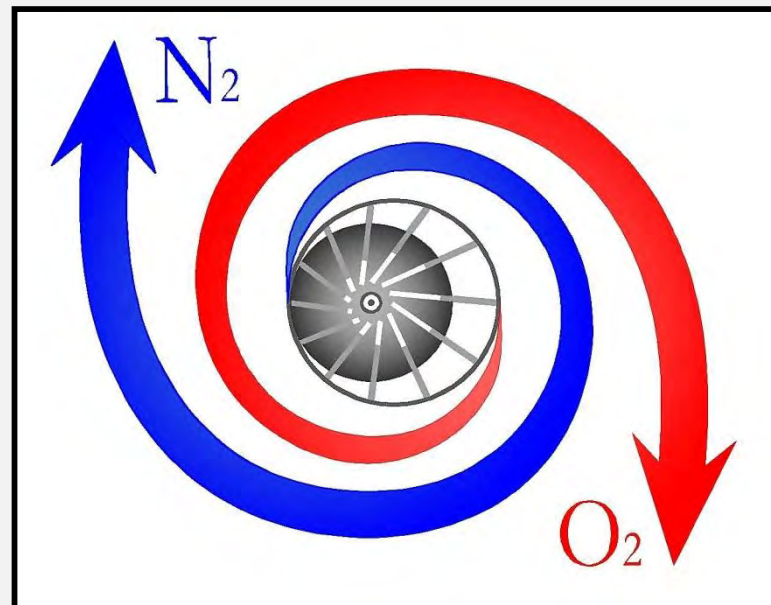
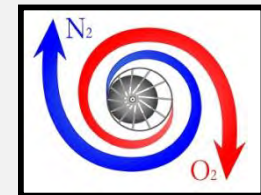


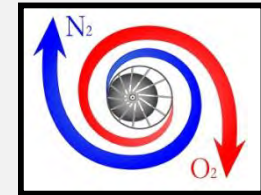
# NITRO-GEN AFRICA

---



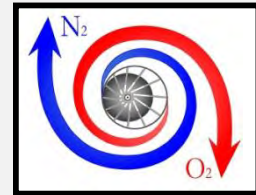
## NITRO – GEN AFRICA

FRIGAIR 2018



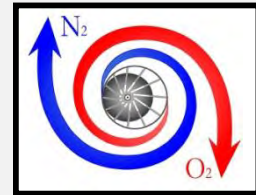
## INTRODUCTION

- NITRO-GEN AFRICA
- Engineered Solution for Fire Protection
- Cold and Freezer Rooms
- Proactive Approach
- Prevention of a Fire Starting
- Traditional – Reactive Approach
- Extinguishing the Fire once started



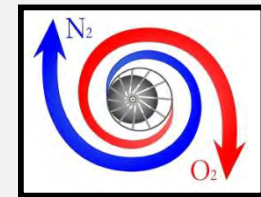
## FIRE ENGINEERS

- Fire Plans / Fire Evacuation Plans
- Fire Protection Equipment – FH / FHR / PFE
- Fire Protection – Sprinkler Installations
- Fire Alarm and Fire Detection Systems
- Smoke Control – Roof Venting / Mechanical Extraction
- Fire Pumps and Water Storage
- Rational Fire Design



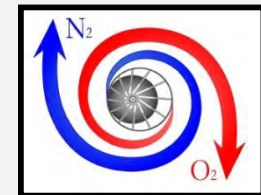
## Rational Fire Design - Fire Safety Objectives

- Life Safety
  - Safe Evacuation of the Building Occupants
- Automatic or Manual Extinguishing of the Fire
  - Protection of the Product
- Prevention of the Spread of the Fire
  - Within the Building / Spread to Adjacent Buildings



## Introduction to an Internal Controlled Environment

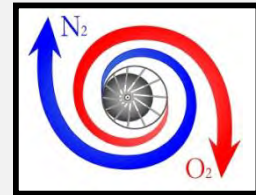
- The Air We Breathe
- 78% Nitrogen / 21% Oxygen / 1% ( Ar / CO<sub>2</sub> / CH<sub>4</sub> )
- Heat Source / Combustible Material / Oxidising Agent
- Reduction of Oxygen Levels
- Lower the Oxidising Agent – No Possibility Fire
- Oxygen Levels Controlled to 15% to 17%
- Non Combustion of Stored Materials



