



MSS NITROCUBE™ ECO

**HIGH PRESSURE NITROGEN GENERATION
SYSTEM FOR LASER CUTTING
& OTHER INDUSTRIAL APPLICATIONS**

MSS GROUP HEAD OFFICE, RUGBY - UK

SOLID FOUNDATION FOR GROWTH



- Dedicated 3,000 m2 facility
- Service workshops, spares & offices
- Production of all MSS gas products

MSS AMERICAS, ROCK HILL - SC

LOCAL MANUFACTURE & SUPPORT



- Dedicated 57,000 ft² facility
- Service workshops, spares & office operations
- NitroCube production for American Continent and APAC

OUR COMPANY HISTORY

A STORY OF SUCCESS

MSS Lasers

Laser Nitrogen

MSS Nitrogen

Nitrocube™

MSS Americas

MSS Group

2003

MSS Ltd was formed as a laser service company, targeting a complete service solution to the UK laser cutting industry.

2004

First MSS 'on-demand' Nitrogen system for laser cutting installed in the UK.

2005

'On-demand' systems design enhanced with addition of high pressure booster and storage pack for improved functionality and energy efficiency. MSS Nitrogen is established in the UK.

2013

NitroCube™ is born with fully integrated equipment and controls. Factory built systems ready for quick site installation work.

2017

MSS Nitrogen starts manufacturing operations in the US. Since then, more than 350 systems have been supplied to laser users across North and South America.

Today

Now part of the Atlas Copco Group
Over 1200 lasers operating using MSS NitroCube™ Technology.
Over 400 NitrO2™ Laser Gas Mixers installed.
Key OEM Global Partners.
Global Distributors in Middle East, Africa, Australasia, South Africa

WHY BUY NITROGEN WHEN YOU CAN GENERATE YOUR OWN?

MSS Nitrocube:

THE REAL ALTERNATIVE TO BULK OR BUNDLED GAS



HOW DOES IT WORK?

