

Botswana Inspection News

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Welcome to our first newsletter on inspection issues—if we find an issue with pressure vessels or lifting equipment which needs airing or raising we will put it in the **BIN!**

Compressors & Carbonized Oil

Inspection of two separate workshop compressors recently identified carbonized oil in the air receivers. This rare but potentially serious phenomenon prompts us to raise its profile.

Hazards of Air Receivers:

An air receiver under full pressure contains considerable energy stored in the compressed air; a 350l air receiver working at 10 bar pressure (a typical workshop unit) contains the energy equivalent of **10-15 gms of TNT**. If the tank ruptures e.g. through corrosion, impact, weld failure or overheating this energy will be released generating an air blast and flying debris which will impact on anyone and anything near it.

This is why it is important to:

- drain water from the tank regularly to minimize corrosion
- not to store flammable material around the compressor
- only use properly coded welders and procedures to weld pressure vessels
- install the compressor in an enclosure to reduce risks of impact

Adding oil mist, carbonized oil and carbon deposits to the equation creates the potential for a detonation causing the tank to fragment and generating a shock wave, resulting in significantly more damage to people and property. Note: the overpressure generated will not be relieved by the pressure relief valve.

Causes of carbonising:

- Compressors use oil to lubricate and seal the moving parts: wear, overfilling, blocked inlet air filters, the wrong oil can lead to oil transfer to the compression chamber
 - All gases get hot when they are compressed - as felt when you use a bicycle tyre pump
 - Compressors are designed to remove some of this heat through cooling fins on the cylinder, radiators on the pipe work, and transfer into the oil in the crankcase. Cooling also occurs as the gas expands from the compression chamber into the transfer line and air receiver.
 - Excessive heat in the compression zone **can** cause the oil to burn, partially burnt oil becomes carbon - hence carbonized oil
 - Most air receivers run warm but if it is particularly hot to the touch you may have a problem with the compressor
 - Carbon deposits make matters worse by preventing the exhaust valves from sealing and by reducing the bore of the transfer line. If they get hot enough glowing particles can pass through to the air receiver and ignite residues there
- Compressor oils are formulated to withstand high temperature which is why it is important to use the correct grade and quality of oil and to change the oil periodically.

Does it actually happen? YES! Follow this link for a case which resulted in fatality.

<http://www.cdc.gov/Niosh/face/stateface/ca/05ca010.html>

Now ask yourself some questions!

- Do I follow the requirements of the Factories Act and Mines & Quarries Act and have my air receiver inspected by an independent authorized examiner?
- Does he look for carbonized oil?
- Does he look for corrosion?
- Does he pressure test the tank?
- Does he test the pressure relief valve?
- Is my compressor serviced by an experienced and reputable agent?

We hope you can answer **YES** to these questions!