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July 25-28, 2022

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Oval Gloveport Failure Evaluation and Design of a True Locking Ring

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President's Message

By: Justin Dexter

Well, here we are again, another tough year with COVID-19 and another year without face-to-face contact with the American Glovebox Society members. I can't wait for our conference this July in Nashville, when we can finally meet face-to-face. I hope all of you can make it. We have a great conference planned in Nashville with unique speakers, exhibitors, and events. Before I talk about July, I first want to thank Gary Partington, our Past President, who served as President for the last two years. He was the first consecutive two term President since our inception. He pushed all of us on the board of directors during the pandemic to remain focused to help keep the society relevant, including our webinars and our virtual conference. Also, none of this would have happened without the support from the AGS headquarters in Santa Rosa, California.

In July, the AGS is going to continue to offer the 4-hour topic-specific class on Thursday, the day after the conference. This year's topic will piggyback on the Nondestructive Examination training from the last in-person conference. This is a very important topic within our industry. In this class, you'll learn about the various NDE methods used today and the basic principles of each method. I hope to see you all there as we continue to learn and grow our knowledge base. This topic will change in the coming years, and as a reminder, the AGS is open to suggestions for this training course.

Our Lessons Learned Committee will be providing an update to the society regarding events that have occurred at our DOE sites that have been shared on OPEXShare. For those of you who haven't visited the website in a while, the new link is https://doeopexshare.doe.gov/. We will also continue to focus on Knowledge Capture and Knowledge Transfer from our colleagues who might have only a few years left until retirement, to the younger generations who are just beginning their careers in the glovebox industry. We will discuss the new ideas and challenges that our society has in front of us.

I can't believe the AGS turned 36 years old this year. I was reflecting on my history with the AGS, and I will share some history, memories and stories at this year's conference during my address. I think it is always important to remember where we came from and what others were thinking at that particular time, to insure we capture the knowledge and the experience of our incredible past members. I started designing gloveboxes in 1995, and my first conference was in Denver in 1997. I joined the Standards Development Committee in 2000, and the Board of Directors in 2011. I want to share how proud I am to be a part of this society and how lucky I am to have worked with the best in the business. I learned so much from the 'old guard', and I miss my old friends who have retired. The best part is knowing that when I give them a call, they always answer or respond quickly. Always remember that we are a family, and the relationships you make within the AGS last a lifetime!

I look forward to seeing everyone in Nashville! We have a lot planned, with new projects to discuss, new information to learn, and new friends to meet and share our knowledge with.

It's an honor to be your President.
See you soon.
Justin Dexter ❖

The Enclosure

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Oval Gloveport Failure Evaluation and Design of a True Locking Ring

By: Thalia Natzic, Lloyd Vigil, José Rodriguez, Rick Hinckley and Stacey Talachy, LANL

Introduction

The Los Alamos National Laboratory (LANL) Glovebox Cognizant System Engineers were put to work to identify the cause and a solution to two uncommon glovebox glove breaches, which halted mission critical operations. With help from the vendor of the oval gloveport assemblies, LANL engineers were able to evaluate the breaches and identify design changes essential to preventing similar future failures. This article discusses each event, the design changes tested, and presents the findings for each new design.

Oval Gloveport Failures

In July 2020 and September 2020, an oval gloveport support ring and glove detached into a glovebox during routine glovebox operations involving the same operator. It is important to note that the two events were rare occurrences that have not happened before at any LANL facility. All previous glove failures involve a glove, the most vulnerable part associated with a glovebox, breaching due to mechanical failures (cuts, pinches, or tears) from glovebox operations or tools used around the gloves.

First Breach

The first event occurred when the operator was entering an oval push-through gloveport, heard a pop, and felt the support ring from the glove fall and rest upon their upper arm. The glovebox operator remained calm and responded appropriately by limiting movement, keeping their arm in the glovebox, keeping their face away from the gloveport, immediately alerting others to exit the room, and notifying radiological control technicians (RCTs).

Multiple RCTs responded in a timely fashion and found contamination only on the glovebox operator's anti-contamination coveralls. Nasal swipes performed on the glovebox operator after the event showed no sign of uptake.

The detached glove was a 30-mil, lead-lined chlorosulfonated polyethylene (CSM) glovebox glove installed with a support ring without a locking ring – the use of a support ring in conjunction with a 30-mil lead-lined glove and the omission of a locking ring was an acceptable installation according to the vendor's published guidance at the time.

