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Welcome to the 73rd Conference on Glass Problems (GPC). This year’s program brings some fresh changes, while continuing to provide high-value technical content to the glass manufacturing industry. Last year, the Ohio State University ended its history of organizing the conference. The Glass Manufacturing Industry Council (GMIC), as the trade association representing the industry, stepped in to provide its resources and ensure the continuing success of the conference. Together with the GPC advisory board, GMIC invited Alfred University to co-organize the conference going forward. This combination of leadership from the glass industry's leading all-segment trade association and a leading US university in glass science, education, research, and outreach, provides a solid foundation for the future of this important conference.

We extend our gratitude to the GPC advisory board members, who have tirelessly worked this past year to assemble an impressive faculty and program. We are pleased to offer a diverse program covering topics in the areas of glass melting, furnace design, refractories, raw materials, energy efficiency, and many other topics material to the business of manufacturing glass products. For the first time, the conference has grown to offer split sessions to accommodate limited contributed papers, in addition to largely invited papers from experts, a historic precedence of this conference. We are also experiencing growth in the number of short courses offered and industry participation, as the attendance has continued to increase each year.

We recognize that the value of a good conference does not come from lectures and courses alone. The real value comes from providing a forum for the exchange of ideas, enabling networking, and expanding potential collaborations among the participants. While other glass shows offer exhibiting opportunities or delve into research topics, we believe the 73rd GPC offers the best balance of trade show and technical content of any North American conference. Our tabletop exhibition has grown considerably. In addition, we continue to offer over 11 hours of hospitality suite networking time. We appreciate the participation of the industry’s leading solutions providers in these events. Also new this year, we have moved to a venue that permits all events to take place in one location, enhancing the networking opportunities.

The 73rd GPC is a historic, yet dynamic and exciting conference, taking place in a vibrant American city, representing a vigorous and resilient glass industry. The conference provides knowledge and tools you can use throughout the year, serving as an indispensable resource to the glass manufacturing industry. We believe you will find The 73rd GPC a valuable and rewarding experience.
WHO IS GMIC
The Glass Manufacturing Industry Council (GMIC) is a trade association of the Glass Industry that includes among its members, representatives of all four sectors: Container, Fiber, Flat, and Specialty glass companies as well as leading suppliers to the industry, research institutes and industry experts. Our goal is to promote the interests and growth and sustainability of the glass industry. Our development represents a milestone of projects, workshops and education that our members have found beneficial. While technology is our primary focal point we have long recognized that the needs of the industry and opportunities to promote its interests will take us in a number of complimentary directions.

The GMIC has a long-standing history of facilitating, organizing and promoting the interests of the glass industry. Our consolidation of the benefits of the projects that have been developed since our formation in 1998 has brought significant advantages to the industry. As we work to serve the global interests and strategies of glass manufacturers everywhere, we seek to increase the importance, value and strength of glass as a vital part of society around the globe.

GMIC LEADERSHIP AND STAFF
Executive Committee: Bruno Purnode, Owens Corning, Immediate Past President; Madonna Cornelissen, Corning Incorporated, President; Steve Badger, Pittsburg Corning, Vice President; and Robert Weisenburger Lipetz, Secretary.

Board of Trustees: Keith Bagarus, RoviSys, Inc; Kenneth Bratton, Emhart Glass; Patrick Gehl, World Kitchen, LLC; Terry Hartman, Libbey, Inc.; Robert Hofman, Roman Manufacturing; Aaron Huber, Johns Manville; Susan Jones, Anheuser-Busch InBev; Brian Naveken, Toledo Engineering Co., Inc.; Mohan Rajaram, Evanite Fiber Corporation; Andrew Richardson, Linde; David Rue, Gas Technology Institute; Wladimir Sarmiento-Darkin, Praxair, Inc.; Steven B. Smith, Verallia/Saint-Gobain Containers; Rajiv Tiwary, PPG Industries; and Steven Weiser, O-I, Inc.

GMIC Staff: Robert Weisenburger Lipetz, GMIC Executive Director and Donna M. Banks GMIC Executive Assistant

CONTACT GMIC
Our offices are located at 600 N. Cleveland, Suite 210, Westerville, Ohio 43082
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GMIC MISSION
Facilitate, organize and promote the interests economic growth and sustainability of the glass industry through education and cooperation in the areas of technology, productivity and the environment.

