

BROADCASTER

INTERNATIONAL OXYGEN MANUFACTURERS ASSOCIATION

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Harmonization in Focus



Developing a globally harmonised document on liquid oxygen valves in ASUs

By **Lars Kirchner**, *General Manager Conceptual Design Air Separation Units, The Linde Group*

The air separation industry has seen an accelerating shift to globalisation in the last decade. Ten years ago the majority of plants were designed in the engineering headquarters of the companies. Today projects are executed globally and markets for air separation units (ASUs) have moved to the fast developing countries in Asia and South America.

New approach in terms of quality, safety

Competition has driven the use of local engineering capacities and local suppliers. Strong specialisation and a focus on the core competencies of all partners involved make the process of engineering, manufacturing and construction more cost effective but less easy to control in terms of quality and safety. We can see this effect not only for complete projects but also for the manufacturing processes of suppliers and sub-suppliers, for example valve manufacturers. Material is purchased from different vendors, the assembly of valves takes place in different locations and the quality assurance systems need to reflect the individual manufacturing and sourcing circumstances.

Harmonisation projects are an integral part of IOMA activities to continuously improve the safety requirements in the international industrial and medical gases industry. The importance of this work is shown by the following example of a severe incident in an air separation unit.

In the spring of 2013 a high pressure liquid oxygen valve caught fire in an internal oxygen compression system of an ASU while the second pump of a redundant pair was being put back on line after maintenance work.

There was a violent metal fire (a violent

energy release) involving a DN 150 (6 inch) manually actuated butterfly valve and the enclosed stainless steel and aluminium equipment in liquid oxygen (LOX) service in an air separation plant. Regrettably this resulted in two fatalities. In total the fire consumed approximately 200 kg of stainless steel and aluminium.

The pump system had already been cooled down with LOX and it was in the process of being brought on-line by opening the downstream isolation valve. The incident happened during the initial opening of the valve. This pump had not been started at the time of the incident.

Setup of a joint working group 'Valves in LOX and GOX Systems'

After this severe incident Linde felt the responsibility to ensure that such an incident would never happen again. Consequently Linde initiated the process of developing a globally harmonised document on liquid oxygen valves. Based on this suggestion, in October 2013 the International Harmonisation Council proposed, and the IOMA Global Committee approved, the work item request and a joint working group consisting of globally recognised experts was



Click to watch "A Way Forward – Globally Harmonised Requirements for the ASU Industry" (5:30 min video)

established. All member companies agreed to start the work immediately. It became clear in the first teleconference that all companies felt the urgency of closing gaps related to liquid oxygen valves in their HSE management system.

The work was finished in May 2015 after nine face to face meetings alternating between European and U.S. locations.

Creating a harmonised document for the global ASU industry

The group members worked very efficiently and against a tight schedule. We saw the team spirit growing and changing as a group of individuals turned into a team while we made progress with the document. It became clear to all of us, that our companies are confronted with similar problems in valve design, installation, operation and maintenance. The only way to address the uncertainty and mitigate the risks for the future was to agree on global requirements in a harmonised document for the whole ASU industry. All team members were aware of the importance of the work and showed a high degree of commitment by sharing knowledge and experience, collecting data and information and preparing the document. In the course of working offline and in meeting face to face or in web meetings, the team made efficient use of all the different expertise available. Such working groups are an ideal incubator for making valuable knowledge accessible for our industry.

Author details:

Lars Kirchner is a chemical engineer and joined Linde in 1988. He started his career as commissioning engineer in the air separation business, worked in process calculation, instrumentation and advanced control systems.

Lars was responsible for the basic design of Linde's hydrogen and syngas business, before he took this role for the air separation business in 2010. Lars chaired the joint EIGA/CGA working group 'Valves in LOX and GOX Systems' developing a harmonised document which covers the safe design, manufacture, installation, operation and maintenance of valves used in liquid oxygen and cold gaseous oxygen systems. ■

IOMA LXXII 72ND ANNUAL MEETING OF THE
INTERNATIONAL OXYGEN
MANUFACTURERS ASSOCIATION

ROME ANNUAL MEETING APPROACHING!