Second Breach

The second event occurred while the same glovebox operator was performing housekeeping activities within the same glovebox as the July incident. The glovebox operator was reaching inside the glovebox making swift brushing motions when they felt the support ring and the glove combo detach slowly from the gloveport. The glove and support ring then fell onto the operator's upper arm inside the glovebox. Again, the operator kept their arm inside the glovebox, notified others of the breach, and waited for RCTs to respond. Contamination was found only on the operator's anti-contamination coveralls. Nasal swipes showed no sign of uptake.

The detached glove was a 20-mil Polyurethane/CSM glovebox glove installed with an oval gloveport support ring without a locking ring. Again, this was an approved configuration from the vendor at the time.

Lesson Learned

The gloveport assembly is comprised of the gloveport, which is attached to the glovebox shell, a glove, an O-ring, and a support ring that sandwiches the glove and O-ring between the support ring and gloveport. Following these two events, cold laboratory testing was performed in an attempt to replicate the failures with the same glovebox operator involved in both events. Testing determined that the oval shape of the port does not supply an equal and continuous amount of force between the gloveport and the glove support ring. The long axis arcs of the oval gloveport support ring do not compress the O-ring gasket and glove with as much force as the short axis arcs of the support ring. See forces shown in Figure 1. By entering the glove at an angle or applying a force laterally, the force on the glove transfers to the weaker edge (long axis arc) of the support ring, making it possible for one to detach/dislodge the support ring and glove from the gloveport with less force.

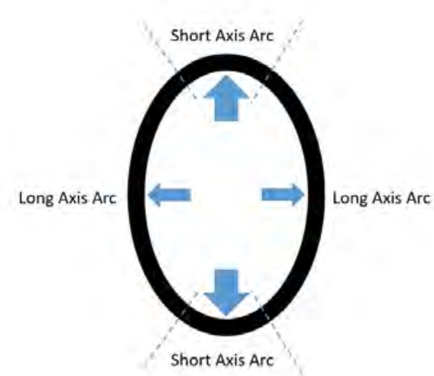

Figure1. Estimated forces oval support ring applies to gloveport on long and short axis arcs. Arrows signify difference in force per arc.

The glovebox operator confirmed that they enter the glovebox gloves at an angle and work inside the box at an angle at times, pushing the glove toward the center of their body rather than entering the glovebox gloves perpendicular to the gloveport. This technique preferentially loads the long axis arc of the support ring, which requires less force to dislodge the glove support ring. It was also noted that this operator is larger than the average operator (greater than 6' tall, arm length greater than 32",

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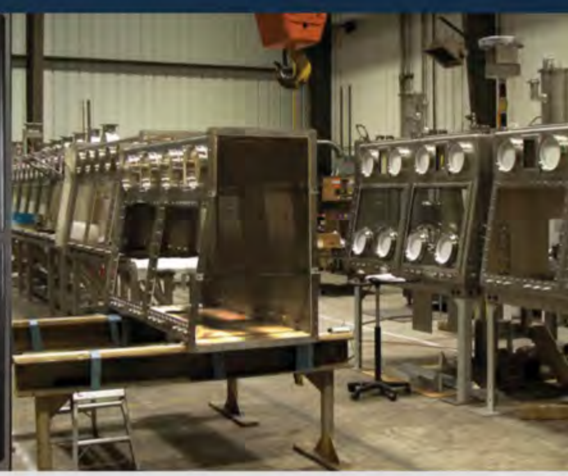

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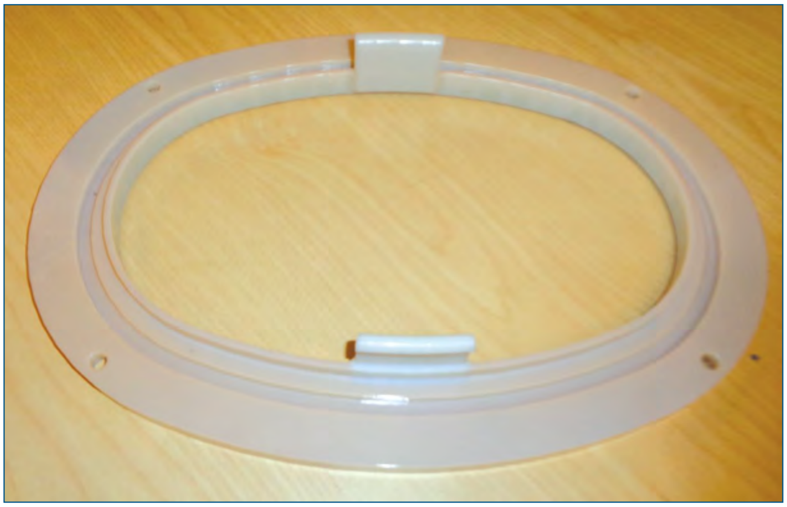
and larger hands that make the glovebox gloves fit very snug) making it much easier for them to dislodge the glove assembly from the gloveport. With this knowledge, it was understood that a modification to the assembly would need to be developed to prevent any future detachments.



