

# FORCON INTERNATIONAL

**MARTIN L. TIMM, PE, CSP**

## **SUMMARY**

Mr. Timm is a professional engineer and certified safety professional with over 40 years of experience in industrial refrigeration and industrial gases. Over the years Mr. Timm has been active in codes and standards development; he is also skilled in consequence modeling, process hazards analysis, incident investigation, and engineering design and modeling of fluid systems.

## **EDUCATION**

Master of Science in Mechanical Engineering – University of Wisconsin-Milwaukee

Bachelor of Science in Chemical Process Engineering – University of Wisconsin-Milwaukee

## **REGISTRATIONS & CERTIFICATIONS**

Registered Professional Engineer:

- Alabama #PE51232
- Arizona #41430
- Florida #92424
- Georgia #PE044204
- Kentucky #16032
- New York #75032
- North Carolina #052425
- Oregon #74862PE
- South Carolina #39337
- Tennessee #125592
- Washington #40682
- Wisconsin #23399

Certified Safety Professional # CSP-30754

B11 Licensed Machinery Safety Specialist #AA311265152

## **PROFESSIONAL ASSOCIATIONS**

- ASHRAE member
  - Recipient of Distinguished Service Award
  - Past Regional Vice Chairman, Refrigeration
  - Past Member, Society Handbook Committee
  - Past Vice-Chair of SSPC 15, Safety Standard for Refrigeration Systems
  - Past Chair of Technical Committee 10.2, Automatic Ice Making Plants/Skating Rinks
  - Past member of Technical Committee 10.3, Refrigerant Piping, Controls and Accessories
  - Past member of Technical Committee 10.1, Custom Engineered Refrigeration Systems
  - Past Local Chapter President, Louisville, Kentucky
- IIAR member
  - Recipient of IIAR “Presentation Excellence” Award, 2018
  - Member, Board of Directors, 2012-2018
  - Current member of Standards Committee
  - Past Chair of Safety Committee
  - Past Member of Code Committee
- CCPS past member (corporate membership)
  - Past committee member for Project 283, update of the 2001 book “Revalidating Process Hazard Analyses”

# FORCON INTERNATIONAL

- Past Industry Co-Chair for Project 246, 2nd edition update of book “Guidelines for Siting and Layout of Facilities”, 2018
- Past peer reviewer for new book, “Bow Ties in Risk Management”, 2018
- Past committee member for new book Project 248, “Guide for Making Acute Risk Decisions”, 2020
- AIChE senior member
  - Member, Safety and Health Division
  - Member, Design Institute for Emergency Relief Systems (DIERS)
  - Past President, Wisconsin Section
  - Past session Co-Chair, Global Congress on Process Safety
- CGA past member (corporate membership)
  - Served on various CO2 subcommittees
  - Served on dispersion modeling task force
  - Chaired update of CGA-G-6.7, “Safe Handling of Liquid Carbon Dioxide Containers That Have Lost Pressure”, 2019
  - Served on subcommittee for update of CGA P-8.7-2016, “Safe Location of Oxygen and Inert Gas Vents”
  - Served on subcommittee for development of CGA P-64-2014, “Guideline For The Location Of Occupied Buildings In Industrial Gas Plants”
  - Served on subcommittee for update of ANSI/CGA G-13-2016, “Storage And Handling Of Silane And Silane Mixtures”
  - Served on subcommittee for update of standard ANSI K61.1/CGA G-2.1-2014, “Requirements For The Storage And Handling Of Anhydrous Ammonia”
- ASME member
- ICC member
- ASSP member
- NAFE affiliate
- TSARC past member advisory council
  - (UW-Madison Thermal Storage Applications Research Center)

## **CONTINUING EDUCATION**

Additional courses and/or certifications completed in the following:

- B11 Licensed Machinery Safety Specialist Training Course 2022
- IIAR Standard 9 Training Certificate: “Minimum System Safety Requirements for Existing Closed-Circuit Ammonia Refrigeration Systems” 2021
- AIChE CCPS’ Introduction to Hydrogen Safety for First Responders 2019
- AIChE CCPS’ Layer of Protection Analysis (LOPA) 2016
- UW-Madison Industrial Refrigeration Consortium (IRC) Course: Engineering Safety Relief Systems 2014
- AIChE CCPS’ HAZOP Studies 2012
- Blast Resistant Structural Design, 5 day course by Baker Engineering and Risk Consultants, Inc., 2011
- Primatch S84/IEC 61511 Standard on Safety Instrumented Systems (SIS) and the Development of a Safety Requirements Specification (SRS) 2009
- Primatch Layers of Protection Analysis for Process Safety Management
- Basics of Six Sigma Training 2006
- Primatch Process Hazard Analysis (PHA) for Team Leaders
- Trained in Apollo Method Root Cause Analysis

## **CAREER HISTORY**

### **FORCON International – Mechanical Engineer**

Providing forensic investigation analysis and expert witness services related to his fields of expertise.