Palazzo Colonna

7 - 11 NOVEMBER 2015 · ROME, ITALY

IOMA's 72nd Annual Meeting is scheduled for **Saturday–Wednesday, November 7–11, 2015** at the Rome Cavalieri Waldorf Astoria. We look forward to welcoming our member company representatives and their spouses/companions from around the world to The Eternal City.

The 2015 Annual Meeting Program Committee, led by Vice President **Tom Thoman** (Airgas, Inc.), has assembled a great program entitled, *Thriving in the New Global Arena: Navigating Volatility and Fast Paced Change*. This year's theme reflects the period of profound political, economic, social and technological change that our world has entered. In this time of constant and fast paced change, regional and global challenges are rising ever faster, are hard to solve, and yet must be dealt with in order for organizations to remain relevant. To address the challenges and potential responses and solutions, we are pleased to welcome the following speakers to our meeting.

Keynote Speakers



Dr. Nariman Behravesh,
Chief Economist, IHS Inc.

Dr. Behravesh is chief economist of IHS and the author of *Spin-Free Economics: A No-Nonsense, Nonpartisan Guide to Today's Global Economic Debates* (McGraw-Hill). IHS provides information and analysis to support the decision-making process of businesses and governments in industries, such as aerospace, defense and security; automotive; chemical; energy; maritime and trade; and technology. Directing the entire economic forecasting process at IHS, Dr. Behravesh is responsible for developing the economic outlook and risk analysis for the U.S., Europe, Japan, China and other emerging markets.

Dr. Behravesh and his team have been ranked as top economic forecasters by *Consensus Economics*, *Bloomberg*, *USA Today* and the *Wall Street Journal*. He is

quoted extensively in print media including the *Wall Street Journal*, *The New York Times*, *Financial Times*, *USA Today*, *Investor's Business Daily*, *Business Week*, *Newsweek*, *Fortune*, *Forbes* and *U.S. News and World Report*. He also regularly appears on radio and television programs such as BBC World Business Report, NBC Nightly News, CNN Headline News, The News Hour, Fox Business News, CNBC, Bloomberg TV and Radio, and All Things Considered and Market Place on National Public Radio.

Dr. Behravesh is a featured speaker at many of the top global conferences each year, including IHS CERA Week and the World Economic Forum in Davos. He holds Ph.D. and M.A. degrees in economics from the University of Pennsylvania, and a B.Sc. from Massachusetts Institute of Technology.



Curt Steinhorst,
Founder and President,
The Promentum Group
The Digital Deluge:

How Trends in Technology are Transforming the Workforce & the World

Curt Steinhorst is the founder and president of The Promentum Group, a communications consultancy that crafts messages for today's distracted audiences. As its lead consultant, Mr. Steinhorst has helped an impressive variety of companies and public figures — from preparing American football star Johnny Manziel for his Heisman trophy acceptance speech (described by ESPN as "the greatest in history") to advising the largest record label in country music on its

marketing to digital consumers. As a leading voice on strategic communications in the age of distraction and a certified speaker at the Center for Generational Kinetics, Curt has spoken across the globe to audiences that include General Motors, Raytheon, The U.S. Naval Academy, Aspen Ski Co, Hotel Association of Canada, and YPO (Young Presidents' Organization). His forthcoming book, *Cave Dwellers*, offers readers strategies for withdrawing from today's distractions to focus on the heart of all great communication—idea creation.



Dr. Marco Magnifico,
Executive Vice President, Fondo
Ambiente Italiano (FAI)
Italy's Cultural, Artistic and
Natural Heritage

Dr. Magnifico is the executive vice president of Fondo Ambiente Italiano (FAI). FAI is an Italian non-profit foundation whose mission is similar to that of a national historic trust. Its purpose is to protect, promote and enhance the heritage of Italian art, historic and outdoor spaces, educate the community and monitor the properties.