The vendor provided results for push/pull tests which determined that it would require 700 pounds of force to detach the assembly directly into the glovebox [Ref. 1]. This testing only considered the force being supplied perpendicular to the face of the gloveport. Additional testing to consider the force in the lateral (or angled) direction are still in progress.

Additional considerations for the cause of the failures included the quality of the gloveport components and the configuration of the glove installation. Existing procurement documentation provided a reasonable assurance that each of the associated components were within specification and were not suspected to be the root cause of the breach. The remaining gloveports on the glovebox associated with the previous failures were visually inspected for installation errors; all appeared to be installed correctly.

New Oval Locking Ring

To address the design flaw of the oval gloveport, LANL Glovebox System Engineers worked with the vendor to test multiple locking ring designs that could prevent the failure from preferential loading of the long axes of the gloveports. The original locking ring is intended to protect the operator's arm from coming in contact with the gloveport. This design smooths the transition from the glovebox shell to the glove which makes the equipment more comfortable to work with.

The vendor allowed LANL to machine/3D print each new locking ring design to quickly test and provide feedback to them. Each design was tested by installing the locking ring in an oval gloveport assembly and monitoring the gloveport seals while operators mimicked the completion of normal operations inside the glove. Multiple operators ranging in arm length and hand size, including the operator involved in the two events, were involved in testing the designs. The normal operations testing resulted in successful results, which lead to rigorous or forcible testing. The operators were instructed to try to detach the glove by bunching up the glove in their fist somewhere in the forearm area of the glove and pressing as hard as they could into the glovebox.

A total of three design iterations occurred for the locking ring. All three designs were determined to be successful in securing the glove to the gloveport. Below are the descriptions of each design and results from testing.

Side Catch Design

The first design, shown in Figure 2, includes the addition of side catches to the long axis of the locking ring. This design allows the locking ring to grab onto the support ring to hold it into place. This prevents the deformation that leads to the support ring being dislodged when the assembly is loaded in an off-axis manner.

Figure 2. Locking ring with side catch design.

It was determined that the side catch design would not fail with regular-to-strenuous glove operations. One design flaw for this locking ring is the potential for the side catches to break off. During testing, it was noted that one prototype had been dropped which caused the side catch to break free from the locking ring. Additionally, during installation and removal of the locking ring, the side catches are stressed around the support ring, which did caused another prototype to have a side catch break off. This design also suffered from manufacturability issues since it would require a large billet of material if it were to be machined out of a solid piece of plastic with a large portion of that billet just being machined away.

Set Screw Design

The second design included the use of set screws to add additional compression along both axes. Three set screws were added to each of the long axes and one to each of the short axes to result in a more uniform distribution of compression throughout the gloveport assembly. The locations of the set screws are shown in Figure 3.

Figure 3. Locking ring with set screw design.

Testing showed that the design could hold the glove and support ring in place during regular-to-strenuous activities. Although this design works to hold the glove in place, it was noted by operators that the addition of the eight small set screws increases the amount of time, complexity, and equipment that is required for glove changes.

Wedge Design

The final design includes a tapered edge or wedged design that does not require any major design change. The surface of the locking ring that meets the glove support ring was tapered to provide a continuous force from the locking ring to the support ring to the gloveport. The design change from the original to the wedged design is noted in Figure 4.

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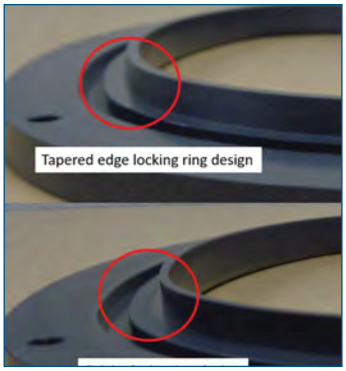

Figure 4. Comparison of original locking ring design to new wedge locking ring design.