ALFRED UNIVERSITY
The Kazuo Inamori School of Engineering at Alfred University (AU) is a leader in glass and ceramics education. Established in 1900 as the New York State School of Clayworking, the School has a long-standing history of providing industry

SCHEDULE AT A GLANCE

**Monday, October 1, 2012**
- 8 a.m. to 5 p.m.: Short Courses
- 4 to 5 p.m.: GMIC Member Meeting
- 5 to 11 p.m.: Advisory Board Meeting
- 6 to 7:30 p.m.: Advisory Board Dinner

**Tuesday, October 2, 2012 (cont'd)**
- 4 p.m. to 5:30 p.m.: Exhibiting
- 6 p.m. to 11 p.m.: Hospitality Suites

**Wednesday, October 3, 2012**
- 8 to 9 a.m.: Exhibiting
- 9 a.m. to 10 a.m.: Plenary Session–Refractories
- 10 to 10:30 a.m.: Exhibiting
- 10:30 to 12 p.m.: Plenary Session–Refractories
- 12 to 1:30 p.m.: Lunch & Exhibiting
- 1:30 to 4 p.m.: Plenary Session–Process Control and Modeling
Today, the School offers BS and MS degrees in five disciplines: Biomaterials Engineering, Ceramic Engineering, Glass Engineering Science general Materials Science and Engineering, and Mechanical Engineering as well as doctoral degrees in the materials disciplines.

The School also serves industry by advancing the forefront of ceramics and glass research. In addition to maintaining an active portfolio of federally funded research, the faculty routinely collaborate with industry on projects ranging from fundamental research through product/process development. Interactions with industry are conducted through the Center for Advanced Ceramic Technology (CACT) and the Center for High Temperature Characterization (CHTC). The CACT facilitates collaboration between industry and academia with the goal of creating economic impact for the CACT’s industrial partners. The CHCT is a user facility that provides research unparalleled access to equipment designed for characterizing materials in situ at high temperatures.

More information about the Kazuo Inamori School of Engineering: http://engineering.alfred.edu

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Alfred University
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PROGRAM SCHEDULE
Monday, October 1, 2012
8 to 11 a.m. - Rue Reolon
Design of Experiments Simplified Short Course
12 to 4 p.m. - Rue Reolon
Fundamentals of Batch & Furnace Operation Short Course
1 to 5 p.m. - Julep
Finishing Processes & Oxidation-Reduction Reactions in Glass Melts Short Course
4 to 5 p.m. - Rue Reolon
GMIC Member Meeting
5 to 6 p.m. - Rue Reolon
Advisory Board Meeting
5 to 11 p.m. - Rookwood/Hall of Nations
Hospitality Suites
6 to 7:30 p.m. - Offsite
Advisory Board Dinner

Tuesday, October 2, 2012
8 to 9 a.m. - Pavilion/Caprice
Exhibiting
9 to 12 p.m. - Hall of Mirrors
Plenary Session–Glass Melting, Session Chairs: Glenn Neff, Glass Service and Martin Goller, Corning Incorporated
9 to 9:30 a.m.
Hans van Limpt, CelSian Glass and Solar B.V., The Netherlands, Energy Recovery from Waste Heat in the Glass Industry and Thermo Chemical Recuperator
9:30 to 10 a.m.
Monny Sklov, Chief Executive Officer, Aegina GlassWorks, Melting and Manufacturing Glass Using Microwave Energy
10 to 10:30 a.m. - Pavilion/Caprice
Exhibiting
10:30 to 11 a.m.
William M. Carty, CSL Materials, LLC, Controlling the Raw Material Reaction Paths During Melting of Commercial Glass Compositions
11 to 11:30 a.m.
Takayuki Fujimoto, Deputy Manager, Taiyo Nippon Sanso Corporation, Development of DFC (Direct Fusion Combustion) using Day-Fuel Burner
11:30 a.m. to 12 p.m.
Oleg A. Prokhorenko, Chief Scientist and Director, L. G. P. International, LLC, Search for New High-Performance Glasses
12 to 1:30 p.m. - Pavilion/Caprice
Lunch & Exhibiting

