
From: keith michael [kpmichael@pci-intl.com]
Sent: Tuesday, January 24, 2006 4:03 PM
To: zzMSHA-Standards - Comments to Fed Reg Group
Cc: 'Reuben Padilla'
Subject: RIN 1219-AB44, comments from Pacific Consolidated Industries

Dear Sirs:

Regarding your request for comments regarding improved mine safety and technology improvements, I am pleased to offer our existing onsite oxygen generation and storage systems to provide emergency life saving oxygen for extended duration anywhere in the mine, buying precious time for recovery operations while preserving the life of the miners. These systems extend the effectiveness of the Self-Contained Self-Rescuers by providing the mines with generous supplies of high pressure O2, and the ability to generate additional O2 on a continuous basis to recharge these O2 receivers.

I have attached a general brochure of our company's products and capabilities, and a short summary of equipment being sold to the US Air Force and other military clients. PCI will work with MSHA to develop a dependable, foolproof oxygen delivery and storage system to meet most mine configurations and operational requirements, and I would personally welcome an opportunity to discuss these products with the designated MSHA personnel assigned to this critical program.

We look forward to assisting MSHA in any way possible, and await your directives.

Respectfully:

Keith Michael
Director-Commercial Development
Pacific Consolidated Industries
Riverside, CA (Corporate)

My regional office is in West Chester, PA
PH 610-701-0708
Cell 714-478-6443

**MSHA Docket No.
AB44-Comm-2**



Pacific Consolidated Industries



Innovative



Reliable



Compact



Cost Effective

Cryogenic, Membrane, and
Adsorption Systems for
Oxygen and Nitrogen
Generation

Military

Oil & Gas

Medical

Industrial

MSHA Docket No.
AB44-Comm-2-A

Pacific Consolidated Industries

World Leader in Portable Oxygen & Nitrogen Generating Systems
for the Military, Medical, Oil & Gas and Industrial Markets

Pacific Consolidated Industries (PCI) designs and manufactures rugged air separation plants designed to operate in remote, extreme, and confined locations. Our products enable customers to generate oxygen and nitrogen in the field inexpensively and eliminates the logistical supply chain. PCI has the engineering expertise, the manufacturing capability and the experience to provide the type of professionally engineered, developed and manufactured equipment that your project requires.

Since different field applications have specific and demanding requirements, PCI offers solutions based on three technology platforms to provide the right equipment to meet customer needs:

Liquefaction: Separation of oxygen and nitrogen by converting air from a gaseous state to a liquid state through a cryogenic process

Membranes: Separation of nitrogen from the air by selective permeation through a bundle of hollow fibers

Adsorption: Separation of oxygen, nitrogen, and dry air by use of differential pressures applied to a molecular sieve



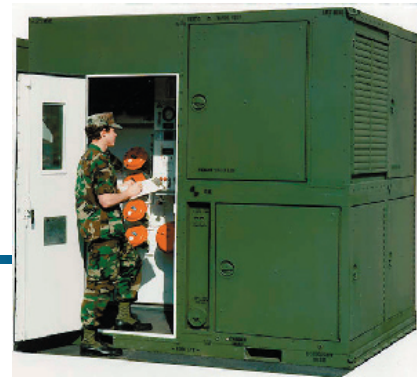
SGNSC supplying portable nitrogen solutions to the U.S. Air Force, Royal Air Force (UK), Royal Thai Air Force, Republic of Korea Air Force and over twenty other nations world-wide