Dr. Magnifico is responsible for managing FAI's cultural relations with the Ministry of Heritage and Culture, and maintain relationships with various public and private institutions and associations, both Italian and foreign. He also is in charge of the restoration and conservation of transportable objects and collections owned by the Foundation, the publications, the Corporate Communications department and the preliminary investigations for future acquisitions. He is a co-author of FAI's main publications, including "The Book of FAI," which illustrates and describes in detail the properties of the Foundation while narrating each estate's stories.

Dr. Magnifico graduated in Liberal Arts at the University of Pavia following a course of studies in Art History, and then specialized in Art History at the University of Florence. For nearly four years he worked as an expert of ancient paintings at Sotheby's, first in their headquarters in London, then in Italy.

IOMA 2015
ROME
7-11 NOVEMBER
LXXII ANNUAL MEETING



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IOMA 72nd Annual Meeting

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Industry Panel

The Program Committee also has assembled a panel of gas industry speakers who will focus on global energy markets and sustainability. Three experts from Air Liquide, Linde and Praxair will address topics related to these themes for Europe and the Middle East, Asia and North America. The panel will be moderated by **Dr. Nariman Behravesh**, chief economist from IHS, Inc.

Many topics will be covered, including energy conservation in gas production, clean energy initiatives, natural gas developments, hydrogen for transportation, waste management and remediation, large chemical plant investments, fracking, gas separation, process technology and modernization of metals, chemicals and refinery industries, to name a few. Our experts will give their views on 'big' global questions related to the economic slowdown in China, the Greek crisis, the outlook for the North American shale revolution, and the ISIS threat to oil supplies.

Special Events in Rome

In addition to our terrific line up of speakers, the program offers several events to help you explore the beautiful city of Rome. IOMA has planned several group activities for our members and their families.

The Annual Meeting kicks off on Saturday, November 7 with our traditional evening **Welcome Reception** at the hotel, allowing you to catch up and network with your colleagues.

On Sunday IOMA is offering several optional tours. Attendees can participate in either a tour of the **Capitolini Museum**, tour of the **Borghese Museum**, a walking tour of ancient Rome (including the **Colosseum**), or a walking tour of the many fountains around the city.

On Sunday evening the Italian member companies of IOMA are generously hosting the dinner and reception at **Palazzo Colonna**, a palatial block of buildings in central Rome belonging to the prestigious Colonna family for over twenty generations. Dinner will be in the Palazzo's Great

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Capitolini Museum

IOMA

72

ND ANNUAL MEETING OF THE
INTERNATIONAL OXYGEN
MANUFACTURERS ASSOCIATION

ROME 2015

7-11 NOVEMBER

CLICK TO REGISTER NOW

<https://www.regonline.com/IOMA2015>

THRIVING IN THE NEW GLOBAL ARENA:
NAVIGATING VOLATILITY & FAST PACED CHANGE

PROGRAM AT-A-GLANCE

Saturday, November 7

All Day Major Arrivals
6:00PM – 9:00PM Welcome Reception

Sunday, November 8

8:00AM – 10:00AM Breakfast

10:00AM – 1:00PM Tour of Galleria Borghese Museum (lunch on your own) ★

10:00AM – 3:00PM Tour of Capitolini Museum with Lunch ★

10:00AM – 3:00PM Walking Tour of the Fountains with Lunch ★

10:00AM – 4:30PM Walking Tour of Ancient Rome & Fountains with Lunch (full day) ★

6:00PM – 10:00PM Reception & Dinner at Palazzo Colonna | *Dress code: Business attire*
Hosted by IOMA's Member Companies from Italy