### **Linde plc (Praxair Inc. prior to merger in 2019)**

#### ***Corporate Fellow***

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- Continued full range of activities as a corporate process safety manager, and actively participated in the development of harmonized versions of various safety standards of the two merged corporations. Combined entity is world's largest industrial gas company.

## **Corporate Process Safety Manager**

- Developed and managed various process safety programs/initiatives at the corporate level. Supported and worked directly with carbon dioxide (CO<sub>2</sub>) production and distribution businesses in North and South America, Europe, and Asia. Led and supported cross functional corporate process safety initiatives in other business segments throughout the company's global operations. Participated in internal incident investigations and incident reconstructions. Performed several projects under attorney-client privilege. Participated in facility audits for compliance with corporate standards, and OSHA and EPA regulations. Managed the corporate RMP submittal process. Did consequence modeling for various molecules to support the RMP submittals and related PSM programs. Molecules modeled included methane, propane, butane, chlorine, ammonia, methyl chloride, ethylene oxide, acetylene, hydrogen, and carbon monoxide. Conducted internal facility siting studies and managed external facility siting studies conducted by subcontracted engineering firms. Actively participated in technical committees at IAR, CGA, and CCPS.

## **Engineering Consultant on PL4 Development team**

- Participated in team developing improvements for a cryogenic oxygen production plant standard design. Analyzed efficiency improvement options and cost reduction opportunities, doing detailed engineering calculations and cost estimates, and presented them to management for consideration.

## **Engineering Consultant in CO<sub>2</sub> Engineering Dept.**

- Conducted engineering work for carbon dioxide production facilities and miscellaneous projects. Designed and estimated cost of upgrades to CO<sub>2</sub> production facilities, and bulk specialty gas systems for electronics customers (ammonia, silane, nitrogen trifluoride, etc.). Led HAZOP studies within my department and wrote the final reports. Actively participated on technical committees in the refrigeration industry, at ASHRAE, IAR, CGA. Participated in development of supercritical CO<sub>2</sub> systems for semiconductor wafer cleaning.

## **Process Engineer in Standard Plants Design Group**

- Worked closely with R&D on the development of mixed gas refrigeration systems for food freezing, and cryogenic air separation. Personally, ran process design software (HYSYS, UNISIM) and heat exchanger sizing and rating programs, and did calculations for optimization and cost reductions. Performed calculations for energy efficiency for systems quoted to external customers. Actively participated on technical committees in the refrigeration industry, at ASHRAE, IAR, CDIG (American Society Heating Refrigerating Air-Conditioning Engineers; International Institute of Ammonia Refrigeration, Carbon Dioxide Interest Group (European).

## **Engineering Consultant in Nitrogen Plant Design Group**

- Wrote specifications and purchase orders for large compressed air dryer systems, screw compressor and air compressor skids, custom engineered refrigeration skids for utilization in cryogenic air separation plants and clean dry air (CDA) compressed air systems. Reviewed and approved vendor submittals. Wrote sections of operating manuals for cryogenic air separation plants, dealing with those subsystems for which I specified and approved the equipment.

## **APV Engineered Systems**

### **Engineering Manager for Unit Systems Group**

- Supervised staff of up to 20 engineers, CAD operators and technicians. Designed process skids for food and beverage industries. Supervised and personally worked on development of proposals, final designs, monitoring of manufacturing progress, final shop inspections, field erection, and startup. Supervised the design and manufacturing of pasteurizers, heating systems, deaerators, plate heat exchanger skidded systems, and blending systems for various other applications. Participated in technical committees and codes and standards work at professional societies including ASHRAE and IAR.

### **Project Manager**

- Managed engineering and manufacturing support for process skids for the food and beverage industries.

## **Industrial Air Centers Inc. – Program Manager**

Successfully started up consulting business as division of a Sullair compressor distributor. Consulting was for compressed air systems in medium to large industrial facilities. Planned and conducted compressed air audits at various chemical plants, an aluminum rolling mill, automotive parts manufacturers, etc.

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## **Tube-Ice Division, Henry Vogt Machine Company – Chief Engineer**

Managed the engineering department for a major manufacturer of commercial and industrial ice machines, industrial chillers, thermal storage systems, and turnkey refrigeration systems for industrial customers, including inlet air cooling systems for combustion turbines. Personally designed, and managed others designing ASME pressure vessels and piping systems. Managed projects and participated in plant startups.

