



Air Products and Dow Corning Silane Safety Seminar

May 17, 2012, 12:00 – 17:00
The Kerry Hotel
Shanghai, China

Please join Air Products and Dow Corning as our guest at our Silane Safety Seminar, being held on May 17, 2012 at the Kerry Hotel in Shanghai, China.

Air Products and Dow Corning are sponsoring this half-day seminar, which brings together many acknowledged experts on silane to reinforce standards, safe handling procedures and regulations.

Seating at this event is limited, so **please RSVP by May 4, 2012** by completing and returning the registration form on the last page of this brochure.

We look forward to seeing you in Shanghai!

Agenda

12:00 – 13:00	Registration
13:00 – 13:10	Welcome and Introduction Karen Liu – <i>Air Products</i>
13:10 – 13:40	Silane Manufacturing Overview Brian Schell – <i>Dow Corning</i>
13:40 – 14:10	Silane Systems and Operation Kelvin Huang – <i>Air Products</i>
14:10 – 14:55	Hazards and Ignition Behavior of Silane Releases Prof Jeng-Renn Chen – <i>Kaohsiung First University</i>
14:55 – 15:10	Break
15:10 – 15:40	Revision of CGA G-13 and Release Testing Gary Miller – <i>Air Products</i>
15:40 – 16:25	Lessons Learned from Silane Use Eugene Ngai – <i>Chemically Speaking LLC</i>
15:40 – 16:25	Silane Emergency Response, Asia Tommy Ju – <i>Air Products</i>
16:55 – 17:00	Closing Remarks Questions/Answers

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Presentation Descriptions

Silane Manufacturing Overview – Brain Schell *(Presented in English)*

Silane Manufacturing Overview will include a survey of the various technologies commercially employed to produce silane, physical properties of silane, common package types/sizes, and the practical implementation of leak detection and mitigation systems in use at Dow Corning.

Silane Systems and Operation - Kelvin Huang *(Presented in Mandarin)*

Proper design and operation of a silane use system is key to safety and quality. This presentation will review industry standards, best practices, and system safeguards that are important to consider for a silane system. Operator training and PPE (Personal Protective Equipment) are other important considerations, and they will be outlined during this presentation.

Hazards and Ignition Behavior of Silane Releases - Prof Jeng-Renn Chen *(Presented in Mandarin)*

A silane release from a pressure source may not always lead to prompt ignition and frequently the ignition occurs when the release is shut-off. In a confined space, significant quantities of silane can accumulate prior to autoignition leading to an explosion, causing significant damage. To date, the mechanism and condition of pure silane ignition upon release into air has not been completely explained. This lecture presents a series of tests that uncovered the precise condition for pure silane ignition upon release into air, in addition to tests with a release from a cylinder valve, flame impingement on the cylinder, explosion of a cylinder cabinet, and detection of silane flame. The implications of the test results are discussed, with emphasis on the safety of silane supply systems and operation practices

Revision of CGA G-13 and Release Testing - Gary Miller *(Presented in English)*

The Compressed Gas Association (CGA), standard G-13 is the recognized world standard for silane and silane mixtures. The first edition was approved in 2000. The second edition which is also an ANSI (American National Standards Institute) approved standard was adopted in 2006. Due to changes in use and packaging G-13 is undergoing the revision process. This presentation will discuss the ramifications of the CGA G-13 revision.

Lessons Learned from Silane Use - Eugene Ngai *(Presented in English)*

In over 40 years the use of silane has grown dramatically. During this time there have been many lessons learned that have helped to improve safety and quality in use. While Silane is a pyrophoric gas with an extremely wide flammable range, releases into the air may not always ignite immediately or sometimes not at all. This presentation will discuss some operating incidents and key safety learnings, including silane leak behavior, leaks due to expansion cooling, and PPE.

Silane Emergency Response, Asia - Tommy Ju *(Presented in Mandarin)*

If an incident involving silane occurs, timely response with a trained team and equipment is critical. This presentation will summarize Air Products Electronic Specialty Gas (ESG) Emergency Response program in China. This has been an ongoing effort since 2000. It will also review an actual silane ISO module ER transfill performed in Korea by the AP Korea ER team due to a leak.

Speaker Biographies



Prof. Jenq-Renn Chen

National Kaohsiung First University of Science and Technology, Taiwan

Jenq-Renn Chen is a Distinguished Professor in the Department of Safety, Health and Environmental Engineering, National Kaohsiung First University of Science and Technology, Taiwan. He is also in charge of the Taiwan EPA Southern Emergency Response Team, which provided emergency response service to southern Taiwan. He received MSc and PhD degrees from Imperial College, London, UK, both in the field of Chemical Engineering. He has authored more than 60 papers in international journals and conferences, all on the broad range of process safety. Dr. Chen has also participated in more than 80 chemical and gas emergency responses and incident investigations in Taiwan. His current research interests are gas explosion, ignition mechanism, and fundamental aspects of chemical releases.



