❖G-4 NEWS❖

Volume 5 No. 1 ***The** Newsletter for Oxygen Compatibility Practitioners* Spring 1998

Test Program on Thick Stainless Steel Underway

The first of the new Industry Sponsored Programs which G-4 has promoted is underway. Stainless steel alloy 316L rods 0.5-in (1.2-cm) diameter have been tested. Due to some contract difficulties, these programs are now independent efforts of the contributors and are not products of G-4, although G-4 will continue to contribute ideas, and commentary to them.

In addition, thresholds were also measured for 0.25-in rods of CF8M, because most larger valves are of cast alloys. These data will provide an initial basis for evaluating thick stainless alloy 316 as a nonpropagating alloy at higher pressures than are now covered in CGA Pamphlet G-4.4. Completion is anticipated this year.

The final phase expected in a few months, will examine the effect of flow, which resulted in reduced thresholds in tests of tubes.

A proposal/solicitation for a second program on testing a spectrum of metals at elevated temperatures will be mailed this summer. **G4N**

Progress at Atlanta:
.....*Back to the grind!*

Following the excitement at San Diego, which culminated several G-4 projects, the Committee settled back into its next cycle of activity. This lull allows for retrospection while standards maintenance is done.

The **Main Committee, G4.00** announced election of new officers (John Cronk, Bill Royals, and Ron Epstein, respectively) for the '98/'99 term.

Test Methods G4.01 began a revision of G 121 (Test Coupon preparations). In addition, it continued its early efforts on the conversion of military documents into ASTM standards, continued its plan to introduce G 86 (Mechanical Impact) as an ISO standard, began reviewing a navy document on nitrox diving (to 50% oxygen) systems, and is promoting a gaseous impact test for components.

Practices G4.02 announced status to date of the first Industry Sponsored Test Program (see article above). Solicitations to study metals at high temperatures are about to be mailed. An action to identify the next effort for 1999 was proposed on the subject of oil film flamma-

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Inside This Issue

Error Found in TPT Coursebook

An error in the equation for SI velocities according to the CGA Pamphlet G-4.4 criteria has been confirmed. The equation appears on page 5-36, *Fire Hazards in Oxygen Systems*, Second Edition.

The CGA Pamphlet G-4.4 Allowed Velocity curve is given as:

$$v = 188{,}000\ P^{-1.29} \qquad (1)$$

where: v = The maximum allowed gas velocity in f/s, and P = Internal Pressure in psig, and an alternate equation is:

$$v = 51{,}000\ P^{-1.29} \qquad (2)$$

where: v = The maximum allowed gas velocity in m/s, and P = Internal Pressure in kPa(gage).

The second relationship, Eq (2), for pressure in terms of kPa(gage) and m/s is in error and applies when velocity is in m/s and pressure is in psig (not kPa). The relationship should be:

$$v = 680{,}000\ P^{-1.29} \qquad (3)$$

where: v = The maximum allowed gas velocity in m/s, and P = Internal Pressure in kPa(gage).

The effect of the error in Equation (2) is to significantly understate allowed velocities as shown below:

Pressure	Allowed Velocity		
psig (kPa[gage])	EQ (1) f/s	EQ (2) m/s*	EQ (3) m/s
200(1361)	202.2	4.6*	61.6
600(4082)	49.0	1.1*	14.9
1000(6803)	25.4	0.58*	7.7

*Value in error.

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Spring '98 Seminar Series

Although just six months after the San Diego symposium, the Spring Seminar still hosted four papers:

"Homogenous Processes in Metal Ignition and Combustion," by Ed Dreizin discussed testing at Aerochem Research Laboratoryand their capabilities. They have recently been studying metal combustion in oxygen and have a facility that can lend itself to commercial testing. They are a participating laboratory in a new research program being proposed to the ASTM Institute for Standards Research (ISR) to study aluminum combustion in oxygen.

"History of the CGA Velocity Curve," by Ken McIlroy. This long-sought history detailed the origins of the allowed velocity curves in the CGA Pamphlet G-4.4. The curve is known to have been proposed by Linde Division in the early 1960s based on practices dating much further back. Ken traced the curve to a memo in 1956 and the paper **"Safe Handling of Large Quantities of Gaseous Oxygen in Steel Piping"** by W. E. Groves, *Iron and Steel Engineer*, January, 1965. McIlroy believes that the curve is based on a constant mass flow condition over its 200-1000 psig region. There is no hard-copy paper available.

"TNT Equivalency Concepts" by Barry Werley, James G. Hansel and William C. Buchter reviews the definitions of TNT equivalency and briefly describes how they are conservatively estimated from chemical and thermodynamic data. References are cited for more rigorous treatments. This paper was distributed at the seminar.

