



**QUANTUM**  
CRYOGENICS

T +44 (0)1844 339993  
[info@quantumcryogenics.com](mailto:info@quantumcryogenics.com)



# You may have seen...



T +44 (0)1844 339993  
info@quantumcryogenics.com

# Critical Oxygen Safety

or

The Low Oxygen Hero Challenge

Paul Maynard – Engineering Manager

T +44 (0)1844 339993  
info@quantumcryogenics.com



# Cryogenics and Depleted Oxygen Atmospheres

- Expansion of cryogenic fluids creates very large volumes of gas
- Gas displaces breathable air
- Depleted oxygen levels leads to asphyxiation risks

# Death in the cryogenics industry

- 80 people died due to nitrogen related asphyxiation between 1992 and 2002 in USA. Chemical Safety Board USA, 2003.
- Deaths in the UK
- Numerous near-miss incidents

T +44 (0)1844 339993  
info@quantumcryogenics.com



# Do you work with cryogenic fluids?

- Do you feel safe?
- Are you safe?
- Do you have O2 depletion monitor alarms?
- Have you considered **exactly** what to do in the event of an alarm?
- Have you considered **exactly** what to do in the event of someone collapsing due to asphyxiation?
- Could have? Would have? Should have?

# The “*NEVER*” event...

So the unthinkable event that should ***NEVER*** happen has happened. A co-worker has collapsed in the LN2 store. Do you know what to do? Has this part of your procedure been defined?

Limited time to act:

- 3 minutes before brain damage is likely
- 5 minutes before death is likely

**THIS IS NOT THE TIME TO BE DEFINING  
A NEW PROCEDURE - YOU SHOULD BE  
TAKING ACTION**

# But I can hold my breath...

## ...the *HERO* scenario!

- It is often stated that if a person collapses due to asphyxiation that another person (hero) could hold their breath, run in and pull the casualty out.
- This is much harder than it might seem
- Highly likely that hero will become second casualty making the situation twice as bad.



# Still think you could be a hero?

- Within practicable limits it may be that your only action is to call the Fire Service and wait for them to arrive with breathing apparatus
- At this time the temptation will be great to try and be a hero
- Can you hold your breath and perform a demanding physical task?

## How hard can it be..?

# Your motivation...

## Win an Apple iPad 2



T +44 (0)1844 339993  
info@quantumcryogenics.com



# Our casualty

- Please meet Fred the coffee sack



T +44 (0)1844 339993  
info@quantumcryogenics.com

# Hero Challenge Rules

- Order determined by random selection
  - Position swimming nose clip
  - Take a deep breath
  - Surgical-tape across the mouth – with an easy release tab
  - Set off to rescue Fred
  - Pick up Fred
  - Return to stage with Fred
  - WIN
- 
- Audience please shout out if you spot cheating

Challenge ends when Hero removes tape / clip

Or

Hero successfully returns to the stage with Fred

**YOU FAIL**



**(but thanks for trying)**

T +44 (0)1844 339993  
info@quantumcryogenics.com

# We have a WINNER!



T +44 (0)1844 339993  
[info@quantumcryogenics.com](mailto:info@quantumcryogenics.com)



# What is usually covered?

- Reducing / mitigating the risks
  - Limited gas volumes
  - Ventilation systems
  - Procedures
  - Staff training
  - Monitoring alarms

# Have you also considered...

- How to rescue a casualty procedure?
  - Emergency stop / shut-off systems
  - External repeaters
  - Waiting for the fire service
  - Confined entry procedures
  - Breathing apparatus
- Stop a hero becoming a further casualty.





Thanks for Listening  
Stay Safe

T +44 (0)1844 339993  
[info@quantumcryogenics.com](mailto:info@quantumcryogenics.com)