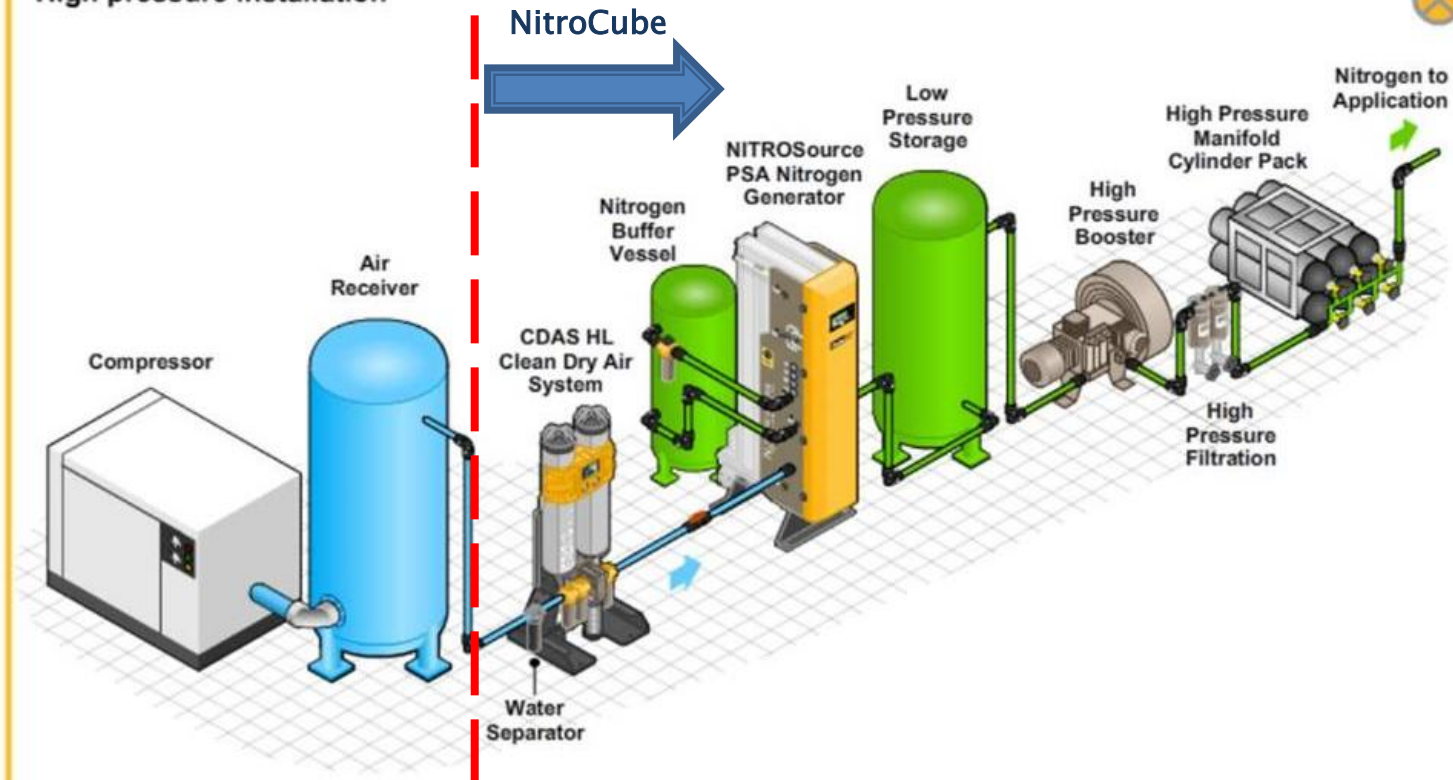
NITROGEN SYSTEM BASICS

Typical Installations

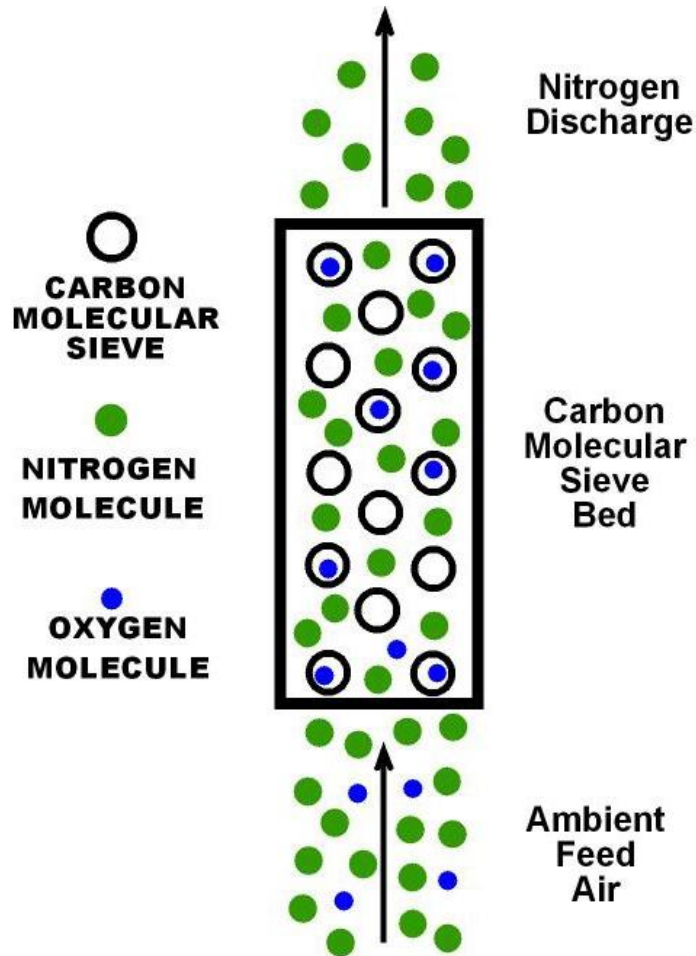
Hollow Fibre Membrane

Pressure Swing Adsorption

High pressure installation



PSA NITROGEN GENERATION



- Pressure Swing Adsorption (PSA) is the technology behind our nitrogen generation system.
- The Nitrogen generator features a series of aluminium pressure columns, each filled with Carbon Molecular Sieve adsorption bed (CMS).
- Compressed air enters each aluminium column and passes through the CMS.
- Smaller O_2 and other traces gas molecules are adsorbed by the CMS, allowing only the larger N_2 molecules to exit the pressure column.
- When the generator detects that the N_2 exiting each column is losing purity, the pressure column switches to regenerative mode and depressurizes which then allows the adsorbed gas molecules to be released and vented back to atmosphere.
- The N_2 molecules exiting the generator system represents the high purity N_2 required as product gas.

WHAT PURITY NITROGEN IS REQUIRED FOR LASER CUTTING ASSIST GAS?

- ▶ It depends on type of material being cut.
- ▶ It depends on the thickness of material being cut.
- ▶ Nitrogen Oxygen & Compressed Air may be used.
- ▶ Generally stainless steel requires higher purity to cut oxide free
 - Powers <6KW oxide free for <3mm @ 99.95%. Above this thickness need 99.9975%
 - Powers <10KW oxide free for <5mm @ 99.95%. Above this thickness need 99.9975%
 - Powers <20KW oxide free for <10mm @ 99.95%. Above this thickness need 99.9975%
- ▶ Mild Steel >99.5% purity
- ▶ Aluminium 95% purity
- ▶ Almost ALL laser applications require 99.9975% or 99.95% purity

WHAT PURITY?

PARTS PER MILLION (PPM)	Technical Grade	PERCENTAGE (%)
1	6.0	99.9999
10	5.0	99.999
25	4.75	99.9975
50	4.5	99.995
100	4.0	99.99
200	3.8	99.98
250	3.75	99.975
500	3.5	99.95
1000	3.0	99.9
5000	2.5	99.5

WHAT N2 PURITY?

