

# HSEM ALERT

## Pressure Vessel Explosion

### Who needs to read this?

All Curtin University Staff and Students who use pressure vessels for teaching or research purposes

### Investigation Results

On the 19<sup>th</sup> July 2016, a furnace on campus was irreparably damaged by the successive explosions of three titanium tube autoclaves. These pressure vessels contained minor quantities of nitric acid, dodecanethiol and hydrogen peroxide to which a very small amount of acetone was added. The mixing of the nitric acid and the acetone (incompatible chemicals) with the addition of heat resulted in the explosions.

As these pressure vessels did not contain any pressure relieving devices (i.e. burst discs), the vessels failed at their weakest point, on the thread between the cap and the tube of the vessel.



Figure 1 Autoclave damage



Figure 2 Furnace damage

Thankfully, as the explosions were contained within the furnace, no staff or students were injured.

## Recommendations

It is recommended that prior to commencement of projects:

1. Supervisors review the proposed facilities where the research/teaching is to occur to ensure their suitability for the proposed project. This includes the provision of suitable monitoring and alarm systems, ventilation, safety systems and emergency equipment.
2. All [chemicals](#) and [plant/equipment](#) are individually risk assessed and a Scope of Work/[Generic Risk](#) Assessment completed to identify hazards/incompatibilities of the combination of chemicals and equipment to ensure that suitable controls are in place for any reactions that may occur.
3. All chemicals have current Australian compliant SDS's with copies placed on [ChemAlert](#).
4. Pressure vessels are hazard assessed as required under [relevant legislation](#), placed onto the Curtin Pressure Vessel Register and where necessary [registered](#) with Worksafe WA.
5. Where cross discipline research is to occur, consultation is arranged between the respective areas and specialist committees (where necessary) to ensure that all hazards have been identified and suitable controls implemented.
6. Risk assessment is undertaken of any changes to the approved experimental design and approval obtained from the respective Supervisor before recommencement.

## Who do we call with questions?

If you have any queries, please contact Health, Safety and Emergency management on 9266 4900 or email [healthandsafety@curtin.edu.au](mailto:healthandsafety@curtin.edu.au).

## References

[Australian Standard 4343:2014 Pressure equipment - hazard levels](#)

[Occupational Safety and Health Regulations 1996 – Regulation 4](#)

## Date of Issue

[07/02/2017]