## Direction

- Creating a Fire Safe Environment
- Reduction of Oxygen Levels
- Non Combustion of Stored Materials
- Installation of an Oxygen Reduction System
- Introduction of Nitrogen Diminishes the Oxygen Level
- Alternative Fire Protection Solution and Omission of :
  - Automatic Fire Sprinkler Systems
  - Smoke Control / Smoke Extract Systems

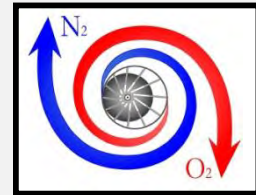




## Typical Projects

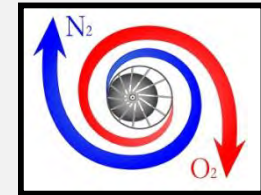
- Temperature Controlled Rooms +18°C
  - IT Server Rooms
  - Wine Storage and Distribution Warehouses
  - Pharmaceutical Stores / Preparation / Dispatch
  - Archive Stores
  - Artwork Storage
  - Document Storage





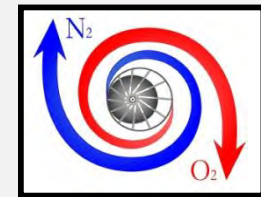
## LOX – Low Oxygen Environment

- Affect on Humans ?
- 78% Nitrogen / 21% Oxygen / 1% ( Ar / CO<sub>2</sub> / CH<sub>4</sub> )
- Lower the Oxygen Levels to 15% to 17%
- Equivalent of being in an Aircraft - Lower Pressure
- Equivalent Consumption 15 % O<sub>2</sub> - Eq. 2 700 m
- Kilimanjaro ( 5 895 m ) – 10 %



## Introduction to the FX Prevent System

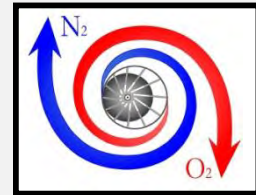
- FX PREVENT Company
- Based in the Netherlands
- Over 20 Years Experience in Nitrogen Production
- 12 Years in Fire Prevention Application
  
- Installed in Southern Africa by NITRO-GEN AFRICA



## Introduction of **Nitro – Gen Africa (Pty) Ltd**

### Design Requirements for Installation

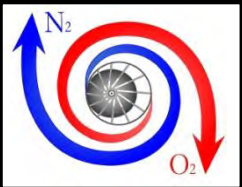
- Application – Operation / Storage / Product
- Internal Temperature Control - °C / RH – Fresh Air
- Area / Volume
- Losses / Opening and Loading of Product
- External - Environment – Altitude and Climatic Conditions
- Monitoring / Data Recording / Alarms