Colosseum

Monday, November 9

6:30AM – 8:30AM Breakfast

8:30AM – 12:00PM First General Session

1:00PM – 3:00PM Global Committee Meeting

1:00PM – 4:30PM Walking Tour of the Fountains ★

1:00PM – 4:30PM Walking Tour of Ancient Rome ★

1:00PM – 4:30PM Walking Tour of the Jewish Quarter ★

1:00PM – 4:30PM Tour of San Clemente Church & Caelio Hill ★

3:30PM – 5:00PM Board of Directors Meeting

6:30PM – 12:00PM President's Banquet | *Dress code: Black Tie/Formal*



Trevi Fountain

Tuesday, November 10

6:30AM – 9:00AM Breakfast

8:30AM – 12:00PM Second General Session

1:00PM – 2:30PM Pizza Making Class ★

5:30PM – 8:00PM Private Tour of Vatican Museum & Sistine Chapel

8:00PM – until Dine-Out Night

Wednesday, November 11

6:30AM – 10:00AM Continental Breakfast

All Day Major Departures



★ **Please note:** Select group activities are **optional**. Advance sign-up is required and additional fees may apply. All tour times approximate and subject to change. For details please see the meeting program.



IOMA 72nd Annual Meeting

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Hall, which was completed in 1703 and houses the masterful Colonna art collection. You are sure to enjoy this evening of traditional Italian cuisine and entertainment.

On Monday following the General Session, IOMA again is offering several optional tours. Attendees have the option to participate in either a walking tour of ancient Rome (including the Colosseum), walking tour of the many fountains around the city, tour of San **Clemente Church & Caelio Hill**, or a tour of the **Jewish District**.

Monday evening is IOMA's traditional **President's Banquet** at The Rome Cavalieri Hotel. This formal attire reception and dinner will be followed by awards presentations and dancing in the hotel's ballroom.

On Tuesday afternoon following the General Session, attendees have the option to participate in a pizza making demonstration with lunch tak-

ing place at the Cavalieri Hotel. Following the hands-on instruction by a chef, the pizzas will be cooked and you and your family will be able to enjoy the final result!

On Tuesday evening, instead of concluding the meeting with our traditional Closing Reception, IOMA is sponsoring a private, after-hours tour of the **Vatican Museum**, including the **Sistine Chapel**. This event is for IOMA meeting attendees only and the cost is included in your registration fee. For approximately 90 minutes you will view breathtaking art and exhibits inside the museum. Following this private tour will be IOMA's traditional Dine-Out Night.

Register Now!

Registration is open and members are urged to visit the IOMA website at www.iomaweb.org to download the meeting program, or for faster service click on the following registration link: <https://www.regonline.com/IOMA2015>. ■

Overlooking the panorama that has inspired visitors for centuries is Rome's most prestigious address – the **Rome Cavalieri Waldorf Astoria** hotel. Though only minutes from the city's great monuments, the Rome Cavalieri has the tranquility of an oasis. Enclosed within six hectares (15 acres) of lush Mediterranean parkland, this luxury hotel is a calm retreat in the heart of the Eternal City.

More than just a 5-star property: boasting a museum-quality art collection, a Grand Spa, and standards of luxury that set it apart from other Rome hotels, the Rome Cavalieri brings new meaning to notions of Italian style. Learn more at www.romecavalieri.com ■



RELATED ASSOCIATION NEWS

EIGA Documents

The **European Industrial Gases Association** (EIGA) (Brussels, Belgium) has made the following publication available. These and other documents are available at www.eiga.eu.