Typical cut edge colour vs nitrogen purity up to 6mm Stainless / Carbon steels			
Oxygen Content	N2 Equivalent Purity	Edge Colour	Laser cut sample
10ppm & 50ppm	99,999% & 99,995%	Bright Silver	
100ppm	99,99%	Silver	
250ppm	99,975%	Silver with very light gold	
500ppm	99,95%	Silver with gold	
0.1%	99,9%	Dark gold	
0.5%	99,5	Dark gold with grey	
1%	99%	Grey with dark gold and blue	
2%	98%	Dark grey with blue (possible scale)	
3%	97%	Dark grey with black scale	
5%	95%	Black scale	

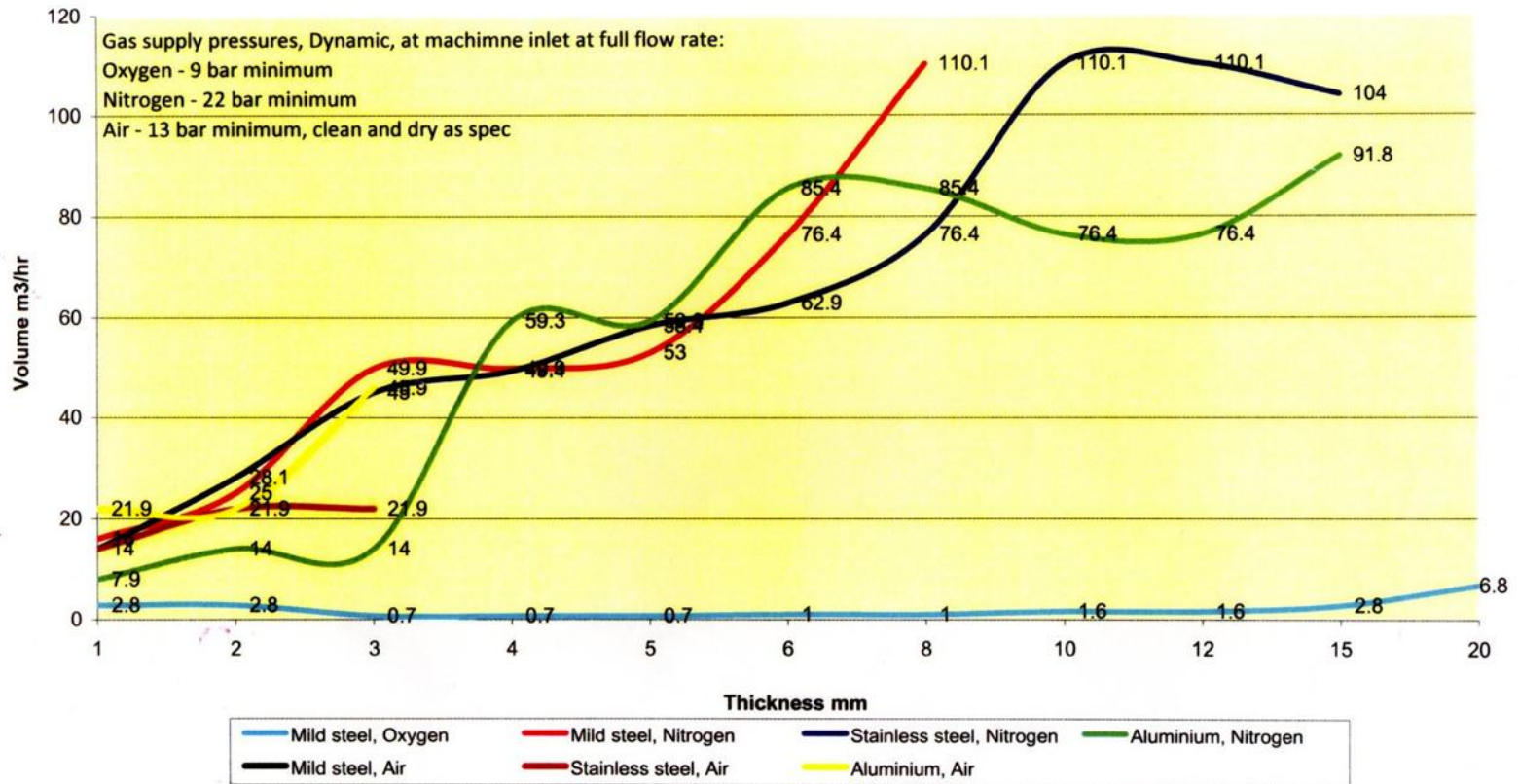
For sub 1mm to 3mm a clean silver finish can be achieved up to 500ppm. The actual laser machine settings including cutting speed, laser power, nozzle size and gas pressure can all have an affect on final cut edge condition.

WHAT QUANTITY OF NITROGEN IS REQUIRED FOR LASER CUTTING?

- Number of lasers ?
- Laser type:- Fiber or CO2?
- Laser power?
- Purity required?
- Shift patterns?
- Typical material type & thickness?
- Maximum material type & thickness?
- Current supply, bottles or bulk?
- Current gas usage per month/year?
- Future expansion plans?

WHAT QUANTITY OF NITROGEN IS REQUIRED FOR LASER CUTTING?

