



# MARINE Field Service News

## 2007 Summer-Fall Edition

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471



### Newly Certified Marine Chemists

At its March 28, 2007 meeting the Marine Chemist Qualification Board approved the certification of two new Marine Chemists.

**John M. Phillippi** - Certificated Marine Chemist Number 704 resides in Mobile, AL and is presently employed at Atlantic Marine, Inc. John is the son of Marine Chemist Johnny C. Phillippi, CMC 647 of Gulf Marine Chemists, Inc.

**Toby Turcotte** - was approved as NFPA Certificated Marine Chemist Number 705. Mr. Turcotte lives in Baton Rouge, LA and is employed by Marine Chemists of Louisiana.

As of the date of this news letter there are 97 NFPA Certificated Marine Chemists and 18 Marine Chemist Trainees. If you're interested in learning more about NFPA Marine Chemists or becoming a trainee contact the NFPA Marine Field Service at 617-984-7948 or marine@nfpa.org.

#### Summer- Fall 2007 Edition IN THIS ISSUE

New Marine Chemists.....	1
2007 ACGIH TLV® Guide.....	1
Fire Prevention Week 2007.....	2
Near Miss – Oxy Acetylene Flashback.....	3
New OSHA/EPA Chemical Database.....	5
Carbon Monoxide Death on Fish Processor Vessel.....	6
Maritime Codes & Standards .....	8
Contacting NFPA.....	8

### ACGIH 2007 TLV® Guide is Available

The American Conference of Governmental Industrial Hygienists (ACGIH) 2007 Threshold Limit Values (TLV®) and Biological Exposure Indices (BEI®) Guide is now available.

**2007 Adopted Threshold Limit Value (TLV®)** - The proposed TLV® that appeared in the 2006 Notice of Intended Change is adopted for toluene.

**Toluene now has a TLV® of 20 ppm (TWA).**

**Notice of Intended Change (NIC)** – Please be aware that the TLV® for **Methyl Isobutyl Ketone** is listed under the 2007 NIC. The proposed revision to the adopted TLV® is 30 ppm

(TWA). The current TLV® is 50 ppm (TWA). The previous announced revision to the adopted values for **Hydrogen Sulfide** remains on the 2007 NIC. The proposed TLV® change for Hydrogen Sulfide is 1 ppm (TWA) and 5 ppm STEL versus the current TLV® for Hydrogen Sulfide of 10 ppm (TWA) and 15 ppm STEL.

**Chemical Substances Under Study** – The ACGIH lists more than 90 chemical substances that are under study. The published list in the 2007 TLV® Guide is accurate as of January 01, 2007. As of June 26, 2007 the list of substances under study was updated on the ACGIH website ([www.acgih.org](http://www.acgih.org)) in a two-tiered list.

Under Tier 1 chemical substances that may move forward with an NIC in 2008 include:

**Diesel fuel - individual TLVs® for vapor and aerosol.**  
**Ethanol (Ethyl Alcohol)**  
**VM&P naphtha**

Under Tier 2 chemical substances that will not move forward with an NIC in 2008 include:

**Ethyl Benzene**  
**Gasoline, all formulations**  
**Methanol**  
**Naphthalene**  
**Vinyl Acetate**

## Fire Prevention Week - 2007



"Practice Your Escape Plan!" — that's the message of Fire Prevention Week 2007. It's not enough just to have a fire escape plan. To escape safely from a home fire you've got to make sure that everyone in the home has practiced the plan as well.

According to a poll conducted by NFPA, while the majority of Americans have an escape plan in case of a fire, most haven't practiced it. And three-quarters of Americans believe they have 10 minutes or less until a fire turns deadly.

From October 7-13, fire safety advocates across the country will be spreading the word that when it comes to escape plans, practice is key. For more information about this and other NFPA Programs go to our web site: [www.nfpa.org](http://www.nfpa.org).

We've got lots of helpful information to help you help neighbors, friends and family members escape safely in the event of a home fire. So let's get started!

# NEAR MISS - FLASHBACK IN ACETYLENE HOSE

The following Near Miss was provided by a vessel operator and provides lessons learned information the NFPA Marine Field Service believes to be important and deserving attention.

**Details of the Near Miss:** Two crewmen were working in the starboard boiler room to remove a leaking ¾” union by heating it with a burning torch. The job was located about 20 feet from the oxygen and acetylene tanks. As soon as the torch was lit a fire started back at the tank set where the hose was coiled. One of the workers immediately shut off the acetylene valve as the other crewman extinguished the fire with a fire extinguisher. Fortunately, the flashback did not result in an injury to the workers. The only damage was to the gas hose.

Upon further inspection the hose was found to have a hole in it and several soft spots in between the outer cover and the inner ply’s. The age of the hose was unknown but it was obvious that it had been in use for an extended period of time, possibly beyond its safe service life.

Flashback protection was provided by arresters at both the torch and at the regulators on the bottles. The arrester at the torch failed to stop the flashback. It appeared to be old and not in serviceable condition. The flashback arrester on the regulator was in good operating condition and prevented the flame from entering the acetylene tank.