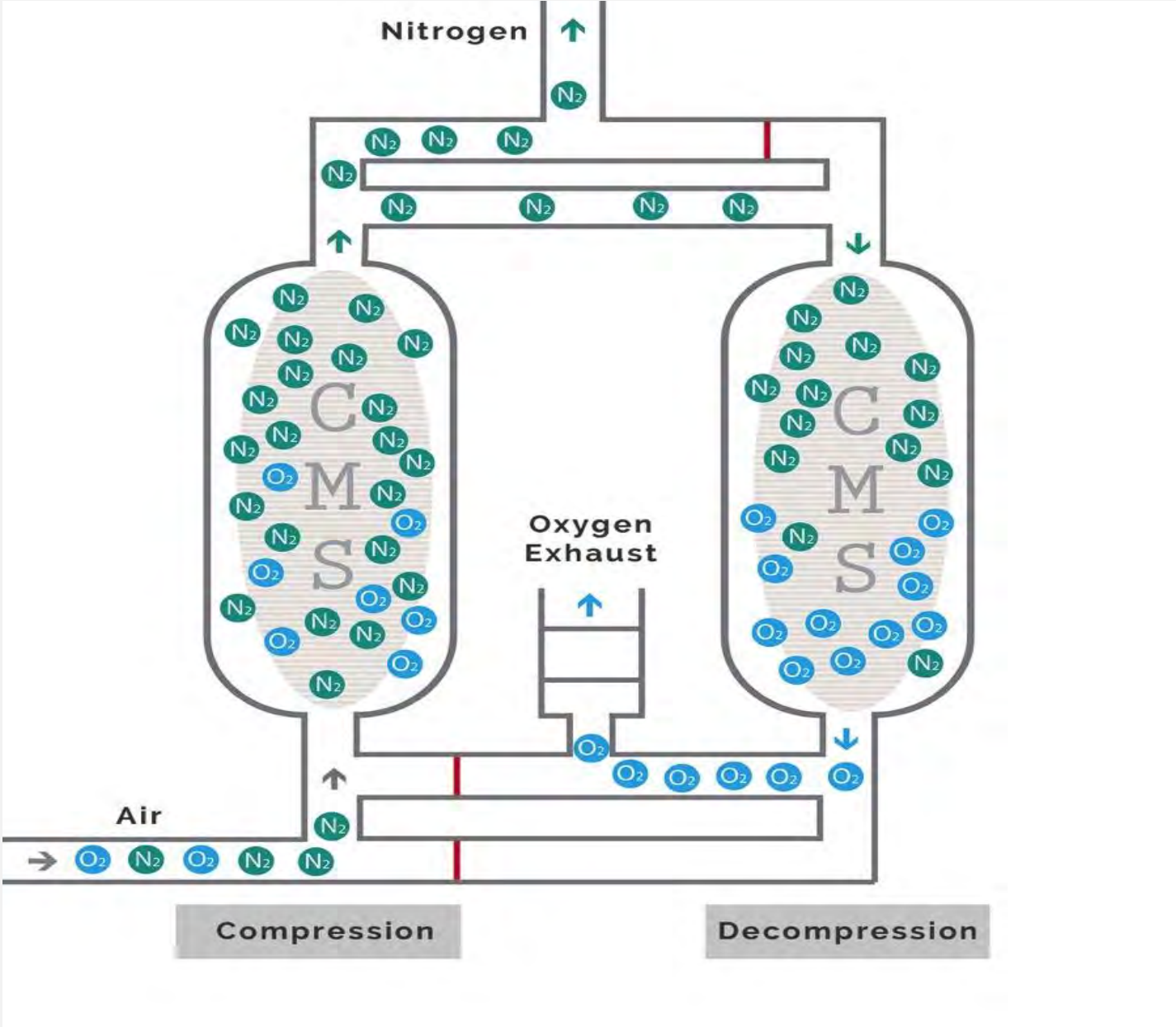
## Production of Nitrogen

- Nitrogen Generators
- Compressed Air passed through Twin Cylinders  
Filled with Compressed Carbon Molecular Sieve
- O<sub>2</sub> absorbed by the CMS
- O<sub>2</sub> Captured and N<sub>2</sub> Passes through
- Air Introduced at – 95% N<sub>2</sub> / 4% O<sub>2</sub> / 1% Ar
- Internal Air Controlled at 15% to 17%
- Cylinders reverse flow and discharge Oxygen
- Pressure Swing Adsorption