Approximate gas usage, BySprint Fiber 4000w, continuous straight line cutting

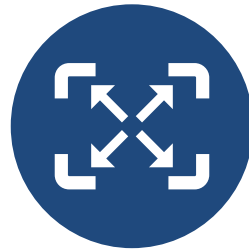


NitroCube™

CONFIGURABLE AND SCALABLE



NitroCube 1 - 5

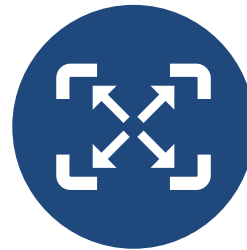


- Flowrates 13–50m³/h (460 – 1750 scfh)
- Purity 99.5% - 99.999%
- Compact footprint 2.2m x 2.6m
- Internal OR External cylinder pack options
- Multiple cylinder pack 2x, 3x, 4x options
- Storage pack 270m³ @ 300bar included

NitroCube™

CONFIGURABLE AND SCALABLE

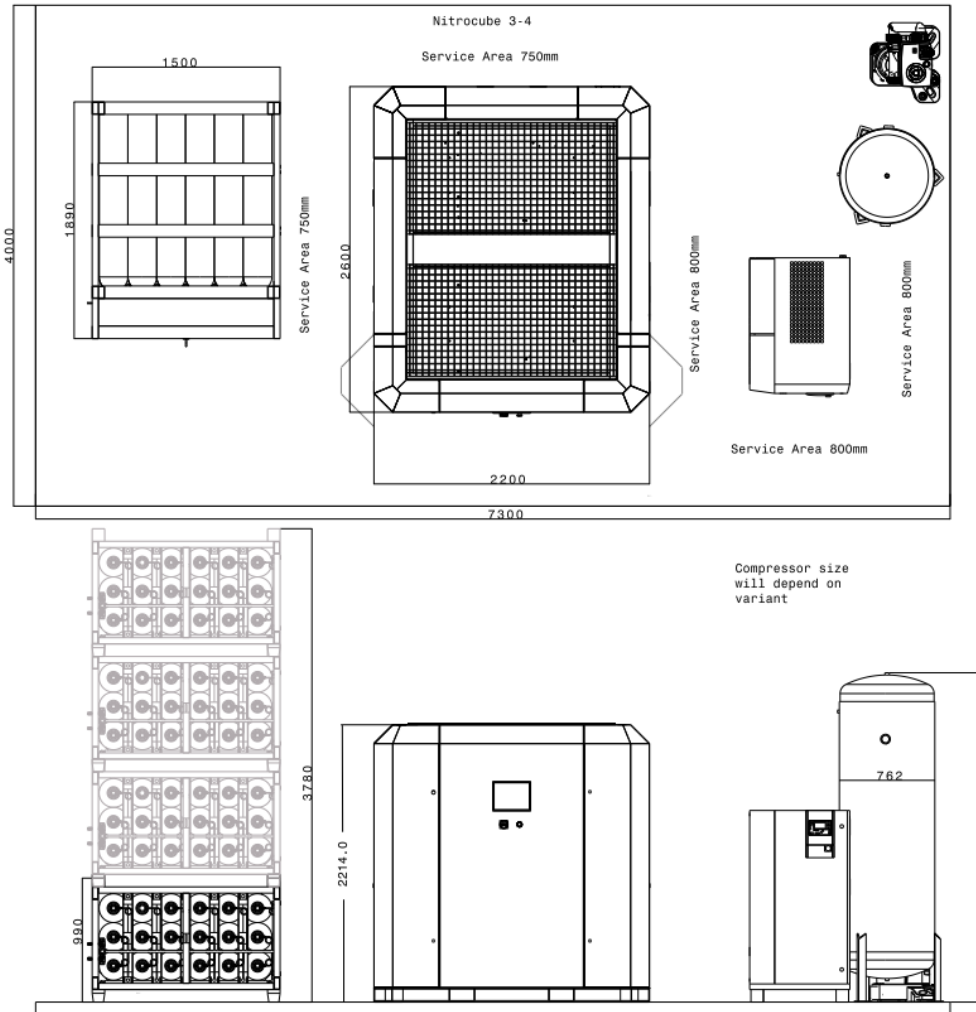
NitroCube 6 to 10+



- Flowrates 70-450m³/h+ (2450 – 15750 scfh)
- Purity 99.5% - 99.999%
- Multiple systems working in tandem
- Multiple cylinder pack 2x - 8x options
- Storage pack 2 x 270m³ @ 300bar included