## To Prevent Flashbacks:

Obtain approval before starting hot work operations. All individuals involved in the hot work operations must be trained in the safe operation of their equipment and in the safe use of the process. They need to have an awareness of the inherent risks involved and understand the emergency procedures in the event of a fire. The hot work operator must handle the equipment safely so as not to endanger lives and property.

## What is a flashback? Is this a cause for concern?

A flashback is a rapid high pressure flame in the hose. It may occur when a flammable mixture of fuel gas (in this case acetylene) and oxygen is present in the hoses when the torch is lit. It may occur if check valves are not installed, installed incorrectly or are not operating properly. Once a flashback starts, check valves can not stop it, but a flashback arrester can stop it. If unstopped, the flame will travel from the torch, back through the hoses and the regulator and into the cylinder.

Acetylene is an extremely flammable and unstable gas. It is susceptible to decomposition into an explosive mixture of its elemental components – carbon and hydrogen. Acetylene is stowed in specially designed cylinders to inhibit this process. Decomposition of acetylene is caused by heat and can occur if the cylinder is subjected to fire, scorching or flashback. Flashback into an acetylene cylinder may leave the cylinder in a dangerous, unstable condition and potentially lead to a catastrophic explosion.

A flashback arrester connects in the same manner as a check valve, in the hose at the torch or regulator and contains a trap that is spring loaded that cuts off the gas flow in the event of a flashback. Both check valves and flashback arrestors are essential safety features of any Oxy-Acetylene welding set.

Handle acetylene cylinders with care. Do not drop or jar the cylinder or roll it across the floor. Never use a damaged or defective cylinder. Keep the cylinder in an upright position far enough away from the actual welding or cutting operation so that sparks, hot slag or flame can not reach it. When this is impractical, fire resistant shields should be used to protect the cylinder.

Ensure that only approved apparatus (torches, manifolds, regulators or pressure-reducing valves, acetylene generators, etc.) are used. Examine all equipment regularly, at least before each shift, to ensure it is in a safe operating condition. Equipment that is found to be incapable of reliable safe operation must be removed from service until it is repaired by qualified personnel.

Use the correct gas pressures and nozzle sizes for the job. Fit non-return valves (or check valves) on the torch, to prevent back-feeding of gas into the hoses. **Note: non-return valves will not stop a flashback once it has occurred.**

Keep nozzles in good condition. Poorly maintained nozzles cause turbulent gas flow, which increases the risk of flashback. Inspect nozzles regularly. Make sure they are not blocked by dirt or spatter and replace damaged nozzles. **Do not hold the nozzle too close to the work piece. The nozzle can overheat and cause a flashback.**

Provide flash-back protection by means of an approved device that will prevent flame from passing into the fuel-gas system. Fit flashback arresters onto the pressure regulators on both the acetylene cylinder and the oxygen cylinder. For long lengths of hose, fit arresters on both the blowpipe and the regulator. **Note: The fitting of flashback arresters is not a substitute for safe working practices.**

Use the correct lighting-up procedures. Before lighting the blowpipe, purge the hoses by opening the gas supply to each hose for a few seconds. This will flush out any flammable mixtures of gases in the hose. Purge one hose at a time and close the blowpipe valve after purging. Use a well-ventilated area. Always light-up torches with friction lighters or other approved devices.

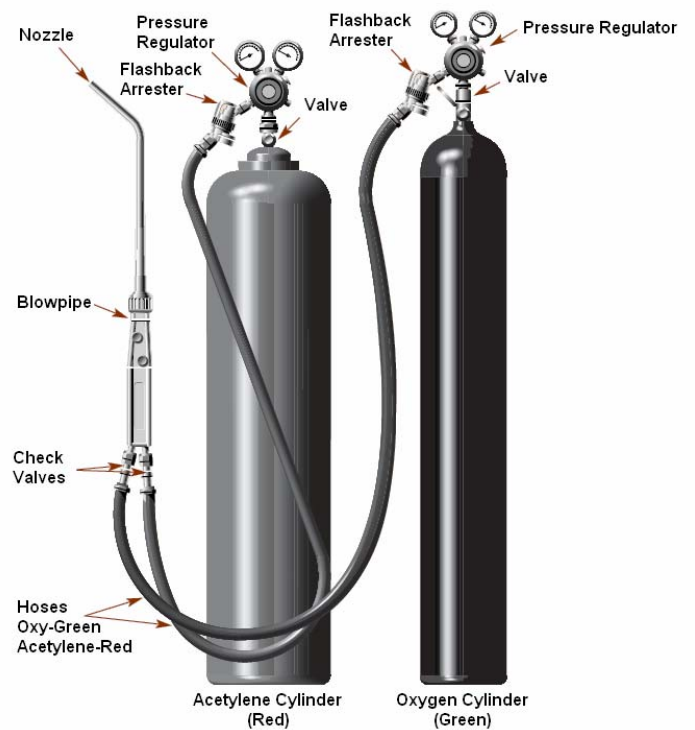


Illustration: *Take Care With Acetylene*, HSE Leaflet INDG327.