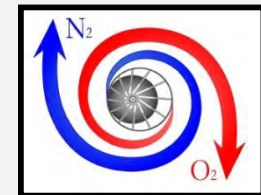
# NITRO-GEN AFRICA



## PSA Technology



# NITRO-GEN AFRICA

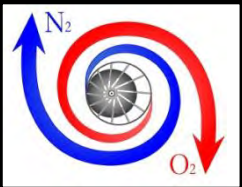


## FX Prevent System

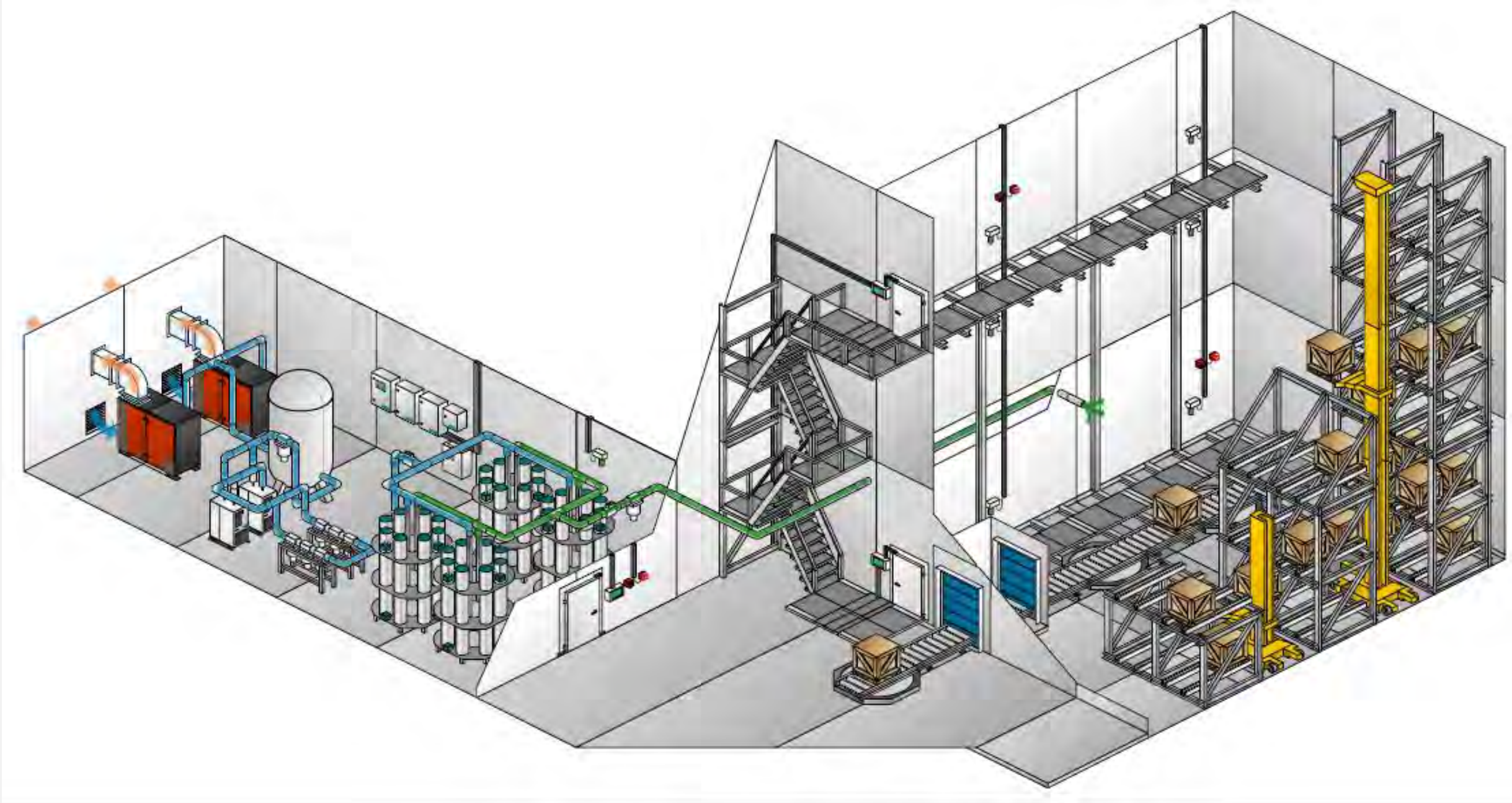


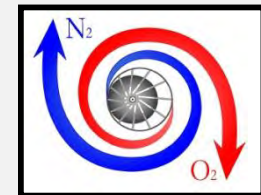


# NITRO-GEN AFRICA



## FX Prevent System - Isometric

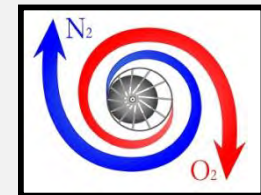




## Typical Project

- Location Cape Town
- Product Fruit / Berries
- Freezer Room Storage
- Temperature -20 °C
- Volume 15 000 m<sup>3</sup>