"Estimating Maximum Gas Velocities in Oxygen System Valves" by Barry Werley reviews the equation and assumptions used to estimate maximum gas velocities that differential pressures might produce. References are cited for more rigorous treatments. This paper was distributed at the seminar.

Gerald Wolf played and described a video of a March 16, 1998 segment "**Operating Room Fires**" from ABC TV's *"20/20"* dealing with oxygen fires during surgical procedures. It was partly based on work at Wolf's laboratory.

Finally, copies of the paper: **"A Brief Study of Steel Combustion Using Quick-Frozen Specimens"** by Barry Werley were distributed. This paper was presented at the first seminar session in Fall 1995 (Norfolk). Peer review found it controversial, and it could not be revised in time for inclusion in *STP 1319*.

For copies of Dreizin's talk contact: Edward Dreizin, Aerochem Research Laboratory, The Titan Corp., P.O. Box 2229, Princeton NJ 08543-2229, E-Mail: edreyzin@titan.com, Fax: (609) 716-1204. For electronic copies of the three Werley papers, submit E-Mail requests to werleybl@apci.com [they can be provided only in portable document file (.pdf) format which requires use of the Adobe Acrobat Reader, a software program which may be downloaded free from the Adobe website at: www.adobe.com/acrobat/]. **G4N**

G-4 Web Site

http://www.wstf.nasa.gov/labs/oxcompat/

The Committee discussed the G-4 Web Site. Portions are dated, and it was agreed to reconsider its content and purpose. The web site curator is Tom Richie (at NASA-WSTF), who can be called at (505) 524-5299. Readers should be aware that the schedule of G-4 meetings and TPT courses can always be found on the ASTM Web Site at www.astm.org. **G4N**

Daikin Purchases Kel F Product Line From 3M

Oxygen compatibility practitioners are advised that Daikin International has purchased the rights to the process and product line for Kel F (formerly owned by 3M Corp.). Members of G-4 have learned that the corresponding Daikin product **Neoflon**, also based on chlorotrifluorethylene, is being substituted for Kel F 81 by many vendors (and has been for several years).

Apparently, between 1991 and 1995, 3M obtained the product it sold as Kel F from Daikin. During this time, it is our understanding that 3M Corporation verified some of the critical parameters, such as the molecular weight and specific gravity, prior to offering it as a 3M equivalent product. Based on preliminary testing, however, the Daikin product does not appear to be identical to original Kel F 81 in its mechanical properties, and it is not performing identically to Kel F in some components.

There have been incidents involving the new material, but it is not clear whether these were due to any differences in inherent oxygen compatibility.

Further complicating matters, both the original Kel F and the Neoflon are sold in several molecular weights and with different specific gravities which also may influence compatibilities. Unfortunately, these parameters are seldom specified by oxygen system designers.

Due to the many applications that employ Kel F 81 in oxygen, G-4 has established a task force to compare historic Kel F 81 material obtained from NASA storage with recent Neoflon and see whether the oxygen compatibility properties are comparable. Eight laboratories have agreed to conduct compatibility tests on both materials. The testing will initially be focused on autogenous ignition tests, but other tests may be conducted later.

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*(**Progress** from page 1)*

bility. A revision of standard G 63 with many new data was modified and will be reballoted. Jake Jacob described several diving industry incidents involving hypobaric and/or hyperbaric compression chambers.

Long Range Planning G4.04, met and proposed its new five-year plan for initial discussion.

Education G4.05 reported 18 students attended the On-site (Atlanta) TPT course and 179 students attended at other sessions since the Fall meeting (at the Canadian Air Force, BOC, Pratt and Whitney, and Stennis Space Center). There were four seminar papers (see ***Spring...*** page 2) and three other types of presentations, including highlights of a four-hour technician-level course that the Committee agreed to review for inclusion in the ASTM TPT series of courses. An error was confirmed in the TPT Course book *Fire Hazards in Oxygen Service*, Second Ed., p. 5-36 (See ***Error...*** p.1).

Symposia G4.06 continued it planning for the next symposium in Paris, 2000, now scheduled for September 28/29. Also, a postmortem was conducted on problems that occurred during the production of ***STP 1319*** (See ***Postmortem...*** p.3).

Publicity G4.94 decided to experiment and distribute this newsletter via E-Mail as an Adobe Acrobat portable document file (.pdf) to those who have the Acrobat Reader and who request it by E-Mail to werleybl@apci.com. This format can simplify archiving the newsletter and past issues may soon be made available, as well.

Research G4.92 met and adopted a scope statement and reviewed instances in which the latest G4Math.EXE screen might not accurately estimate oxygen gas velocities. A proposal to study aluminum flammability is being broached to the ASTM Institute for Standards Research (ISR).

Statistics G4.93 met and will soon be issuing a "query form" for members to suggest the ways in which data should be available for searching by database.