- *Safe Handling of Electronic Specialty Gases* – Doc 199/15
- *Disposal of Surplus and Used Company Clothing* – Security Alert SA 25/15
- *Unmanned Aerial Vehicles (Drones)—Guidance to EIGA Members* – Security Alert SA 26/15
- *Unmanned Air Gas Plants: Design and Operation* – Doc 132/15 (Revision of Doc 132/05)
- *Safe Preparation of Compressed Oxidant-Fuel Gas Mixtures in Cylinders* – Doc 139/15 (Revision of Doc 139/10)
- *The Safe Design, Manufacture, Installation, Operation and Maintenance of Valves Used in Liquid Oxygen and Cold Gaseous Oxygen Systems* - Doc 200/15

Catalogue of Medical Gases Publications

EIGA's Medical Gases Council has developed a *Catalogue of Medical Gases Publications*, a listing of all publications available on the EIGA website relating to medical gases, medical equipment and homecare services. There are now several publication catalogues accessible on the EIGA website by navigating to > "Publications" > "Catalogue of Publications" from the home page. ■



IOMA MEMBER NEWS

Hydrogen Fueling Station with Linde Technology Opens in Munich

The Linde Group (Munich, Germany) announced recently that TOTAL Multi-Energy fueling station in Detmoldstrasse, Munich, opened its doors to drivers of hydrogen-powered fuel-cell cars. Equipped with innovative refueling technology from Linde, the station is now home to the only public hydrogen fueling service in the Bavarian state capital. Linde was commissioned by TOTAL and BMW, which will be the hydrogen station's main user, to install its high-pressure cryogenic hydrogen pumps – also known as cryopumps – at the site in Detmoldstrasse. The technology was developed in-house by Linde and is designed to directly compress cryogenic liquid hydrogen stored at -253 degrees Celsius. Fuel-cell drive technology enables electric cars to be driven over long distances with short refueling windows and zero tailpipe emissions. Under the umbrella of the Clean Energy Partnership (CEP), the new H2 fueling station will, for instance, supply demo fuel-cell cars based on the BMW 5 Series Gran Turismo. Thanks to Linde's innovative technology, the station can offer two different fueling technologies at separate pumps. Drivers can choose between industry-standard 700 bar compressed gaseous hydrogen (at -40 degrees Celsius) and cryo-compressed hydrogen at -233 degrees Celsius (pressurized at up to 300 bar). This last technique is suited to the pressurized cryogenic tanks in BMW fuel-cell cars.

Messer Invests in New Oxygen Plant in Estonia

Messer GmbH (Bad Soden, Germany) announced recently that as part of the joint venture Elme Messer Gaas, and the second shareholder, the BLRT Grupp, one of the biggest industrial holdings in the Baltic States, have invested in a new oxygen production plant in Järvakandi, Estonia. The facility is on the site of customer Owens-Illinois, Inc., the world's leading manufacturer of container glass. The plant produces 2,650 cubic meters of oxygen per hour, which fully meets the needs of the new glass trough. Owens-Illinois was provided with liquid oxygen during the construction phase in order to supply oxygen to the glass trough that went into operation in December 2014. The use of oxygen for high temperature processes involves feeding the gaseous oxygen through a pipeline directly to the burners of the glass trough that operates using oxy-fuel technology. Messer develops and implements oxy-fuel burners for use not only in the glass industry, but also in the ferrous and non-ferrous metals industries.

Airgas Makes Two Acquisitions

Airgas, Inc. (Radnor, PA, USA) announced that it has acquired the assets and operations of Weldinghouse, Inc., an industrial gas and welding supply distributor. Headquartered in Corpus Christi, TX, Weldinghouse has 4 locations throughout southern Texas and nearly 40 associates. Airgas also has acquired Priority Energy Services, a nitrogen services company headquartered in Covington, LA with approximately 75 employees operating 7 locations in Louisiana, Texas and West Virginia. It will be integrated into Airgas as a newly formed business unit named Airgas Priority Nitrogen, LLC.

MATHESON and Daedeok Gas Announce Helium Supply Agreement

MATHESON (Basking Ridge, NJ, USA) and Daedeok Gas Co., Ltd. (“DDG”) announced that the two companies recently entered into a long-term helium supply agreement. Under this agreement, MATHESON will fill 11,000 gallon liquid helium containers and ship them to DDG's transfill facility in South Korea. Daedeok will transfill the helium into tube trailers, cylinders and dewars at their Gunsan, South Korea facility and resell it throughout South Korea. DDG's helium filling station is expected to start up during the second half of 2015. DDG is one of Korea's largest gaseous helium dealers and a leading dealer of liquefied gases and hydrocarbon products.

