we had to get them all visually inspected to be sure. In this process, it was found that two of the cylinders showed signs of contamination from the compressor run, though some other issues were exposed in the cylinders that were not affected by the compressor.

Whilst the cylinders were being visually inspected, we had 3 of them fail. One of these had only recently been inspected. This failed due to deep pitting in the inside of the cylinder, which I have been advised would have taken some time to accumulate.

After we remedied the problem with the compressor, we had an air purity test conducted, which involved filling a cylinder and taking it to be tested. For this I selected one of the 3L cylinders that you serviced and O2 cleaned for us late last year. The test came back with an odd result and the technician performing the test decided to inspect the cylinder. On opening it he found that it was filled with rust, explaining the air test issue (later the compressor air was verified as being clean). This was from a cylinder that was serviced and O2 cleaned just a few months ago by yourself, and had not been used at all by us as we were preparing to sell it at the beginning of this season.

With regards to the O2 clean cylinders that we have had from you, one of our members hoping to partial pressure blend a nitrox mix decided to check the valves of all of the O2 clean cylinders before using them. He did this as a TDI trained O2 service technician because he had found one of the cracked bonnet nuts when we were troubleshooting some issues. Below is a photo of the inside of one of the cylinder valves (note this is before it had been used for any diving).



He was somewhat baffled by whatever the black stuff is on all of the valve components as only a thin smear of crytox or similar was expected.

I am coming under increasing pressure as the problems with the cylinders stack up, and our members' confidence in their safety has been dwindling. This is particularly in relation to the appearance of the inside of anything marked as "O2 clean". As we have experienced a

failure rate on retest of around 1 in 4, this means we may expect to find another 7 cylinders amongst our collection that could also have terminal issues.

Due to these major issues that I have detailed above, we would like to ask whether you would be willing to remedy every cylinder that we have had tested with you. We are currently seriously concerned about the safety of our cylinders, and I hope that we are able to resolve this issue quickly and amicably, to avoid further disruption to both our activities.

Best regards

-Sam Walder
University of Bristol Underwater Club Equipment Officer

Reference Information

Cylinders serviced 2017-08-17

- 2 x unknown
- CI001
- CI003
- CI027
- CI028
- CI032
- CI034
- CI038
- CI075

Serviced 2017-10

- CI005
- CI008
- CI021
- CI084
- CI033
- CI013
- CI002
- CI037
- CI041
- CI071
- CI025
- **CI040**
- CI015
- CI022

On the compressor at time of issue

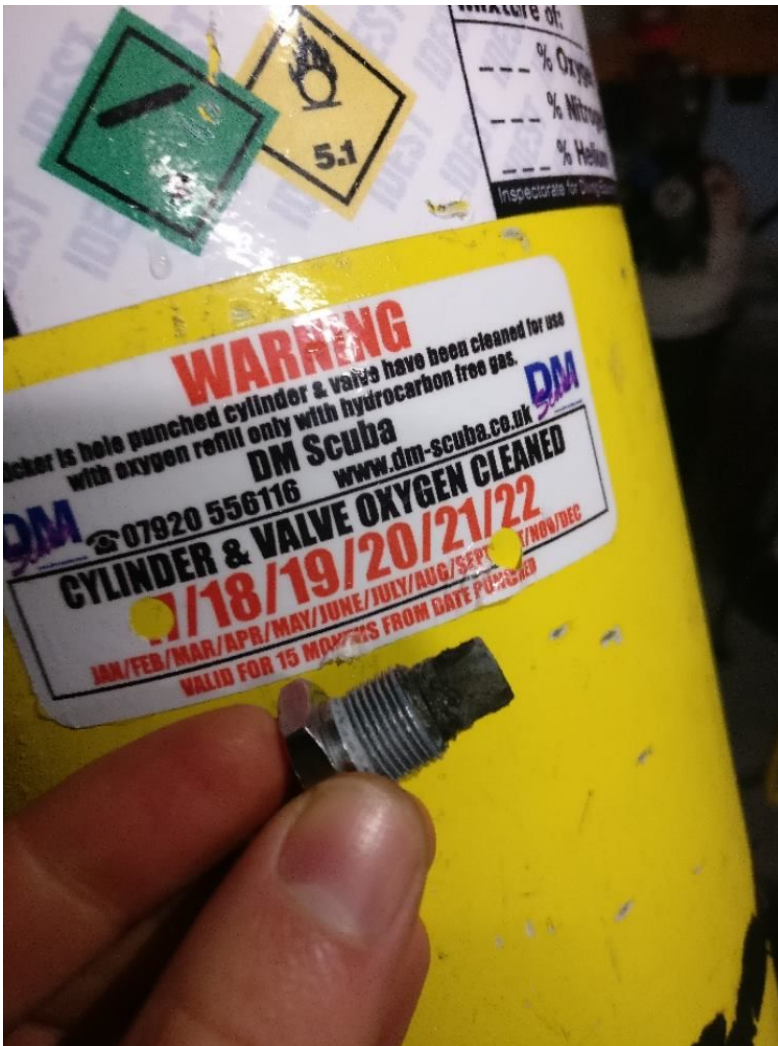
- CI085
- CI016
- CI017
- **CI088**
- **CI089**

- CI040
- CI074
- CI012
- CI013
- CI011
- CI007

Recently failed

- CI088 (visual on 2015-11-29) External rust
- CI089 (visual on 2015-11-29) Internal rust
- CI040 (visual on 2017-10-20) Exceptionally deep internal pitting

Photos of valves



IDEST O2 cleaning information: <https://www.sita.org.uk/idest/uploads/T3.pdf>