This design was determined to not fail during regular-to-strenuous glove movements without dislodging the glove and support ring. When comparing each locking ring design, the wedge design proves to be the easiest to install due to the lack of additional components required.

All iterations supplied the necessary force along the long axes of the gloveport to prevent similar failures. Currently all existing oval gloveports in the LANL facility are fitted with the wedge design locking rings to ensure gloves are secure. The vendor has replaced the original locking ring design with the wedge design locking ring. This is the only locking ring available by the vendor for oval gloveport assemblies.

Why Oval Gloveports are needed in GB design

Great concern arose after the two events occurred, resulting in an effort to remove oval gloveports from future glovebox designs. After testing and design modifications, glovebox engineers find that oval gloveports are acceptable for inclusion in glovebox designs and could be utilized for ergonomic benefits. Oval push-through gloveports have been used as an ergonomic alternative to the traditional 8-inch round gloveports. The oval gloveport provides a greater range of motion and has the potential to fit operators of different statures.

Oval ports are regularly used in glovebox designs at other DOE sites and in the pharmaceutical industry mainly because of the improved comfort that they provide while performing work tasks, thus reducing strain on the upper extremities. In 2018, the LANL ergonomics team conducted a study on worker preference and testing range of motion in oval gloveports. The study compared standard 8-inch round gloveports against vertical oval gloveports and 45 degree offset oval ports. Worker preference demonstrated: 62% - preferred vertical oval, 20% - off-set oval, 18% - 8 inch round. Additionally, the vertical oval ports increased vertical movement in a lift and lower of a canister. The use of oval gloveports in glovebox design, especially when work involves vertical reaching tasks, will mitigate stress on the upper extremity while improving comfort, [Ref. 2].

To reiterate, these events were the first incidents to occur for oval gloveports and involved a single individual with greater than average hand size and arm strength. With the addition of the new locking ring this individual is unable to breach the gloveport, even when forcibly trying to breach the glove. With the inclusion of the wedged locking ring, existing and future oval gloveports now provide a safer means for glovebox operations.

Reference:

1. Balow, A., 2020, “Oval Support Ring and Plug Pull and Push Test”. Central Laboratories Report No. CRLD-731.1, Red Wing, MN.
2. Preddie, A. “Glovebox Workers’ Range of Motion in Three Gloveports.” LA-UR-18-25701, 2018 LANL Annual Student Symposium, Los Alamos, NM, July, 18, 2018. ❖


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Performance Qualification of a Glove Integrity Test System: How is it properly performed?

In order to know if your Glove Integrity Testing System (GITS) is properly detecting holes in your gloves, you need to determine a hole size that is appropriate to detect within your specification requirements. However, once you select your detectable hole size, you need to validate your GITS system can actually detect that hole size. This brings to question, how do I put that exact size hole into my glove to scientifically test it?

Some have used laser drilled holes, others take a needle the size of the hole you want to detect and puncture a hole in the glove, or put a needle with an ID similar to the detectable hole size and leave it in the glove during the measurement. None of these are actually accurate in proving that a known hole size is represented in the glove at the measurement pressure. Recall a glove is a flexible polymer, thus as it is inflated it will expand, so a 150µm laser drilled hole will actually be larger depending on the measurement pressure. A hole punctured with a 150µm OD needle, will self-seal when the needle is removed until inflated to a high enough pressure which will reopen the hole, and then there is no way to validate the hole size detected. A 150µm ID needle will only represent a 150µm hole in the glove if the length of the needle is the same dimension as the thickness of the glove.

The best way to guarantee the measurement of holes down to a specific hole size is to use a physical law like Hagen-Poiseuille, which determines pressure loss in relation to hole properties, viscosity, volume, and time, to determine the proper needle ID and length to represent a required detectable hole in the specific thickness of glove being used. With the proper needle left in the glove, the exact measured hole size is known at any measurement pressure. MK, the experts in glove integrity testing use scientifically proven method to determine the correct needle size which emulates the required detectable hole size in your determined glove of choice. All MK Custom Glove Test Parameters are developed using proven scientific method, so you can be comfortable with your MK GITS scientifically undisputable results if ever questioned by a regulator. Ensure your comfort in your results by calling the experts at MK MetalFree Corp. to Performance Qualify your MK glove testing system.