Nitrogen generator on a gas lift in Qatar

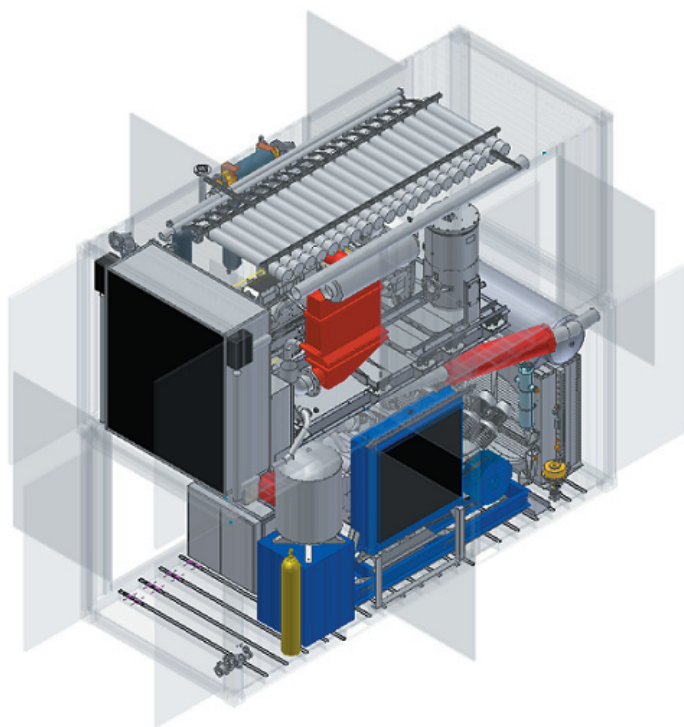


EDOCS-120 unit making medical grade oxygen for U.S. Army Combat Support Hospitals at Bagram, Afghanistan



GAMMA plant producing 99.5% LOX/LIN for Aviators' Breathing Oxygen and aircraft support

Well proven components in a compact, tightly integrated design. Extremely simple operation through automated computer control systems.



Engineering Expertise

Our engineering team has a strong background not only in the latest air separation technology but also years of product development experience in the fluid and process controls business. Members of the PCI staff hold over forty U.S. patents. These programs have produced state-of-the-art, militarized, light weight, air transportable, biological and chemical agent protected nitrogen and oxygen generating systems that have been used by all of the DOD branches, NATO and many other foreign militaries

PCI's Nitrogen Membrane Generators; Diesel powered. Certified for operation in an offshore or zone 2 hazardous environment

Military

Aviators' breathing oxygen
 High pressure nitrogen for aircraft support
 Nitrogen support for heat-seeking missiles

From air transportable plants designed for rapid loading in transport aircraft to plants permanently installed aboard the latest nuclear aircraft carrier, we have designed and built air separation units for the most demanding environments. PCI has the experience and the manufacturing capability to solve your problem.

Medical

Medical oxygen generation & storage
 FDA approved
 USP 93% purity

The ability to provide oxygen to casualties in the field within one hour of injuries significantly increases survival and recovery rates. PCI's medical oxygen generating and storage systems allow for production and delivery of oxygen at the point-of-use, when and where it's needed the most.

Oil & Gas

Reliability on oil rigs and remote fields
 Modular & scalable nitrogen generation plants
 Deliver nitrogen flow at the pressure you need

PCI manufactures a wide range of nitrogen equipment, from gaseous nitrogen generators and liquid nitrogen plants to high pressure nitrogen converters. PCI began manufacturing the nitrogen converter equipment under the brand name Cryomec more than 25 years ago, providing equipment to all of the major oil servicing companies.

Deployed in field hospitals, on flight lines, and oil & gas platforms around the world, PCI ensures a reliable quality flow of Oxygen and Nitrogen without the support logistics and supply chain.

About PCI

Pacific Consolidated Industries (PCI), headquartered in Orange County, California, manufactures ruggedized, onsite liquid and gaseous oxygen and nitrogen generating systems for the Military, Medical, and Oil & Gas markets. PCI was founded in 1984 to manufacture cryogenic air separation devices for extreme and remote environments. Today, PCI has expanded its gas generating platforms to include membrane and adsorption (PSA/VSA) technologies. Using our membrane technology, PCI has manufactured over 1,500 Self Generating Nitrogen Servicing Carts (SGNSC) for the U.S. Air Force and other customers. There are dozens of active EDOCS-120 units in the field built upon PCI's adsorption platform. Based upon our technical expertise in the cryogenic space, PCI has been awarded the contract for the Liquid Oxygen plants on the next Nuclear Aircraft Carrier. A list of global customers include the U.S. Air Force, U.S. Navy, U.S. Army, U.S. Marine Corps, Republic of Korea, Thailand, Taiwan Royal Air Force, U.K., Egypt, Turkey, Jordan and many other countries. Whatever your requirements, PCI can meet your need.