Kelvin Huang, Product Manager Turnkey Project Systems, EES

Air Products

Kelvin Huang is a Senior Manager at Air Products San Fu Gas Company (Taiwan) and is now Global Product Manager of Turnkey Project Systems. He has over 17 years of experience in a variety of positions, including Quality Assurance, Project Engineering, Process Development, MEGASYS® Operations, plant management of the Nanke ESG (Electronic Specialty Gas) facility and participated on the Air Products Asia SAP implementation team. In addition, he has also been an Air Products certified emergency response (ER) trainer and has conducted training courses in both China and Taiwan. Kelvin holds a Masters in Organic Chemistry



Tommy Ju, Asia Product Safety Manager

Air Products

Tommy received his Bachelor's degree of fine chemicals from Tianjin University. He has over 18 years of experience in a variety of positions. Tommy joined Air Products in 1998 as one of the first Electronic MEGASYS® operation team members in China and has hands-on experience in handling different types of hazardous chemical and gases. Tommy joined product safety as a member of their EHS group in 2004 and assumed his current position in 2008. Currently, Tommy is responsible for hazardous communications, emergency response and product regulation compliance in Asia. He is also an Air Products ER trainer and coordinator for China. Tommy obtained his emergency response training in Safety Compliance Management at Richmond, Virginia in 1998. He has conducted emergency response training courses in China, Taiwan, Singapore, Malaysia, Philippines, Thailand and India to support different businesses and customers.



Gary L. Miller, Lead Process Safety Engineer
Air Products

Gary received his Bachelor's of Science Mechanical Engineering degree from Pennsylvania State University. He spent ten years working within the Semiconductor Industry prior to joining Air Products in 1995. His activities included Project Engineering in gas delivery system design and semiconductor tool installation. For the first ten years within Air Products, Gary was responsible for the design development, manufacturing and global installation of Bulk Specialty Gas Delivery Systems (BSGS) for Semiconductor, TFT Flat Panel and Photovoltaic Industries. In 2005, he joined Process Safety Engineering supporting the manufacturing and installation of high purity liquid and gas delivery systems, gas and chemical plant construction and Semiconductor project execution. He specializes in qualitative and quantitative risk analysis, consequence modeling, process safety reviews and process safety training. Currently, Gary is the Air Products Process Safety representative to the Compressed Gas Association (CGA) G-13 Silane standard revision Subcommittee.



Eugene Ngai
Chemically Speaking LLC

Eugene has over 40 years of Specialty Gas Experience in Production, Laboratory, R&D, Engineering and Safety positions. He was Vice President of Corporate Development and Technology for Solktronic Chemicals prior to the Air Products acquisition in 1999. He retired in 2009 as Director of ER and Disposal Technology in the Product Safety Group. He now provides safety and emergency response consulting services to a number of silane, PV materials and polysilicon manufacturers and users. He continues to be active in a number of industry association working groups, including CGA G-13, NFPA 55, NFPA 400, SEMI EHS, SSHA and UN TC58 SC2 WG7. Eugene has worked with silane since 1972. Since 2006, he has coordinated 8 silane safety seminars around the world. Eugene was honored with the CGA Lifetime Safety award in 1999, Fire Dept of New York Commissioners award in 2007 SSHA Fellow in 2009 and ACS Safety award 2011. He holds five US patents for Gas Safety Devices.



Brian Schell - Product Line Director Specialty Materials
Dow Corning Corporation

Brian has responsibility for Specialty Materials in the Electronics, Clean Energy, Healthcare and Compound Semiconductor industries, including UHP gases such as silane, tri- and tetra-methyl silane. Most recently as the Solar Product Line and Supply Chain director, Brian had program responsibilities for the product and business development, engineering, construction, start-up and operations of Dow Corning's new 4000MT silane plant. Prior to his Solar responsibilities, he was President of Multibase, Inc, a Dow Corning Company in Copley, Ohio. Brian joined Dow Corning in 1985 and has held various Engineering, Manufacturing, Business Process and Finance Management roles, with a concentration in new business development.



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Registration Form

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How did you find out about our Silane Safety Seminar?

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Please complete and save this form, then email or fax to:
Carolyn Neilson, Marketing Communications, Air Products
Email: neilsoc@airproducts.com
Fax: +610-706-5256

You will receive confirmation upon receipt of registration.

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