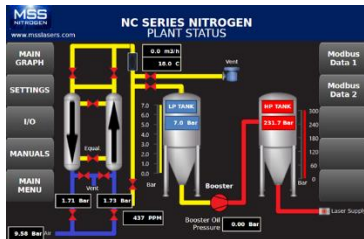
TYPICAL NITROCUBE LAYOUT



NitroCube™

INTEGRATED CONTROLS

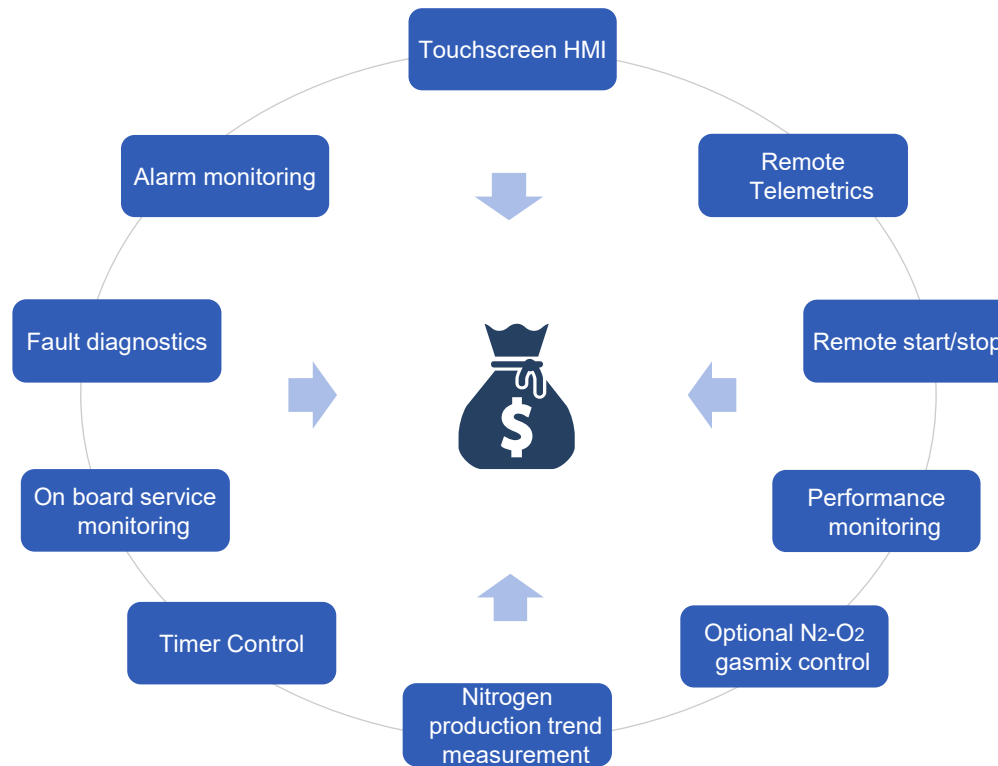
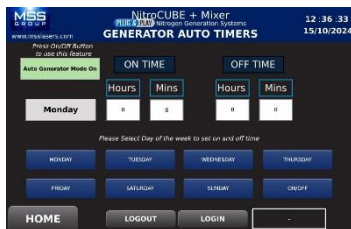
Colour Touch Screen Control



