

SAFETY BULLETIN

Exposure of copper or copper alloys to ammonium nitrate – TACN formation

BACKGROUND

Many mines manufacture explosives on site. Manufacture of explosives requires handling of chemicals that can react with certain metals to produce hazardous or explosives substances.

When copper or copper alloys are exposed to ammonium nitrate the product of corrosion is usually blue. This material is likely to be copper nitrate; however, it may be the explosive tetraamine copper nitrate (TACN).

FORMATION AND SENSITIVITY

TACN is formed when air, moisture, ammonia, copper and electrical currents combine. It is a deep purple, as opposed to the blues and greens of copper nitrates. If copper nitrates are exposed to air, the purple TACN will begin to form underneath. The photos below (Image 1) show TACN formation on a brass locking lever of a cam-lock fitting.



Image 1 - TACN on brass locking lever of cam-lock

TACN is an impact sensitive explosive that becomes sensitive as it dries out. The impact required to initiate TACN is reported to be equivalent to dropping a 2 kg weight from a height of approximately 20 cm.

CODES

The Australian Explosives Industry and Safety Group (AEISG) code of practice for mobile processing units (MPU), says in relation to this issue:

The use of copper zinc and their alloys on an MPU should be limited to those components (mainly electrical) for which no realistic alternative is available. Any such copper containing components need to be inaccessible to MPU ingredients or manufactured product.

RECOMMENDATIONS

It is recommended manufacturers of explosives develop and follow procedures to ensure:

- personnel are trained in the correct use and maintenance of equipment
- equipment is kept clean
- only fittings made of aluminium or stainless steel are used
- the AEISG Code of Practice, Mobile Processing Units is followed.

NOTE:

Please ensure all relevant people in your organisation receive a copy of this Safety Bulletin, and are informed of its content and recommendations. This Safety Bulletin should be processed in a systematic manner through the mine's information and communication process. It should also be placed on the mine's notice board.

Issued by

Dave McLean

Chief Inspector of Mines

Appointed pursuant to Work Health & Safety (Mines) Act 2013

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