

## High energy chemistry

Cambrex is an innovative life sciences company with a refreshingly human approach. Driven by passion, our pharmaceutical products, expertise and technologies are accelerating small molecule therapeutics into the market to help businesses grow.

We offer our customers a truly end-to-end partnership for the research, development and manufacture of their small molecule APIs at every stage of the lifecycle.

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### High energy chemistry

Cambrex's expertise in high energy reactions and hazardous materials dates back to the work of Alfred Nobel, who founded the company in Karlskoga, Sweden in 1896. Our dedication to quality and safety of energetic chemistry has laid a solid foundation for supplying cGMP high energy compounds to world-leading pharmaceutical companies. We offer world-class expertise in energetic chemistry combined with quality cGMP capabilities.

Cambrex can provide thermal and process safety studies to support manufacturing at our facilities or on a consultancy basis.

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### Remote controlled cGMP manufacturing facility

- Specialized bunkered high energy manufacturing facility
- cGMP compliant for API production
- Suitable for the development and manufacturing of thermally unstable and explosive products
- Safely monitored from a control room located 50 meters from the facility

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### Process safety management and analysis

- Cross-functional process hazard analysis and management plan
- Methodical and comprehensive review during each step in the synthetic route
- Safety solutions integrated into development and manufacturing of all high energy reactions
- In-house process safety testing of energetic reactions/compounds

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### Process safety analysis testing

- Differential Scanning Calorimetry (DSC)
- C80 Calorimetry
- Reaction Calorimetry, Chemical Process Analyzer (CPA)
- Micro Calorimetry
- Explosivity Testing (Koenen test, BAM Fall hammer, BAM Friction apparatus)

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### Manufacturing capabilities

- High energy APIs
- High energy intermediates
- Nitration with Nitric Acid
- Catalytic hydrogenation
- Oxidation with Nitric Acid
- Oxidation with Hydrogen Peroxide
- Diazotization with Sodium Nitrite
- Grignard, formation and reaction
- Organic Azide formation with Sodium Azide
- Reduction with  $\text{LiAlH}_4$
- Lithiation with  $\text{BuLi}/\text{HexLi}$
- Hydroxylamine, HCl as reagent