Published by The American Ceramic Society and Wiley, and shipped to you mid 2013.
Tuesday, October 2, 2012 (cont’d)
Split Session
1:30 to 4 p.m. - Hall of Mirrors
Melting, Raw Materials, Batch Reactions, and Recycling, Session Chairs: Phil Tucker, Johns Manville
1:30 to 2 p.m.
Igor Piro, Director of Graduate Program, Professor, Faculty of Energy Systems and Nuclear Science University of Ontario Institute of Technology, Advanced Melting Technologies with Submerged Combustion
2 to 2:30 p.m.
Peter Wray, Director of Communications, The American Ceramic Society, Critical and Strategic Materials: An Update and Survey of Developments in Last Biennium
2:30 to 3 p.m.
Andrew Zamurs, Development Specialist, Rio Tinto Minerals, The Influence of Borate Raw Material Choice on the Glass Manufacturing Process
3 to 3:30 p.m.
Lazaro Alejandro Lopez Ramirez, Senior Principal Industry Engineer-Glass Segment, Cryoinfra, S.A. de C.V., A Review of Oxygen Application Technologies for Melting Glass
3:30 to 4 p.m.
David Boothe, President, Allstates Refractory Contractors, LLC (also representing Bock Energietechnik, Germany), Electrical Heating Systems for Melting Tanks, Forhearths and Feeders

Split Session
1:30 to 4 p.m. - Continental Ballroom
Coatings, Strengthening, and Other Topics, Session Chairs: Jack Miles, H.C. Stark and Martin Goller, Corning Inc.
1:30 to 2 p.m.
David Haskins, Research Associate PPG Industries, Inc., Color Control of Glass and Multi-Layer Sputtered Coatings on Glass
2 to 2:30 p.m.
H. P. H. Mulienberg, Vice President, Glass Service Inc., A Furnace Combustion System Conversion During Operation Shows How Flame Geometry Improvement and Excess Air Control Contributes to Fuel Savings
2:30 to 3 p.m.
Steven Brown, Principal Mechanical Engineer, Emhart Glass Manufacturing, Inc., Hard Glass: Thermal Strengthening of Container Glass
3 to 3:30 p.m.
Charles J. Cocagne, Recent Additions, Inc., Effects of Glass Coatings On the Glass Tempering Process
3:30 to 4 p.m.
Robert Weisenburger Lipetz, Executive Director, GMIC, The Usable Glass Strength Coalition Initiative to Provide Industry Funding for Fundamental Research in Glass Strength
4 p.m. to 5:30 p.m. - Pavilion/Caprice
Exhibiting
6 p.m. to 11 p.m. - Rookwood/Hall of Nations
Hospitality Suites

Wednesday, October 3, 2012
8 to 9 a.m. - Pavilion/Caprice
Exhibiting
9 a.m. to 10 a.m. - Hall of Mirrors
Plenary Session–Refractories, Session Chairs: Matthew Wheeler, RHI US LTD and Thomas Dankert, O-I
9 a.m. 9:30 a.m.
Amul Gupta, Research and Development Manager, Fused Cast Products, RHI Monofrax, Performance of Fusion-cast and Bonded Refractories in Glass Contact Application
9:30 to 10 a.m.
Matthias Lindig, Research and Development Manager, Nikolaus Sorg GmbH & Co. KG, Energy Savings and Furnace Design
10 a.m. to 10:30 a.m. - Pavilion/Caprice
Exhibiting
10:30 to 12 p.m. - Hall of Mirrors
Plenary Session–Refractories, Session Chairs: Warren Curtis, PPG Industries and Elmer Sperry, Libby
10:30 to 11 a.m.
Julien P. Fourcade, Saint-Gobain NWDRD, New Tin Oxide Electrodes for Glass Melting
11 a.m. to 11:30 a.m.
Yusuf Bayram, Chief Executive Officer, PaneraTech, Inc., Structural Health Monitoring of Furnace Walls
11:30 a.m. to 12 p.m.
Cyril Linnut, Development Manager, Saint-Gobain SEFFPRO, New Cast-In-Place SEFFPRO Refractory Solution to Extend Soda lime Glass Furnace Life
12 to 1:30 p.m. - Pavilion/Caprice
Lunch & Exhibiting
1:30 to 4 p.m. - Hall of Mirrors
Plenary Session–Process Control and Modeling, Session Chairs: Bruno Purnode and Larry McCloskey
1:30 to 2 p.m.
Byron L. Bemle, Senior Research Associate, Owens Corning Science and Technology, Three Dimensional Non-isothermal Pendant Drops of Molten Glass, Part I

NOTES
Wednesday, October 3, 2012 (cont’d)

2 to 2:30 p.m.