PCI built its reputation on its responsiveness to customers' needs, production and delivery of defect-free products, its strict adherence to highest ethical standards, and maintenance of an unconditional guarantee of order fulfillment. PCI has established an enviable reputation for its innovative, patented, problem-solving engineering approaches, its introduction of state-of-the-art technology and its outstanding product value. PCI has also earned a reputation among its many customers for providing excellent training, product support and after-market service. PCI has in place a long-standing, proven quality assurance plan.



Pacific Consolidated Industries

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MOST

Medical Oxygen Storage Tank



Deployable Self Contained Multi-Patient Oxygen Delivery & Storage System

The MOST is an oxygen storage and distribution system consisting of lightweight, high strength, high pressure composite wound brass lined cylinders secured within a rugged water resistant case. It is person-portable and is used in both military aircraft for treating casualties and on the battlefield to quickly supply oxygen to front line troops.

- Refillable from any high pressure oxygen supply
- All in one package — equipped to deliver oxygen direct to patients in minutes
- Store oxygen as compressed gas without loss
- Lightweight & portable weighs less than 200 lbs



Deploy in Forward Areas

The Medical Oxygen Storage Tank (MOST) has been developed to address the need for an oxygen transportation system that could be stored and stockpiled, ready for immediate use, transported with the unit, and totally self sufficient for as long as required in the field. It also had to be easy to operate, dependable and as small and light as possible.



Safe Storage & Transport

MOST's two composite carbon fiber wound brass-lined cylinders prevent combustion and do not fragment, or explode on ballistic impact (.50 caliber ballistic tested).



Rapid Response

MOST's all in one design includes three regulators and hoses. The MOST is equipped to transport oxygen into the field, delivering life-saving oxygen to patients in minutes.

Features

- Approved JROC & JCDD under "Deployable Oxygen System"
- DoD air worthiness by platform
- Over 1,000 units currently in delivery to USAF
- FDA approved for military use*
- Replaces transport of PT LOX and cylinders
- Manufactured utilizing an ISO 13485:2003 compliant quality management system

System Specifications

Size	<ul style="list-style-type: none"> • 37 inches long • 27 inches wide • 15 inches tall
Weight	<ul style="list-style-type: none"> • 187 lbs empty • 208 lbs full
Capacity	<ul style="list-style-type: none"> • 10,000 liters at 2,250 psig • Supports up to 15 Patients for 2.25 hrs
Flow	<ul style="list-style-type: none"> • 0-15 liters per minute regulators • 150 liters per minute at 50 psig • 3 Delivery ports
Standard Equipment	<ul style="list-style-type: none"> • 1 Ruggedized water resistant case • Three 20 ft oxygen hoses • 3 Flow regulators
Accessories	<ul style="list-style-type: none"> • Hi-Altitude calibration kit

Order Information

P/N	• 793080-002
NSN	• 6530-01-551-2702
Purchase options	<ul style="list-style-type: none"> • FSS listed • IMPAC Card accepted
Contracts	<ul style="list-style-type: none"> • DoD # SP0200-04-R-8008 • VA # V797P-4700a

Pacific Consolidated Industries

*FDA approved for military use only, Request for approval for civilian applications has been submitted.
380002 Rev B

MSHA Docket No.
AB44-Comm-2-B



ISO 13485:2003
FM 94938

Mobilize | Deploy | Generate



Oxygen, Nitrogen & Water at the point of need safely, quickly, reliably minimizing resupply logistics



