

Zac Chami
Clayton Utz

Level 15, 1 Bligh Street,
SYDNEY
NSW 2000

MR IAN TOLLIDAY
218 Lerderberg Park Road
MERRIMU, Vic. 3340

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Use of LDAN in Emulsions

Dear Mr Chami,

This letter gives my technical opinion regarding the use of Low Density Ammonium Nitrate (LDAN) in emulsion explosives. I have a Bachelor Degree in Applied Science (Chemistry) and have 36 years of industrial experience. I have specialised in the application and development of bulk mining explosives for the last 10 years and currently hold the position of *Global Technology Manager - Explosives* for the large multi-national company, Clariant.


LDAN, also referred to as 'Porous Prill', is widely known not to be suitable for the production of emulsion explosives.

The manufacture of LDAN requires the use of a crystal modifier additive in order to obtain the porous low density structure of the prill. The majority of these crystal modifiers are strongly anionic in nature. A typical example of this type of additive is sodium naphthalene sulphonate.

The standard benchmark emulsifiers used in the emulsion explosives industry are Polyisobutenyl succinic anhydrides reacted with alkanolamines (PIBSA-alkanolamine derivatives).

The anionic nature of the crystal modifiers in LDAN strongly interferes with the functionality of PIBSA-alkanolamine based emulsifiers. This means the additives in the LDAN 'poison' or destabilise the emulsion explosive. The mechanism of this destabilisation is breakdown of the emulsion droplets and formation of crystals throughout the emulsion.

Yours sincerely,



Ian Tolliday