H.P.J. Muijsenberg, Vice President, Glass Service, Modeling of the Glass Melting Processes An International Commission on Glass Presentation on How Reliable and Validated Simulation Tools Can Help to Improve the Glass Melting Efficiency and Productivity

2:30 to 3 p.m.


3 to 3:30 p.m.

Sarath Tennakoon, Principal Engineer, Emhart Glass Manufacturing Inc., Novel Method for Stress Inspection of Tempered or Thermally Strengthened Glass

3:30 to 4 p.m.

Manoj Choudhary, Vice President, International Commission on Glass, Owens-Corning Science & Technology, The International Commission on Glass (ICG)

ONLINE CONFERENCE EVALUATION

Help us improve the Conference on Glass Problems by filling out our evaluation at:

www.surveymonkey.com/s/27QV/LJW.

We are continually striving to improve the quality of the conference. Your feedback from the online evaluation will be carefully considered by the GPC advisory board in designing future conferences.

Thank you for taking the time to provide your opinions on the conference.

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Emhart Glass is the world’s leading international supplier of equipment, controls and parts to glass container industry. With broad-based expertise in glass container forming, glass conditioning, gob forming, ware handling, cold end inspection, refractory parts and quality assurance, the company’s machines and systems are established as standard products worldwide. Emhart Glass also provides installation, training, production assistance, and maintenance related services.

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RHI AG is the world market and technology leader in high-grade ceramic refractory materials. A global leader with Austrian roots, RHI employs roughly 8,000 people worldwide at 33 production sites in Europe, North America, Latin America, South Africa and China and is represented by over 70 sales offices in four continents. RHI is the only global refractories supplier to offer products for all age groups of the basic industry. The RHI umbrella brand combines a series of traditional brands that have been established in the market for many years, including Didier, Vetitscher, Rades, Dolomit Franchi, Interstop and Mono-frax.

RoMan Manufacturing, Inc.
Booth: E18
861 47th St. S.W., Grand Rapids, MI 49509
Phone: +1-616-530-8641
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SavSys

Booth: H9-10
1455 Danner Dr., Aurora, OH 44022
Phone: +1-330-995-8103
glass@rovisys.com | www.rovisys.com/glass

SavSys is an engineering services company that specializes in process control and information automation. Our Glass division has incorporated state of the art systems around the world for all major glass manufacturers. As an independent company, we work with you to design and develop the best solution to meet your needs.
Conference on Glass Problems
October 1–3, 2012 • Hilton Cincinnati Netherland Plaza • Cincinnati, Oh

PLANSEE USA
Booth: E2
115 Constitution Blvd., Franklin, MA 02038
Phone: +1-508-553-3800
maggie.boyd@plansee.com | www.plansee.com

PLANSEE will be present at the Glass Problems Conference to discuss the features of their products. Whether its molybdenum glass melting electrodes, tank reinforcements or stirring and gobbing equipment, PLANSEE’s leading edge technologies and high performance materials provide for an efficient glass melting process. For decades PLANSEE has significantly contributed to making glass production more effective and environmentally friendly. As the largest fully integrated partner worldwide for the glass industry, PLANSEE provides its customers with technically advanced designs manufactured from our high performance materials resulting in excellent corrosion resistances, coarse grain structure, and highest purity.

Poco Graphite
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larry_whitburn@entergris.com | www.poco.com

Poco Graphite’s precision ware handling solutions and unique GLASSMATE® graphite materials can improve performance in container glass production, reduce machine downtime and increase yields. POCO is known for its designs, particularly precision holders and inserts that allow fast accurate machine setup and insert replacement. Inserts are available as semi-flushed blanks, or can be precision machined to a specific finish. POCO also offers graphite dead plate assemblies, lehr bars, sweep-out assemblies, and custom components. Application specialists can assist in the selection of the optimum graphite grade based on pickup, application, and length of the production run.

Praxair, Inc.
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39 Old Ridgebury Rd., Danbury, CT 06810
Phone: +1-800-PRAXAIR
info@praxair.com | www.praxair.com

Praxair is a leader in innovative oxyfuel technologies for the glass industry. With over 70 years of oxyfuel combustion experience in the glass industry and over 200 oxyfuel projects completed worldwide, our technologies can deliver substantial fuel savings, increased productivity and product quality, reduced NOx emissions and alkali volatilization, and prolonged furnace campaign. Praxair is a Fortune 300 company. We also supply atmospheric, process and specialty gases, high performance coatings, and related services and technologies. Among the gases we supply are oxygen, nitrogen, argon, carbon dioxide, helium, and hydrogen.