Technology, Innovation, and Service. Pacific Consolidated Industries (PCI), headquartered in Riverside, California, manufactures ruggedized, on-site liquid and gaseous oxygen, water purification, and nitrogen generating systems for the Military, Medical, Homeland defense, and Oil & Gas markets. PCI was founded in 1984 to manufacture cryogenic air separation devices for extreme and remote environments. Today, PCI has expanded its gas generating platforms to include membrane and adsorption (PSA/VSA) technologies. Global customers include the U.S. Air Force, U.S. Navy, U.S. Army, U.S. Marine Corps, Republic of Korea, Thailand, Republic of China, United Kingdom, Egypt, Turkey, Jordan and numerous companies and organizations. Whatever your requirements, PCI can meet your need.



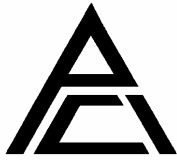
Pacific Consolidated Industries

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PACIFIC CONSOLIDATED INDUSTRIES

**EXPEDITIONARY -
DEPLOYABLE OXYGEN CONCENTRATION SYSTEM
120 LITERS PER MINUTE**

E-DOCS-120

NSN

6530-01-505-0526 PN 793035-001

INTRODUCTION

The availability of medical oxygen in the hospital is a prime factor in saving the lives of critical patients. Previously, oxygen demand was met by use of high-pressure oxygen cylinders. Cylinders satisfied the demand for oxygen but created unacceptable logistical burdens associated with transportation, refill, and storage. The introduction of liquid oxygen systems reduced the logistical problems associated with cylinders but created new problems. A liquid oxygen generating plant was centrally located and cryogenic storage tanks were used to distribute the liquid to outlying locations. The size and complexity of a liquid oxygen generating plant required extensive maintenance and highly trained operators. Liquid oxygen cannot be stored for long periods nor stockpiled, and transportation over long distance results in a high percentage of loss.

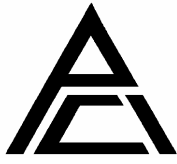
The introduction of the modern lightweight, self contained, highly mobile medical unit that can be deployed and operational with minimal logistic support means that the old methods of supplying oxygen by cylinder or in liquid form were no longer acceptable. The new medical unit required a oxygen generating system that could be stored and stockpiled, ready for immediate use, transported with the unit and totally self sufficient for as long as required in the field. It also has to be easy to operate, dependable and as small and light as possible.

The Expeditionary Deployable Oxygen Concentration System (E-DOCS) is an innovative solution to the problem of generating oxygen at the point of use. This system, once deployed, totally eliminates any resupply requirements.

The logistical tail is not shortened, it is eliminated.

SYSTEM OVERVIEW

The Expeditionary Deployable Oxygen Concentration System (E-DOCS) generates oxygen utilizing Vacuum Swing Adsorption technology. The E-DOCS-120 concentrator generates 120 liters per minute (lpm) United States Pharmacological 93% Monograph Oxygen (93% purity \pm 3%) at a delivery pressure of 100 psi. The oxygen can be delivered directly from the concentrator to the hospital distribution system at 100 psi or supplied to the boost compressor. The built-in boost compressor receives the oxygen at



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100 psi and compresses the gas to 2,250 psi (optionally to 3,000 psi). The high-pressure gas is stored in four cylinders which provide a 2 hour backup supply. The high-pressure compressor can also be used to fill “D” and “E” size cylinders utilizing the four position cylinder filling manifold. A vacuum pump is included with the DOCS to evacuate cylinders prior to filling.