Thoughts from Newman

By: John T. Newman, P.E.

How Can a Project Be Successful?

A little while back, I was in one of our board of director's conference calls, and out of the blue someone asked "What does it take to make a project successful?" I'm not sure why they asked, and there was no discussion about it, but it got me thinking. I have always been a design guy, but there was a time, many years ago in my career, when I actually did have the title of Project Manager. Project management, in my opinion, is a "thankless" position where you have all the responsibility, but absolutely no control. The older you get, you begin to realize that control is actually only an illusion. The old saying "sh*t happens" very accurately describes the phenomenon of how the best laid plans can veer out of control.

> A good understanding of the project requirements is crucial to the success of the project.

I should clarify that the majority of my project perspective has been from the custom equipment vendor side of the project. This makes me a little, well, actually a lot one sided, but it's a side that can have a profound effect on the relative success of a project.

There is a whole science devoted to the profession of project management, and the people who do this for a living have many tools that they use to manage projects, such as; project plans, budgets, and schedules. All of this is good stuff and does help to keep a project on track. That is, if you actually use it.

But first, let's back up and think a little about what it means for a project to be successful. Most people would say a project is successful if it is completed on schedule and within the established budget. That's usually what makes the stakeholders happy, and if they are happy, then the rest of us will be happy. At least the poor tables won't get beat as much. But there is a lot more to it. Does the machine actually work like it was intended and is the end-user happy with it? Does it "look nice"? Looking good/professional is surprisingly important to the success of a project. Was anybody killed in the process? Did the project cause any vendors to go out of business? Did they make a profit? Vendor's kind of need that to survive and to be able to complete future projects. Does anybody care at the end of the day? It doesn't always seem so. Sorry, I'll stop being so cynical, that's not really the topic of discussion here.

So, let's add to our successful project definition, and say that along with being in budget/schedule conformity, the machine/product must "look good" and function satisfactorily for the end-user, no one was killed or severely mentally damaged in the process, and everyone involved made a reasonable profit. There are many other factors involved, but basically that sounds pretty good to me.

As I said, I'm a design guy, not a project manager, but the design process does require a certain amount of project managing skills to get through the day. Although I have also been discreetly told by management, "John, please don't talk about schedule or money." Being the creative guy, I do know that would probably be a good thing.

Over the years, I have had the opportunity to participate in what is now piling up to be a lot of projects. Most of them went well and could be considered successful, but there were a few of them that went really, really bad. Fortunately, because of the brain's sanity protective features, the bad ones tend to fade from memory fairly quickly, but the pain effects stick with you, and become reactive (i.e., red hot burner, don't touch).

Several things bubble up to the top of my thoughts that I think can increase the successfulness of a project. These are upfront understanding of project requirements, time allowed for the project, a realistic estimate /schedule, preparation for the unknown, accepting the fact that things will go wrong, a good temperament, and good communication.

A good understanding of the project requirements is crucial to the success of the project. This is important from the very beginning. If I were to compare, the project that starts with a well-defined "written" requirements specification will always run smoother than a project with poorly defined requirements. I've done many projects where the customer didn't know what they wanted.

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And that's ok, as many people don't know the intimate details of how a containment system works. That's my job, to help my customer understand and get the containment part of it right. But the requirements and expectations for the project need to be defined as accurately and thoroughly as possible up front before the project starts. Some of the worst disaster projects I've been on started with poorly defined project requirements. When you start with, little more than a sketch on a back of an envelope, you can't expect a project to go very smoothly, and in the end the customer's most likely going to say "That's not at all what I wanted."

Plan enough time to make a project successful. Nobody likes project schedules and deadlines, but let's face it, if we didn't have deadlines, we would never get anything done. And then you also have to keep Parkinson's Law in the back of you mind, "the amount of work expands to fill the time available for its completion," which means that if you allow yourself a week to complete a two-hour task, then (psychologically speaking) the task will increase in complexity and become more daunting so as to fill up the week. But by planning realistically, and allowing enough time to complete the project and accounting for some "go wrong time," it can greatly improve the success of the project.