Prodim USA
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Phone: +1-888-229-3328
john@prodimusa.com | www.prodimusa.com

Prodim USA is the manufacturer of The Prolinier. Prolinier is a 2D and 3D Digital Measuring System. They are the fastest and easiest way for getting accurate dimensions on site, as well as digitizing existing shapes and objects. Each system includes among its members, representatives of all four sectors: Flat, Container, Fiber and Specialty glass companies, as well as leading suppliers to the industry, research institutes and industry experts. Our goal is to promote the interests and growth of the glass industry.

H.C. Starck, Inc.
Booth: E15
45 Industrial Place, Newton, MA 02461 USA
Phone: +1-617-630-5800
info@hctstarck.com | www.hctstarck.com

H.C. Starck’s innovative research, engineering development, manufacturing execution, and diverse product portfolio make it a leading manufacturer for the glass melting industry. H.C. Starck is one of the world’s largest suppliers of the refractory metals: molybdenum, tungsten, tantalum, and niobium. Large diameter molybdenum tubing suitable for quartz melting vessels and orifice plates are extruded at its premier extrusion and forging facility. Fabricated products from molybdenum and tungsten include: glass melting electrodes, crucibles, extruded tubes, and other components. H.C. Starck’s molybdenum, with its exceptional purity level (99.95% minimum), has outstanding resistance to chemical corrosion, degradation, and minimal detrimental glass discoloring.

Henry F. Teichmann, Inc.
Booth: Salon C
3009 Washington Rd., McMurray, PA 15317
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Henry F. Teichmann, Inc. is a world leading Glass Process Engineering Contractor dedicated solely to the glass industry. For 63 years, we have been providing turnkey projects that include engineering, procurement, technical service, construction and project management for clients worldwide. Those projects consist of complete float, fiberglass and container plants. Teichmann also provides those turnkey services for specialty plants such as sodium silicate, borosilicate tubing, television, tableware and lighting products. In addition to successfully converting TV glass furnaces and fiberglass furnaces to oxy-fuel firing, HFT has worked with PPG in converting two PPG float furnaces into oxy-fuel firing. Henry F. Teichmann, Inc. has teamed up with PPG to provide solutions and up-to-date float technologies, including oxy-fuel technology to the glass industry worldwide.
discuss several offerings including Wonderware System both management and operators information indicating enables the glass industry to transfer productivity dataing process for both management and operators. Invensys information. This delay seriously impacts the decision making appropriate to the production process, whereas Manage solutions. Process control systems operate in a timescale industry, in addition to highly advanced process control.

zywana.johnson@invensys.com | www.eurotherm.com
Booth: E11

Lilja Corp.
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North American Refractories
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North American Refractories Company engineers, manu- factures and supplies a full-line of refractories to support the most demanding glass making applications. NARCO’s experienced Installation Group provides the Glass Industry with high quality hot and cold repair service as well as hot sealing of new furnaces. Our Glass Support Team is located in Pittsburgh, PA and Cincinnati, OH with Sales Representatives that cover the United States, Latin America, South America, Europe and Asia. Our Glass Sup- port Team works closely with each customer to ensure the best possible refractory solutions are met. We have 17 plant locations in the United States, 1 in the United King- dom, 1 in Mexico, 1 in China, and 1 in Indonesia.

Motim Fused Cast Refractories Ltd.
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fusedcast@motim.hu | www.motim.hu
Motim Fused Cast Refractories Ltd.is recognized as a world leader producing fused cast AZS and alumina refractories, refractory castables. Our products are used in the glass manufacturing furnaces. More than 95% of our turnover is from export sales. Our traditional markets are Western and Central Europe, and we are present with our products on all continents of the World. Represented in the USA by Argent Enterprises Inc., +1-724-499-5800 or aine@ windstream.net.

The SORG Group through their member companies can supply turnkey installations from raw material delivery through the glass gob globally. This includes all aspects of the furnace lifetime cycle. From sustainable designs, construction, services, repairs, through demolition at the end of the campaign. SORG through EME, Nikolaus Sorg GmbH & Co. KG, and SKS delivers Made In Germany solu- tions to all sectors of the glass industry globally. Our latest products include the BATCH3 system comprising often the IRO® Doghouse, EME-NEND® charger and the proven Sorg® Batch Preheating system.

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