DEPLOYABLE OXYGEN CONCENTRATOR SYSTEM (E-DOCS-120)

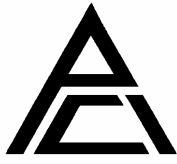
The primary function of the Deployable Oxygen Concentrator System is the generation of oxygen utilizing the VSA principle. All DOCS systems are completely contained in a rugged aluminum structural frame. The case measures 42” wide by 67” high by 104” long and weighs approximately 3,500 pounds. The case is fitted with forklift slots on the bottom for ground handling. Forklift slots are also provided on the top so that the unit may be loaded over the side of a trailer or truck. A lifting ring is provided at each corner to allow the unit to be sling loaded under a helicopter. Two DOCS units may be loaded on one 463-L standard aircraft pallet. One complete DOCS system for the support of an EMEDS + 25 field hospital may be loaded on one half of a 463-L pallet.



E-DOCS-120 shown in shipping configuration with air cleaner, tools and consumable spare parts kit packed inside case

E-DOCS-120

- Oxygen Purity in accordance with USP 93% monograph ($93\% \pm 3\%$)
- Oxygen purity is maintained by utilizing an oxygen sensor to control the speed of the scroll compressor. Lowering the compressor speed will reduce the flow reducing the draw on the VSA thereby raising the purity. Increasing the speed of the compressor will increase the flow thereby reducing the purity
- Pressure is maintained at 100 psig under variable usage (draw) conditions by regulating the speed of the scroll compressor. When pressure reaches 100 psi the compressor speed will be lowered to reduce the pressure.

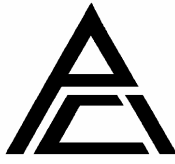


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- If purity control and pressure control conflict so that lowering compressor speed to reduce pressure would increase purity beyond the maximum (96%) a relief valve will open to vent pressure thereby increasing flow and lowering purity.
- Purity is always the primary control point.
- Production = 120 liters per minute minimum flow at USP 93%.
- Pressure = Regulated to 100 psig delivery pressure from DOCS
- Two Low Pressure Supply Connections
- May supply 100 psig /120 lpm directly to hospital distribution system (PODS, Provisioning Kit)
- Pressure regulator at supply connections regulates both supplies to same pressure.
- High Pressure Compressor provides 2,250 psig. @ 60 lpm, (3,000 psi @ 40 lpm)
- Four “M” sized cylinders (3,540 liters of oxygen at 2,250 psi per cylinder) mounted within the DOCS frame provide back-up storage capacity.
- Four “M” storage cylinders equal 14,160 liters of oxygen. At the full rated flow of 120 liters per minute, storage will provide 2 hours of backup capability.
- Backup flow will automatically start when delivery pressure from DOCS to hospital drops below the minimum 80 psi.
- Available in 50 Hz and 60 Hz., 208 Volts or 415 Volts, Three phase

CYLINDER FILLING

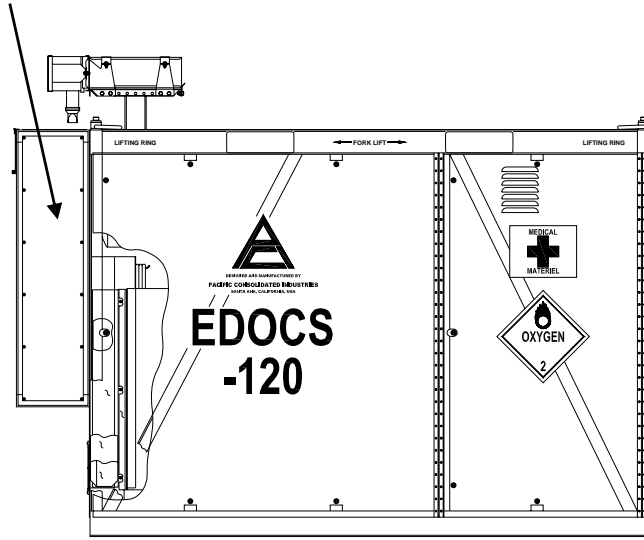
- Oxygen for filling cylinders is available from a DOCS unit at a maximum rate of 60 lph at a pressure of 2,250 psi. (40 lpm @ 3,000)
- A charging manifold and automatic pressure regulator is provided to refill four “D” sized cylinders simultaneously.
- A Vacuum Pump included to evacuate the cylinder from atmospheric pressure to 27 in. Hg. of vacuum is provided so that any possible contaminations are removed prior to refilling with oxygen.
- When the DOCS is being used to fill cylinders, 60 lpm of flow will be utilized by the high pressure compressor to fill cylinders and 60 lpm will be available for hospital usage. If during cylinder filling operations, the hospital usage increases beyond 60 lpm, the pressure supplied to the hospital will decrease as demand exceeds supply. When the DOCS discharge pressure drops to 80 psig, the regulator will open allowing the flow being utilized to fill cylinders to be redirected to supply hospital demand and the pressure will stabilize at 80 psi. When demand is reduced, the pressure supplied by the DOCS will increase above 80 psig causing the regulator to close and the filling of cylinders will resume
- A system for securing four “D” or “E” sized cylinders as used by the ambulance and helicopter medivac crews is provided. Fill hoses and pressure regulation are included to automatically fill the cylinder to 2,250 psi.
- The supply of oxygen to the hospital will always have priority over cylinder filling.