Engineers can be notorious for using all the time for a project, and there can be benefits from that. Better upfront engineering and a complete and detailed design can have a huge impact on the manufacturability of a piece of equipment. But there comes a time in every project when you have to shoot the engineer and begin production. Sufficient time has to be allowed for the manufacturing part of the project. When engineering has used all the upfront time, you are only kidding yourself if you think the fabrication will go unusually quick without any issues.

The unknown is probably one of the biggest contributors to causing a project to go badly. If you don't know, how can you plan for it? Predicting the future can be a valuable asset when planning a project, but unfortunately most of us do not have that particular skill set. How boring life would be if we could actually do that. It's the thrill of uncertainty that makes life fun, but that uncertainty is not so good for project management. The greatest thing that experience teaches us is that you learn to recognize when to be scared and when to proceed with caution. Just the fact that you know "that you don't know" can help the planning.

When planning a project, writing a project plan is always a good idea, and I must emphasize the "writing" part. Just the process of writing it down forces you to think through all the details required to complete any project. We have all heard the saying "The devil's in the details," meaning, it's all the tiny details that you don't think about ahead of time that will get you in trouble every time. This is where you can try to account for the unknowns in a project. Try very hard to think through all of the particular details required to accomplish your project and the unknowns will show up. Then you can attempt to account for these in the schedule and budget by adding some extra cushion for all of the unforeseen events that could happen. It's difficult to account for everything, but a little strategically applied Cush can make a major difference when things go wrong later. If you accept the fact that things can and will go wrong, you can make a little space for them in your project plan. Think about it; has it been done before? If yes, then there's a reasonable chance that things will go smoothly. If it's never been done before, then there will be a very high potential for those unknown things to pop up and cause those schedule delays and cost increases.

Good communication is essential for the success of a project. I am convinced, that the single most important activity required for the success of a project is the "Kick-Off Meeting." In the old days, we always had them. We would always get together, face to face, at the very start of a project. This is where the project team will get together around the table to discuss all of the project details, literally go line-by-line through the project specifications, go over potential problem areas, discuss the project schedule, establish lines of communication, get a good understanding of the important nuances of the project, and most of all, meet all of the players and stakeholders. I think this helps greatly if people get to know each other a little bit. It helps communication when everyone understands the personalities involved, and it makes things a little more personal. When I think about past projects, I believe I can make a direct correlation between how successful a project was to whether or not there was a good project kick off meeting, as the successful projects always had one.

When things go wrong, it really helps to maintain composure and not get emotional. I never understood why people think that it helps to get mad and yell at someone in a business relationship. I do understand that it can be painful to all parties when things go wrong, but why make it worse by getting all emotional and out of control? No one tries to purposely make things go bad. Being late on a project can be one of the most stressful things that can go wrong, but yelling about it won't magically change the past timeline and make things different. You can't change the past; all you can do is move forward and the best thing you can do is to try to influence the future for a better outcome. When a project does go bad, or is late and/or over budget, you can't just stop and walk away, you still have to finish it and getting emotional does not help the situation. No matter how hard you beat on the table and make decrees, it won't change a thing, except perhaps give you a coronary.

There are a lot of things that can factor in and affect the successfulness of a project. Some of the best contributors are a good project plan, a well-defined written project requirements document (up front), detailed and realistic project schedule/budget, and good project communication. And always remember, "It's just another day in the custom equipment business."❖

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- ❐ **AGS Publication Purchase**
- ❐ **AGS Conference**
- ❐ **Internet Search**
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PAYMENT INFORMATION

❐ **Regular Member (Individual)**
$75 + $50 Entrance Fee = $125

❐ **Sustaining Member (Company)**
$525 + $50 Entrance Fee = $575

Questions:

(800) 530-1022
AGS@GloveboxSociety.org

❐ **Check - Payable to AGS and Mailed to:**
American Glovebox Society
526 South E Street, Santa Rosa, CA 95404

❐ **Visa** ❐ **Mastercard** ❐ **American Express**

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Join Online At: GloveboxSociety.org