Air Products Opens Doe Canyon Helium Plant

Air Products and Chemicals, Inc. (Allentown, PA, USA) recently held a grand opening at its new Doe Canyon helium production facility in Colorado, USA. The Doe Canyon plant is the only one in the world extracting helium from a gas stream composed primarily of carbon dioxide (CO2). Much of the helium currently produced in the United States comes from the United States Bureau of Land Management (BLM) system. However, the BLM system is in decline, and eventually that storage supply will be depleted as global demand for helium continues to grow. The purified helium at the new Colorado facility will be liquefied on-site for subsequent delivery to Air Products' customers. The plant is expected to produce up to 230 million standard cubic feet of helium per year, replacing more than 15 percent of the current BLM reserve helium supply. Most of the helium produced around the world is a by-product of natural gas (methane) processing. However, not all natural gas fields contain helium, and few gas fields have high enough helium concentrations to make it economical for extraction. In this case, the natural gas is composed of primarily CO2, and it contains high enough concentrations of helium to make it economical for extraction. Air Products' Colorado facility will use a new technology process to produce pure helium from the CO2 stream. Kinder Morgan, operator of the Doe Canyon Unit, supplies this CO2 to the Permian Basin in West Texas, where the CO2 is used for enhanced oil recovery (EOR). Air Products will extract the helium and return the CO2 to Kinder Morgan for its intended EOR use.

MATHESON to Build ASU in Southern California

MATHESON (Basking Ridge, NJ, USA) will build a second state-of-the-art large capacity Air Separation Unit (ASU) in the Los Angeles, CA, area. “The new ASU is in line with MATHESON's ongoing strategy of expansion in high growth markets and the vertical integration of our merchant bulk liquid and cylinder gas distribution capabilities to include our recent acquisition of Sims Welding,” according to Scott Kallman, MATHESON president & CEO. “The added capacity is intended to meet the growth in the Los Angeles and San Diego areas over the upcoming 5-7 years.” The ASU will produce liquid nitrogen, liquid oxygen and liquid argon, and is expected to be on stream in 2017. ■



2015 OFFICERS & DIRECTORS

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Stefan Messer, *Messer Group GmbH*,
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BRIEFS

■ **Praxair, Inc.** (Danbury, CT, USA) announced that after purchasing the former GE Capital building in Danbury, CT, they will move its global headquarters housing approximately 400 employees to 10 Riverview Drive in Danbury. The move will be completed by the end of 2016.

■ **Air Products and Chemicals, Inc.** (Allentown, PA, USA) announced the addition of Charles “Casey” Cogut, Senior M&A Counsel at the law firm Simpson Thacher & Bartlett LLP (STB), to its board of directors. ■

IOMA & INDUSTRY EVENTS CALENDAR

2015

OCTOBER 11–14

GAWDA Annual Convention
The Phoenician Resort • Scottsdale, AZ, USA

OCTOBER 20–21

CGA Safety and Reliability of Industrial
Gases, Equipment, and Facilities Seminar
InterContinental Tampa Hotel • Tampa, FL, USA

NOVEMBER 7–11

**IOMA 72ND
ANNUAL MEETING**
Rome Cavalieri Waldorf Astoria • Rome, Italy

REGISTER NOW!



2016

APRIL 23–27

CGA Annual Meeting
Palm Beach Gardens, FL, USA

JUNE 2–4

EIGA Summer Session
Berlin, Germany

OCTOBER 23–27

**IOMA 73RD
ANNUAL MEETING**
The Grand del Mar
San Diego, CA, USA



2017

NOVEMBER 11–15

**IOMA 74TH
ANNUAL MEETING**
The Ritz-Carlton Dubai
Jumeirah Beach • Dubai, UAE