Executive G4.90 kept this Committee's eye on the ball. **G4N**

Postmortem Weighs Future of Publication Series

A postmortem on *ASTM STP 1319* posed the question: Can G-4 sustain its stunning recent successes in publishing scholarly work on oxygen safety?

The release of *STP 1319* last Fall was coincident with the Eighth International Symposium. It reversed a decaying trend and became the largest and most timely volume to date, and it is the *only* volume in the entire series to have been distributed at the same symposium from which it contains papers.

However, this landmark accomplishment was not without pain and strain. The effort placed unreasonable demands on many, several papers were lost, and some Committee procedures failed, en route. Can G-4 repair, protect and yet grow this product in the face of these problems and new challenges?

Importantly, the pressure of modern times is eroding the base of papers. Barry Werley reviewed problems with a series of eight-to-ten papers his coworkers planned for *STP 1319* (six were ultimately included). Excessive preparation time, deadline problems, copyright transfer issues, quality problems with peer reviews, and breakdown of G4's "no-fault" publication and controversy resolution mechanisms were cited.

Peer review was a particular onus. ASTM uses a "Publish *or* Perish" model beneficial to credential generation or for tenure and promotion in academia, but it can be more of an antithetical "Publish ***and*** Perish" model in industry where global competition and efficiency are key. G-4 has not been successful in balancing the disparity. These authors wish to continue participation but now expect most of their future papers will be distributed as presented (and not submitted for *STP*s). This sustains their contribution but will provide little to the paper stream needed for the *STP* series to thrive.

Several options were identified for future consideration: (1) streamline peer reviews by narrowing the peer reviewer corps, perhaps even to only two or three people (specifically the technical editors) and provide an honorarium for the large effort this would demand, (2) focus the peer review and editing efforts in retired emeritus members of G-4, rather than members whose primary job priorities can deflect them (as happened with *STP 1319* and others before it), and the most extensive prospect: (3) withdraw the publication from the ASTM series of *STP*s and publish the papers under a G-4 procedure. The last option could focus on electronic instead of paper publication and could cut cost, expedite publication, allow enforcement of G-4's own procedures, and even allow an option to make peer reviews merely advisory or to waive them entirely.

Wisdom will be needed to sort through these issues and elect the right paths to nurture this valuable product. However, if the pressures and trends of the past continue (corporate streamlining/downsizing), much support and at least some measures may be crucial to survival of this key portion of the Committee's collegium. **G4N**

I want G-4 News!

Your name will be listed in our publicly available database of oxygen compatibility enthusiasts, please check ***all*** boxes that apply to you.

G-4 O_2

☐ New Request ☐ Correction

Name _____

Company _____

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☐ G-4 Member
☐ G-4 Symposium
☐ G-4 TPT Course Student
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☐ Commercial Testing Source
☐ General Interest in Subject

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Non-Profit Org.

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G-4 Events and Housekeeping

Regular meetings of the Committee G-4 have been scheduled as follows:

Sept 23-24, 1998 .....Cocoa Beach, FL
Mar 17-18, 1999 .....Seattle, WA
Sep 15-16, 1999 .....Las Cruces, NM
Mar 15-16, 2000 .....Toronto, Canada
Sept 28-29, 2000.....Paris
Mar 14-15, 2001.....Salt Lake City, UT

Contact Steve Mawn (610) 832-9726 for details or membership data. ASTM Membership is $65 per year.

The next G-4 Symposium is :

Sep 26-27, 2000 .....Paris

For a Call for Papers or Program, call Steve Mawn (610) 832-9726.

Public offerings of the course: *Controlling Fire Hazards in Oxygen Handling Systems* are planned for:

Sep 21-22 1998 .....Cocoa Beach, FL

Contact Scott Murphy (610) 832-9685 for information or brochure. Cost is $675.00 (including text). It can be offered at your site for a negotiated price.

The course materials: *Fire Hazards in Oxygen Systems* may be ordered separately from Kristina Falkenstein, (610) 832-9686. Price is $250.

A 210-page compilation of 23 1997 ASTM Standards on oxygen safety is available, PCN 03-704097-31, $68 in the USA, $75 elsewhere, (610) 832-9585.

The G-4 Videotape *Oxygen Safety* PCN 12-700880-31 may be ordered from ASTM Customer Service at (610) 832-9585. Price $75 ($67 for members).

Recent G-4 Standards actions/revisions:

G 86-98 "Mechanical Impact....."

All G-4 standards appear in part 14.02 of the Book of Standards or may be ordered individually from ASTM Customer Service (610) 832-9585. Typical standard prices range $15-30.

Details:

This newsletter is a product of ASTM Committee G-4. The editorial staff is the G-4 Committee Officers and ASTM Staff:

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