AGS Order Form	AGS Member Price	Non-Member Price	Quantity	Total
GUIDELINE FOR GLOVEBOXES THIRD EDITION (AGS-G001-2007) Contains over 160 pages of established and proven practices compiled by experienced industry professionals. Covers areas of glovebox technology from conception to installation, operations, and maintenance.	$245	$320		
GUIDELINE FOR GLOVEBOX ERGONOMICS (AGS-G013-2011) Recommendations for the application of sound ergonomic principles to the design, operation, and maintenance of gloveboxes, glovebox appurtenances, and glovebox ancillary equipment.	$125	$200		
STANDARD OF PRACTICE FOR LEAK TEST METHODOLOGIES FOR GLOVEBOXES AND OTHER ENCLOSURES AGS-G004-2014 Establishes requirements for leak testing gloveboxes and other enclosures and their appurtenances.	$195	$270		
STANDARD OF PRACTICE FOR GLOVEBOX FIRE PROTECTION (AGS-G010-2011) Establishes fire protection requirements for the design, operation, and maintenance of gloveboxes, isolators, and their appurtenances serving as barriers to protect the worker, the ambient environment, and/or the product.	$125	$200		
STANDARD OF PRACTICE FOR GLOVEBOX INERT GAS RECIRCULATION PURIFICATION SYSTEMS (AGS-G015-2015) Establishes requirements and considerations for the design, procurement, receiving, and installation, test, and operation and maintenance of glovebox inert gas recirculating purification systems and related components.	$125	$200		
STANDARD OF PRACTICE FOR THE DESIGN & FABRICATION OF NUCLEAR APPLICATION GLOVEBOXES, SECOND EDITION (AGS-G006-2017) Establishes requirements for the design and fabrication of nuclear application, negative-pressure gloveboxes used for the operations that involve radioactive materials that emit low-penetrating ionizing radiation.	$125	$200		
STANDARD OF PRACTICE FOR THE SPECIFICATION OF GLOVES FOR GLOVEBOXES SECOND EDITION (AGS-G005-2014) Establishes requirements for procuring gloves to be used on gloveboxes.	$125	$200		
STANDARD OF PRACTICE FOR THE DESIGN AND FABRICATION OF GLOVEBAGS (AGS-G002-1998) A standard of practice establishing standards for the design and fabrication of glovebag components.	$50	$125		
STANDARD OF PRACTICE FOR THE APPLICATION OF LININGS TO GLOVEBOXES (AGS-G003-1998) A standard of practice that establishes the technical requirements for the materials, installation, testing, and quality assurance of corrosion resistant linings for gloveboxes and similar containment enclosures.	$50	$125		
A GUIDE FOR PERSONNEL QUALIFICATION AND CERTIFICATION IN GLOVEBOX/ISOLATOR OPERATIONS (2014) Provides recommendation for the establishment of an employer-based qualification and certification program.	$25	$75		

- Member prices are only available to members of the American Glovebox Society.
- Quantity discounts available. Contact AGS for more information.
- No refunds, returns, or exchanges.

Submit completed form to:
American Glovebox Society
526 South E Street, Santa Rosa, CA 95404
Fax: (707) 578-4406

Online Ordering Available at: GloveboxSociety.org

SHIPPING INFORMATION (PHYSICAL ADDRESS REQUIRED)

Name ____________________

Company ____________________

Address ____________________

City, State, Zip ____________________

Phone ____________________

Email ____________________

Shipping and Handling
Charges included if ordered in the US

Outside US FEDEX account number # Required:
Account Number:

TOTAL:

Payment Method:

❒ Check (payable to AGS)
❒ Visa ❒ MasterCard ❒ American Express

Account #:

Exp. Date & CID # & Billing Zip:

Authorized Signature:

For Office Use

AGS CONFERENCE 2022

July 25 - 28, 2022 ~ Nashville, TN

Registration Form

Name Last (Surname): ______________________ First ________________ Middle Init. __________

First name/Nickname for badge __________________ Company ______________________________

Company Title or Position ____ Company Mail Code ______

Mailing address is my ❑ Home ❑ Business

Mailing Address ____ City ______________

State/Province ______________________ Postal/Zip Code ___________ Country ______________

Daytime phone number: (______) _____________ FAX number: (______) ____________________

Email: ____

Conference Registration

	BY JUNE 25	AFTER JUNE 25		
❑ **CONFERENCE & WORKSHOP (MON. - THUR)**	$1025.00	$1075.00		$ ________
❑ **CONFERENCE ONLY (MON. - WED.)**	$845.00	$895.00		$ ________
❑ **THURSDAY (THUR.)**	$295.00	$345.00		$ ________
❑ **TITAN STADIUM TOUR (SUNDAY)**	$25.00	$25.00	X_____	$ ________
❑ **GRAND OLE OPRY SHOW & TOUR (TUESDAY)**	$83.00	$83.00	X_____	$ ________
❑ **GRAND OLE OPRY SHOW ONLY (TUESDAY)**	$50.00	$50.00	X_____	$ ________