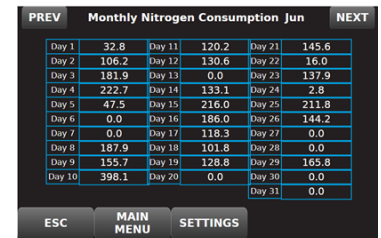
Remote control



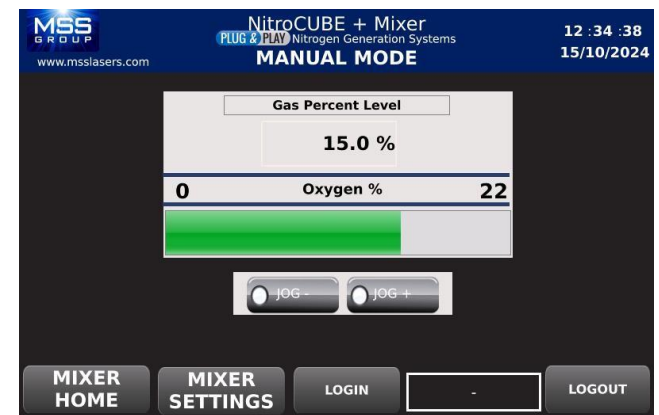
Energy management 7 day timer controls



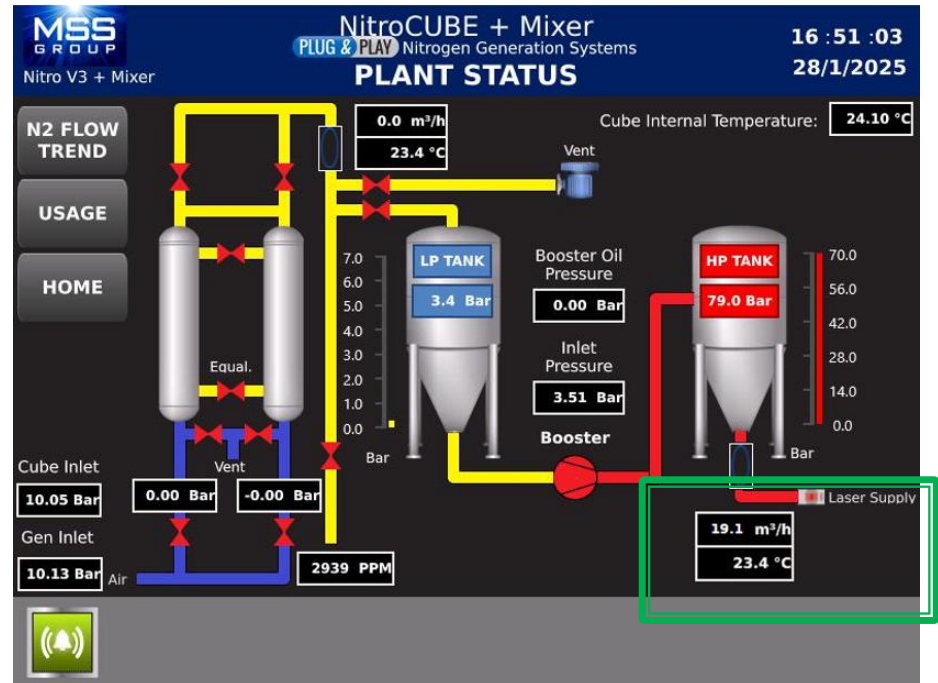
N2 production trends



OPTION: INTEGRATED NITRO2 GASMIX



OPTION: SUPPLY FLOW MONITORING & LOGGING



OPTION: N2-RACK

SPACE EFFICIENT CP STORAGE



MSS NITROGEN:- NitroCalc

TRANSPARENT AND ACCURATE SALES VIA PC, PHONE OR TABLET

NitroCalc Calculator

Customer Name: [Text Field]
Reference Number: [Text Field]
Are you a liquid or multi-liquid pack user? [Radio Buttons]
How much nitrogen do you consume? (kg/year) [Text Field]
Year N2 Consumption per year [Text Field]
What thickness of material do you cut with nitrogen? [Text Field]
How often do you run in production per week? [Text Field]
How many weeks per year do you run in production? [Text Field]

Our recommended system based on your answers

Nitrocube-2 200ppm
With 1 x CP12 Storage Pack(s)

Upgrade to larger nitrocube? [Text Field]
Add any additional CP12s required? [Text Field]

NITROGEN FLOWBACK SUBSCRIPTION

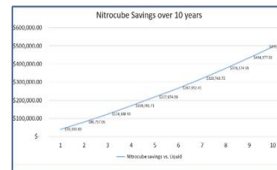
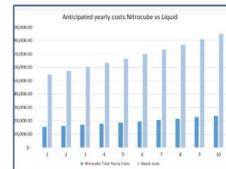
Customer Name: [Text Field]
Reference Number: [Text Field]
Are you a liquid or multi-liquid pack user? [Radio Buttons]
How much nitrogen do you consume? (kg/year) [Text Field]
Year N2 Consumption per year [Text Field]
What thickness of material do you cut with nitrogen? [Text Field]
How often do you run in production per week? [Text Field]
How many weeks per year do you run in production? [Text Field]
Total production hours per year [Text Field]
Our recommended system based on your answers
Nitrocube-2 200ppm
With 1 x CP12 Storage Pack(s)
Upgrade to larger nitrocube? [Text Field]

So much do you spend on N2 currently? (Liquid)

N2 cost per unit [Text Field]
Environmental charge [Text Field]
Delivery cost [Text Field]
No. of deliveries [Text Field]
Amount of equipment [Text Field]
Other costs [Text Field]
Total cost per year [Text Field]
Cost of Liquid N2 [Text Field]

So much does it cost to generate N2?

Average cost of electricity per kWh (kWh cost) [Text Field]
Cost of Nitrocube N2 [Text Field]
Savings based on average electricity costs £0.025/kWh per year and average annual volume costs of £0.025/kWh



- Accurate system sizing tool.
- Accurate estimated operating cost including electricity & compressed air use and servicing costs.
- Estimated costs saving by gas unit volume \$\$\$
- Estimated costs savings/year \$\$\$
- Estimated Capital investment return \$\$\$
- Highly accurate & effective sales tool
- MSS Dealer App Summer 2024
- Purity required?
- Shift patterns?
- Typical material type & thickness?
- Maximum material type & thickness?
- Current supply, bottles or bulk?
- Current gas usage per month/year?
- Future expansion plans?

MSS Nitrocalc

Customer Details

Customer Name

Parker

Reference Number

Dealer Conference #1

Are you a Liquid or Multicylinder Pack User??

Liquid Pack User

How much Nitrogen do you consume? (Liquid)

Liquid Nitrogen used

10000

m3

Monthly

What actual purity of material do you cut with Nitrogen?

99.5% (5000ppm)

99.95% (500ppm)

99.9975% (25ppm)

99.999% (10ppm)

How often do you run production per week? (Hours)

Monday

8

Tuesday

8

Wednesday

8

Thursday

8

Friday

8

Saturday

0

Recommended System

recommended based on data provided.



Nitrocube-3

With 1 x CP12 Storage Packs

You can run your laser(s) for 4.4 hours approx, even when the system is switched off.