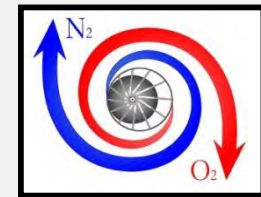




## Typical Project

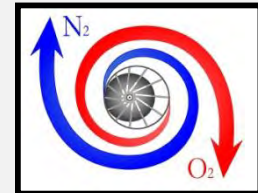
### Requirements to Comply with SANS 10400 Part T

- Sprinkler Installation      Mobile Racking > 6m - ESFR
- Sprinkler Installation      Roof Void – High Hazard
- Smoke Control              Areas > 500 m<sup>2</sup>
- Smoke Control              Open Panels / Roof Vents
- Smoke Control              Mechanical Extraction
- Smoke Detection            Aspirated System



## Typical Project Costs - 15 000 m<sup>3</sup> Freezer Room

■ Sprinkler	R 3.8 M
■ Smoke Extract	R 0.4 M
■ Smoke Detection	R 0.2 M
■ <u>Total #1</u>	<u>R 4.4 M</u>
■ Pumps and Tanks	R 2.4 M
■ <u>TOTAL #2</u>	<u>R 6.8 M</u>
■ FX Prevent System	R 2.93 M
■ Saving	R 3.67 M ( Excl Detection )



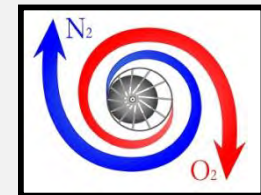
## Compliance

### Local Approval – Fire Department / SANS 10400 T

- Part of a Rational Fire Design
- BS 7974 Report required
- Approved by the Cape Metropole Fire Department
- Application Applied as Part of the SANS 10400 Part T

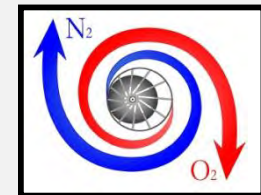
### International Standards

- EN 16750
- VDS – Vertraun Durch Sicherheit
- Approved by Insurance Companies - Allianz



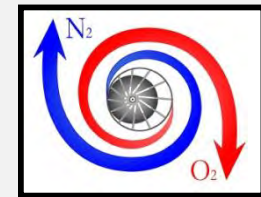
## ADVANTAGES

- Fire Hazard is completely eliminated
- No False Alarms or Damage
- Prevention Method is Environmentally Safe
- Small Plantroom Space
- Ease of Installation – Full Redundancy
- Cost effective to Conventional Systems
- Modular and Expandable to New Areas
- Compatible and interactive to current systems
- Constant monitoring and Alarms



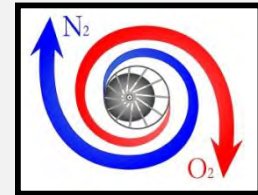
## DISADVANTAGES

- System Requires Electrical Input
  - Operation of Compressors
  - Compression Ratio – Air to Nitrogen < 2:1
  - Equivalent to 5% of Refrigeration Operation Cost
- Sprinkler Thermal Bridge as Calculated
- Refrigeration Room Losses
- No additional Operation Cost ?
- No Real Disadvantage



## MAINTENANCE

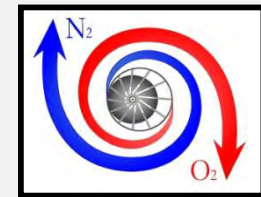
- Sprinkler System
- Annual Approval and Certification R 20 000-00
- Nitro-Gen System
- Annual Maintenance and Calibration R 18 000-00
  
- Sprinkler Pumping Stations
- Annual Testing and Certification R 25 000-00



## CONCLUSION

- NITRO-GEN AFRICA
- Complete Design and Supply Installation
- Local Fire Authority Planning and Approval
- SANS 10 400 Part T Compliance
- EN 16750 Certification
- Handover and Training
- System Maintenance
- Annual Calibration

# NITRO-GEN AFRICA



**Thank You**  
**Questions**

**Allan Cuninghame**  
**Cell 083 414 6535**

**Allan Lucraft**  
**Cell 082 876 9201**