Payment Information

TOTAL DUE $____________

Payment Enclosed: ❑ Check (Payable to "AGS") ❑ Credit Card (Visa/Mastercard/Amex)

CARD NUMBER: ____

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LESSONS LEARNED *Update*

By: Justin Dexter
Lessons Learned Committee Member

Finally! We all get to see each other again, spend time together, and share information about our glovebox projects over the last couple of years. For the first time in years, the Standards Development Committee and the AGS Board of Directors will also be meeting in person. Nashville is a great place to visit, and I hope you all enjoy your time there.

During the last six months, the Lessons Learned Committee has been in contact via online meetings and through various telephone calls. We have discussed the last couple of years and what lessons have been learned.

If you have been following OPEXShare, you know about the various glove breaches at Los Alamos National Laboratory. What you might not know is that there were some amazing things that occurred that didn't make the news. It always seems to be the bad news that is reported. Our Lessons Learned Committee members were all discussing this, and we are planning on celebrating some of the good things, or best practices, along with some of the other lessons. The group at Los Alamos will eventually present on some of the amazing things that they are tracking, such as wear on a glove that can be tracked in a database. They perform studies on gloves with various chemicals, radiation, and general wear and tear and track the information. Hopefully the team can present that data soon. If any of you have some good news to talk about, please share this with the AGS and OPEXShare.

As I have talked about before, we also need to remember the importance of transferring the experience of the older generations of workers to younger operators. I just found out that two folks who have contributed to the Lessons Learned Committee are retiring. We need to capture as much as we can from this incredible generation while we can. We will have a presentation on the UK ARC Programme from Sellafield this year, and at the end of the conference, I will try to talk Stanley into wrapping up the highlights from the presentations like he used to, which is still one of my favorite additions to the conference.

Please share any lessoned learned, general knowledge, or best practices with the AGS and OPEXShare. By sharing your experiences, you could help others who might have a similar challenges. Please note the new link and website, if you haven't already updated your bookmarks – https://doeopexshare.doe.gov/

I look forward to seeing everyone again (In Person!!) at the end of July in Nashville. Please travel safe and stay healthy. Take care and see you soon.

If you would like to be a part of the Lessons Learned Committee, please contact the AGS front office.

Justin Dexter
Lessons Learned Committee Member ❖

Thank You Sustaining Members


inert
Process control and operator protection
Regulation - Safety mechanical valves
Bringing 75 years experience in design and fabrication
scan here
Inertcorp.com

NFPA 770
Fire Suppression
MINI HYBRID-PAC ®
Installed &
operating at
several DOE sites

FPSG

FIRE & PUMP SERVICE GROUP

"Industrial Special Hazards Fire Suppression"

ENGINEERING, PROCUREMENT & CONSTRUCTORS

Pre Design Services, Consulting, Assessment & Constructibility Services, Training & Commissioning Fire Suppression Systems for the Nuclear & Power Related Industries

COMMERCIAL GRADE DEDICATION

ASME NQA-1 - 10 CFR 50 Appendix B
With thousands of items dedicated, Fire & Pump Service has the historical data, technical acuity, and required experience to dedicate commercial grade items for use in safety-related applications and qualified inventory in stock.

APPLICATIONS

Gloveboxes - Hot Cells - Custom Enclosures
Waste Processing Facilities - Nuclear Waste Repositories
Hybrid, Clean Agent & Inert Systems
Full Scale Production and Onsite Testing Capabilities

PROFESSIONAL AFFILIATIONS

NFPA 770 Hybrid Fire Extinguishing Systems
NIAC Supplier No. 3951 - SFPE - AGS G010 Stds. - EFCOG

NEW DEVELOPMENTS

FPSG NITROGEN BASED FIRE SUPPRESSION SYSTEMS FOR GLOVEBOXES

Final discussions during 2021 AGS Standards development committee meetings to refine Nitrogen Based Fire Suppression Systems for Gloveboxes in AGS - G010 standard.

FPSG HAS OPENED A NEW FACILITY BY OAKRIDGE TENNESSEE

To see videos & reports, please visit our website at: fireandpumpservice.com