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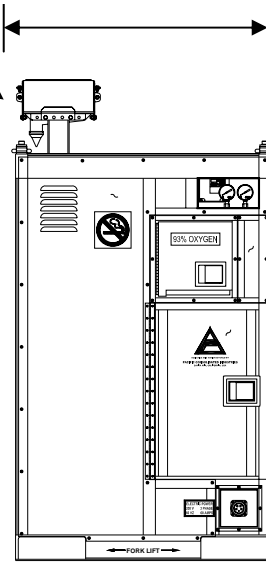
HIGH EFFECIENCY AIR
CLEANER WITH CYCLONIC
DIRT / SAND / RAIN REMOVAL

TWO HOUR BACK-
UP SUPPLY



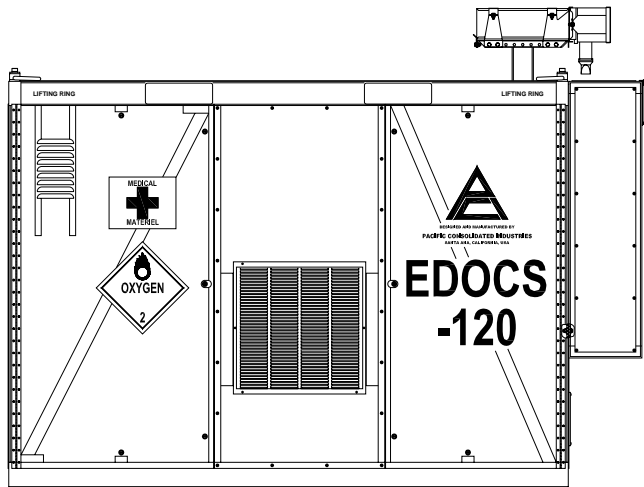
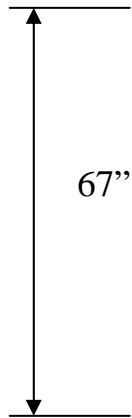
LEFT SIDE VIEW

42"

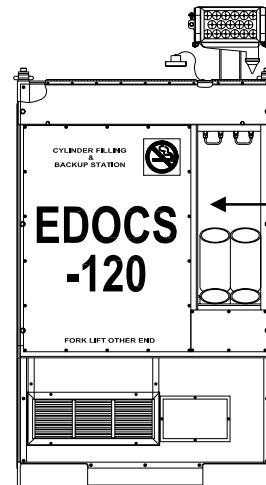


FRONT VIEW

67"



RIGHT SIDE VIEW



REAR VIEW

CYLINDER FILL
STATION

"E" AND "D"
CYLINDERS

MOST and "H"
CYLINDERS
FILLED AT
OPPOSITE END

104"