Net Price

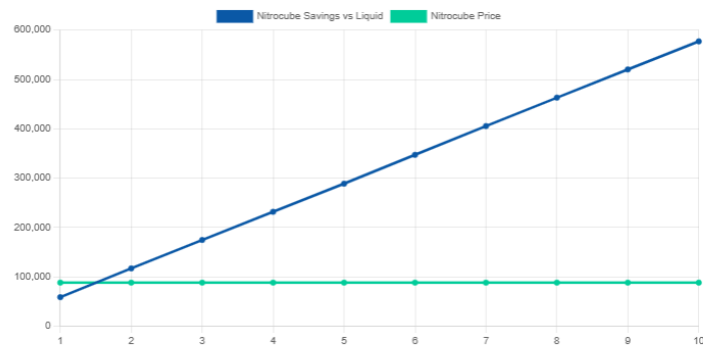
£ 88,001

MSS Nitrocalc

Nitrocube Savings

Nitrocube Annual Savings over 10 Years

Nitrocube



Total 10 year savings

£577,090.86

Nitrocube Price

£88,001

ROI Years

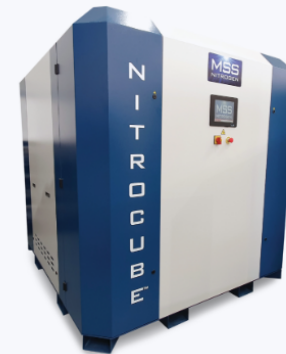
0.58 years

PREVIOUS

NEXT

Recommended System

recommended based on data provided.



Nitrocube-3

With 1 x CP12 Storage Packs

ⓘ You can run your laser(s) for 4.4 hours approx, even when the system is switched off.

Net Price

£ 88,001

MSS NitroCalc Report



ADVANTAGES OF TRADITIONAL SUPPLY METHODS

- MCPs considered convenient for smaller volumes
- Bulk liquid can be cost effective for very large volume users.

DISADVANTAGES OF TRADITIONAL SUPPLY METHODS

▶ MCPs

- High £/\$ solution for small to medium volume use.
- Regular changeovers
- Regular deliveries – disruption to business
- Regular invoicing
- Complex invoicing
- Manual handling concerns
- Increased road traffic
- Late or lack of deliveries

▶ Bulk Liquid

- High installation costs with groundwork requirements
- Significant installation space requirement
- Restrictive & lengthy rental supply agreements
- Significant gas loss through boil off.
- Delivery, invoicing issue as MCPs. Short or part deliveries.

ADVANTAGES OF NITROCUBE ON SITE GENERATION

- Low cost nitrogen with proven cost savings.
- Transparent ROI budgeting with fixed cost servicing options.
- Rent or Buy options to suit all business users. (UK)
- 24/7 running capability.
- No unplanned gas outages
- No wasted gas – only generate gas used.
- Eliminates rental or delivery charges.
- Eliminate complex & restrictive gas contracts.
- Eliminate machine downtime for gas changes.
- Environmentally friendly – eliminates road transport.
- Faster & cleaner carbon steel cutting using N2 generation & gas mixing technology.
- More control on costs – NO SURPRISE & SUDDEN PRICE CHANGES

CASE STUDY 1

B&P FABRICATIONS, LEICESTER, UK



- Multi fiber laser user (5 lasers)
- Nitrocube 7 installation Sept 2021
- 100 m³/hr N₂ generation capacity
- CP12x8 300bar storage (2,304 m³)
- 200ppm N₂ purity
- Dual 30kW compressor air supply



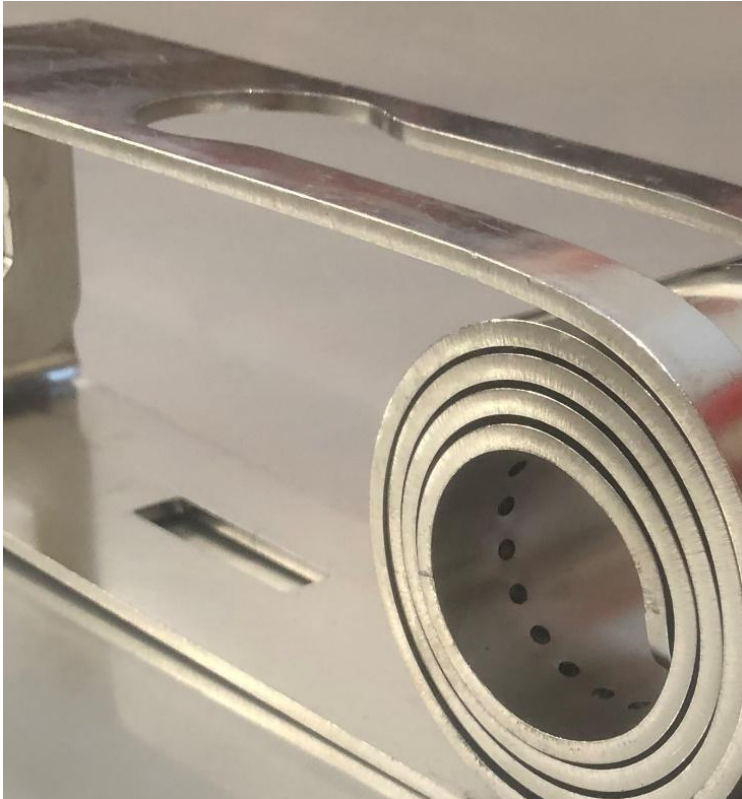
CASE STUDY 2 – MORGAN STEEL, MEMPHIS, TN, USA



