# **AutoStem Generation 3**

Patent protected

# June 2023

UIOS

# The reinvention of

9mm – 9mm Prange Spinon deconating blasting cartridges

Dual-Stemming<sup>™</sup>

Safety Lock™

AutoStem<sup>™</sup> sequential

Waterproof

www.autostemtechnology.com

### AutoStem range is first viable non-explosive blasting technology

- A fundamentally differentiated blasting category
- No shock combined with high energy delivery, classified as 1,4S
- Cartridge products suitable for all borehole sizes from 9mm 103mm
- Significant factors leading to adoption include:
  - Classification: Benefits from 1,4S accreditation in transport, storage and use
  - Legislation shifts: No mass detonation hazard or malicious application favours non-explosive solutions in sensitive blasting and/or built-up areas
  - Productivity: Avoided shock means minimal scatter rock, no site downtime, immediate re-entry
  - Cost effectiveness: Lower than the cost of a detonator
  - Safety: 1,4s accredited. No deflagration without confinement. World's first safety switch in Gen III
- AutoStem is more suited for civils blasting than conventional detonating explosives, particularly where vibration effects are of a concern



## Non-detonating Solutions (Pty) Ltd – Advanced non-detonating technology

- Company formed in 1997
- Introduced multiple products since 1999
- 2011 breakthrough: AutoStem Technology
- World's first viable alternative to conventional explosives
- Led to a refocus of business activities in Research and Development of AutoStem Products
- Production out of South Africa, currently setting up facilities in 3 new locations
- Multiple patents granted internationally
- Since introducing the AutoStem range in 2015, we now supply product to over 40 counties
- Wide variety of customers and blasting applications



# AutoStem **design objectives**

More power:	Increase energy capacity, not VOD
No shock energy:	Reduce VOD ("velocity of detonation"). No detonation.
Energy conversion:	Delivery to rock
Safety paradigm:	No malicious application, safe unless initiated in borehole
Predetermined fragmentation	Cartridge for every application and requirement

- **RESULTS:**
- Improved upon the energy released in the chemical reaction  $(\Delta H_f)$
- Proven the decoupling of variables VOD and ΔH<sub>f</sub>
- Self-stemming the only blasting technology which requires no stemming in the world
- Very safe in that AutoStem cannot be deflagrated outside a confined borehole
- Wide range of cartridge diameters, lengths and cartridge choices in terms of energetic masses

	AutoStem Gen III	Conventional packaged product
TNT equivalent	1.1x	0.8x
Strength relative to ANFO	c. 1.5x	1.0 - 1.1 x
Velocity of deflagration	360 m/s	5,000 m/s
Heat of combustion (Celsius)	2,500	3,000
Vibration at 10m	Highly controllable (< 2.5 mm/s)	Significant



### Generation III... 2017 launch

Highest power non-detonating (non-explosive) ever designed and manufactured

ILAUIO.

TRUTOSTE

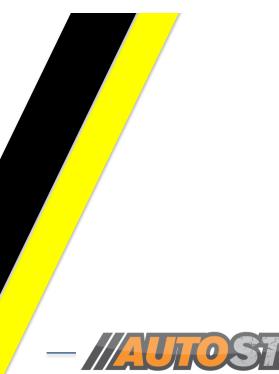
VAUIOSI

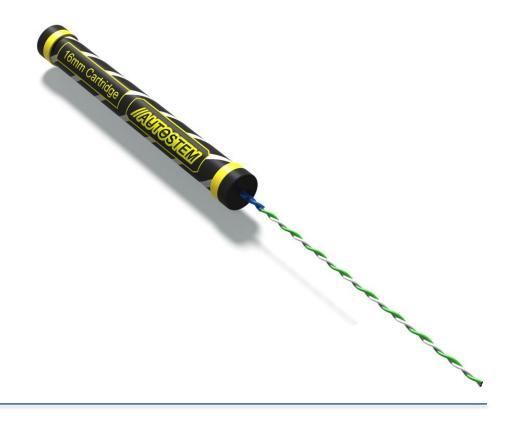
- Dual-stemming, Safety lock feature, water proof
- Does not require explosive accessories to be initiated
- Cartridges from 3g to 1,700g
- Diameters from 9mm 87mm and larger
- Widest range of blasting cartridges
- Can be initiated with/without detonators

## AutoStem Micro

## The smallest range of blasting cartridges

- The smallest range of blasting products ever
- 9mm suitable for 10mm holes: Power charges from 3g
- 16mm stuiable for up to 20mm holes: Power charges from 15g
- No measurable vibration output
- Suitable for all types of concrete breaking, sensitive rock breaking, small boulder blasting, in-crusher blasting
- Drilling can be done with a hand-held electric drill
- No compressor, rock drill, diesel, air-hoses required





# Seen as "Future of explosives"... (Economist, 2015)

# Patents and accreditations

Dual accreditation (Pyrotechnic and Cartridge, power device)

– Europe	(CE Mark of approval)
- USA	(Department of Transport)
— Canada	(Ministry of Environment)
— South Africa	(South African Police Services)
– Australia	(State Ministry of Mines)
– Chile	(classified outside of explosive class)

- Few explosive products have global approval status or similar regulatory endorsements
- Tecnocom are official distributors of AutoStem products in Italy





#### Profiled in "Global Trends".. A series produced by the BKT Network in May 2023



#### **Alternative Energies**

Share 🚯 🎔 🛅

Our journey through the OTR sector continues with a crucial topic in the OTR world of today: how are mining companies investigating alternative energy options to reduce environmental impact and improve sustainability?



Guests



#### https://www.bkt-network.com/alternative-energies



## Disclaimer

All information contained in this documented is intended only for the recipient of this document and shall not be reprinted or reformulated in anyway without the express written consent of Non detonating Solutions (Pty) Ltd

All rights are reserved