## **Bassett Mechanical – Project Manager**

Designed industrial refrigeration systems and managed their installation and startup. Managed projects at dairies, cheese plants, meat processing plants, and various industrial facilities.

## **Aqua-Chem Inc.**

### **Manager, Application Engineering, Desalting Systems**

- Responsible for design, start-up, and troubleshooting of large land-based desalination plants. Supervised development of proposals for new projects. Managed update of design software used in plant design. Worked on many proposals during this short time period, but no projects had progressed to the start-up stage. Supported troubleshooting of land-based desalination plant in Aruba and Kharg Island. Assisted in development of portable ROWPU reverse osmosis desalination plant for US Army.

### **R&D Engineer**

- Planned and executed pilot plant tests in-house and at customer chemical and pulp and paper facilities. Designed and operated various evaporator types including horizontal tube falling-film, vertical tube rising-film, and vertical tube falling-film. Designed and worked with steam systems, compressor systems, and pumping systems, including for non-Newtonian fluids.

## **SPEAKING ENGAGEMENTS**

- Speaker at 2011 conference of the European Industrial Gas Association (EIGA), on Considerations for Siting of Occupied Buildings in or Near Industrial Gas Facilities
- Speaker for multiple seminars for local ASHRAE Chapters – Refrigerant Piping Design
- Co-instructor, Thermal Energy Storage Course – UW Madison Engineering Extension
- Co-instructor, HVAC&R Piping Design Course – UW Madison Engineering Extension
- Co-instructor, Heat Exchanger Course – UW Madison Engineering Extension
- Co-instructor, Introduction to Ammonia Refrigeration Course – UW Madison Engineering Extension

## **PATENTS**

Mr. Timm is a co-inventor on the following United States patents:

8,447,175 – Energy Delivery System for a Gas Transport Vessel Containing Low Vapor Pressure Gas

8,161,771 – Method and Apparatus for Separating Air

7,778,530 – Energy Delivery System for a Gas Transport Vessel Containing Low Vapor Pressure Gas

6,595,009 – Method for Providing Refrigeration Using Two Circuits with Differing Multicomponent Refrigerants

## **PUBLICATIONS**

Timm, M.L. (2021). *“Designing Industrial Refrigeration System for Full Vacuum-Considerations”*. IIAR Proceedings, [www.iiar.org](http://www.iiar.org)

Timm, M. L., & Haley, J. (2019). *Avoiding Brittle Fracture When Re-pressurizing Carbon Steel CO<sub>2</sub> Vessels That Have Lost Pressure*. IIAR Proceedings, [www.iiar.org](http://www.iiar.org)

Timm, M. L. (2018). *Application of Bow Tie Diagrams to Understanding Threats and Barriers in Industrial Refrigeration*. IIAR Proceedings, [www.iiar.org](http://www.iiar.org)

Vaughen, B. K., Timm, M. L., Connolley, D., & Cowley, C. (2017). *CCPS project 246: Second edition of the guidelines for siting and layout of facilities*. *Process Safety Progress*, 37(2), 311–321. <https://doi.org/10.1002/prs.11918>

Timm, M. L. (2014). *Modeling of Releases from Ammonia Refrigeration Pressure Relief Valves Using Dispersion Modeling Software*. IIAR Proceedings, [www.iiar.org](http://www.iiar.org)

# FORCON INTERNATIONAL

- Timm, M. L. (2013). *Case Study: Use of Dispersion Modeling Software in Ammonia Refrigeration Facility Design*. IIAR Proceedings, [www.iiar.org](http://www.iiar.org)
- Peters, G., Phakey, S., & Timm, M. L. (2013). *Safe Location of Occupied Buildings at Industrial Gas Plants*. EIGA Annual Meeting, 1–22
- Zhu, H., Sarigiannidis, C., Timm, M. L., & Brown, L. (2011). *Secure and safe ammonia*. *EuroAsia Semiconductor*, 33(2), 10–15
- Timm, M. L. (1999). *Ammonia Refrigeration in Sanitary and Aseptic Applications*. IIAR Proceedings, 259–299
- Timm, M. L. (1991). *An Improved Method for Calculating Refrigerant Line Pressure Drops*. ASHRAE Transactions, 97 Part 1, 10
- Timm, M. L. (1989). *Cool Storage for Industrial Applications*. *Proceedings of the Twelfth World Energy Engineering Congress*, 273–276
- Timm, M. L. (1986). *Economic and Technical Tradeoffs Between Open and Closed Cycle Vapor Compression Evaporators*. Eighth Annual Industrial Energy Technology Conference & Exhibition