- 12 off Lasers. Average power 15KW
- Nitrocube 12 installation started from 2019
- 300m³/hr (10,500cfh) N₂ generation capacity
- CP12x8 300bar (4350psi) storage (2304m³/84000ft³)
- 25ppm N₂ purity

CASE STUDY 3

JB SPRINGS SKIPTON, UK



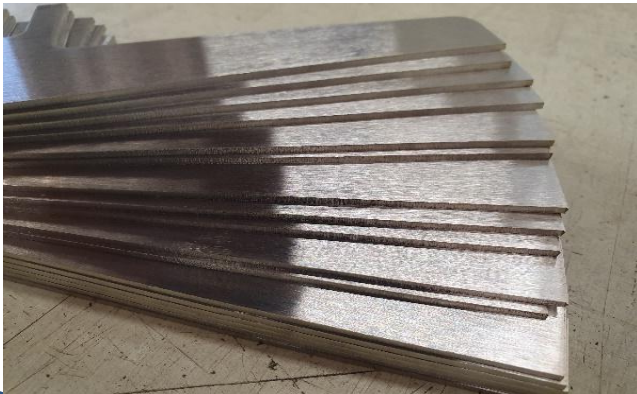
- Amada Ensis 3kw fiber laser
- 20m³/hr N₂ generation capacity
- CP12 300bar storage (288m³)
- 25ppm N₂ purity
- 15kW Air compressor & air treatment package

CASE STUDY 4

WDA KNIVES, SHEFFIELD, UK



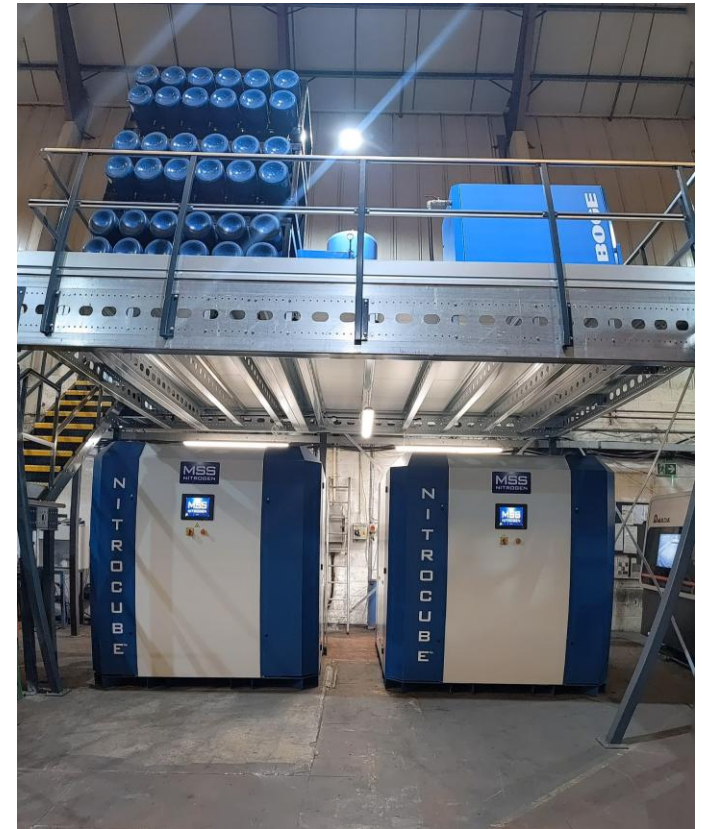
- Byspeed 4kw CO2 laser
- 13m³/hr N₂ generation capacity
- CP12 300bar storage (288m³)
- 25ppm N₂ purity



CASE STUDY 5

PNJ ENGINEERING

- 2 No. Amada 6kW fiber lasers
- 100m³/hr N₂ generation capacity
- CP36 300bar storage (864m³)
- 25ppm N₂ purity
- 2 No. 37kW Compressors



NITROCUBE — MEZZANINE FLOOR INSTALLATIONS



NITROCUBE — OUTDOOR ENCLOSURES



MSS LASER GAS PRODUCTS

TAKING CARE OF MULTIPLE NEEDS



NitroCube™

On site Nitrogen
Generations System.

- Save Money
- Save Time
- Reduce Carbon Emissions



NitrO2™ Gas Mixer

High pressure mixing oxygen
and nitrogen.

- Improve edge quality,
- Reduce burr
- Increase cutting speed



FlowBox

Laser gas measurement &
monitoring

Understand and control
Nitrogen use.



PureGas

High purity filtration & oil
vapour removal.

Reduce laser cutting head
contamination problems.
Extend cutting head lens &
nozzle life



AirCube

High-pressure
Compressed Air cutting

Save Money
Reduce Carbon Emissions



CombiMix

High pressure laser gas
mixer with oxygen
pressure booster for liquid
O2 supplies