**If a flashback does occur:**

- Immediately close the valves on both the acetylene and oxygen cylinders, if it is safe to do so. The flame should go out when the fuel gas (acetylene) is shut off. If the flame cannot be put out at once, evacuate the area and call the emergency fire services and the gas supplier.
- Check any acetylene cylinder that has been involved in a flashback or that may have been affected by fire or flames. If the cylinder becomes warm or starts to vibrate, evacuate the area immediately and call the emergency fire services.
- Do not attempt to move an unstable cylinder. Direct water spray at the cylinder body, if it is safe to do so.
- Before using again, check flashback arresters and other components which may have been damaged by the flashback. Replace any damaged equipment. If in doubt replace it.
- The operator must cease hot work operations if unsafe conditions develop and notify his/her supervisor or the person in charge for reassessment of the situation.

Cutting and welding processes are a necessary part of vessel construction and repair. Unfortunately and too often the persons engaged in this activity do not fully appreciate that improper use can result in loss of life and property by fire and explosion. Approximately 6% of fires in industrial properties and many fires in other properties have been caused by cutting and welding. The keys to safe hot work operations are:

1. Trained workers,
2. Properly maintained equipment and
3. Strict observance of safe work practices, regulations and standards.

The following publications were used in the preparation of this article:

NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, 2003 edition, National Fire Protection Association, Quincy, MA.

Title 29, Code of Federal Regulations, Part 1910, "Occupational Safety and Health Standards"; and Part 1915, "Occupational Safety and Health Standards for Shipyard Employment", Occupational Health and Safety Administration, U. S. Dept. of Labor, Washington, DC: GPO, 2007.

*Take Care With Acetylene*, HSE Leaflet INDG327, reprinted 01/01. Health and Safety Executive, London, UK.

## **OSHA/EPA Occupational Chemical Database**

Looking for a resource for information on hazardous chemicals in the workplace? Check out the new OSHA/EPA Occupational Chemical Database (available on the OSHA web site). This handy reference tool provides quick and easy access to information on over 800 chemicals commonly found in the workplace.

The database is jointly maintained by OSHA and EPA and compiles information from several government agencies and organizations. Available database reports include: "Physical Properties," "Exposure Guidelines," "NIOSH Pocket Guide," and "Emergency Response Information," including the DOT Emergency Response Guide. In addition, an all-in-one report, "Full Report," is available.

# Carbon Monoxide Death in Fish Hold Results in OSHA Citations

An Occupational Safety and Health Administration (OSHA) press release dated May 14, 2007 announced that a seafood processor failed to protect its employees against carbon monoxide and confined space hazards and was issued 11 serious citations with the possibility of \$46,900 in penalties.

In November 2006 an employee was fatally overcome by carbon monoxide fumes while using a gasoline-powered pressure washer to clean the inside of a water tank in a fishing boat. OSHA investigators found that the deceased and two other employees were exposed to excess levels of carbon monoxide while working in the tank and that the company failed to implement satisfactory controls to reduce those exposure levels.

According to OSHA the company also lacked procedures and equipment for employees to work safely in confined spaces, did not train employees on working in confined spaces, did not identify and post danger signs for the tank and other confined spaces in the workplace and had no program in place covering employees' proper training and use of respirators.

## Carbon Monoxide Hazards in the Maritime Workplace

In 1996 NIOSH issued a safety alert, Preventing Carbon Monoxide Poisoning from Small Gasoline-Powered Engines and Tools (DHHS NIOSH Publication No. 96-118) in an effort to prevent carbon monoxide (CO) poisonings resulting from widespread use of small gasoline-powered engines and tools in confined spaces. Failure to recognize CO hazards is a key causal factor. CO poisoning can occur quickly, even in the presence of what you may consider to be adequate ventilation in a confined space or in relatively open spaces, such as shelter decks, cargo holds or RORO decks.

## CO Concentration Can Quickly Exceed Permissible Limits

The NIOSH Alert illustrated several environmental models based on actual fatal accidents. NIOSH engineers modeled the time required for a gasoline-powered, 5-horsepower, 4-cycle engine to reach the 200-ppm (NIOSH Ceiling) and 1,200-ppm (NIOSH IDLH) for carbon monoxide concentration in various room sizes and ventilation rates. The results are shown in the following table.

Room Size (Volume)	1 Air Change/Hr	5 Air Changes/Hr	20 Air Changes/Hr
1,000 ft <sup>3</sup> (28.3m <sup>3</sup> or 178 bbls)	IDLH (1200 ppm) in less than 1 min.	IDLH (1200 ppm) in less than 1 min.	IDLH (1200 ppm) in less than 1 min.
10,000 ft <sup>3</sup> (283 m <sup>3</sup> or 1781 bbl)	Ceiling (200 ppm) in 1 min. IDLH (1200 ppm) in 7 min.	Ceiling (200 ppm) in 2 min. IDLH (1200 ppm) in 10 min.	Ceiling (200 ppm) in 2 min. 500 ppm in 8 min.
100,000 ft <sup>3</sup> (2833 m <sup>3</sup> or 17,818 bbl)	Ceiling (200 ppm) in 13 min.	Ceiling (200 ppm) in 35 min.	~35 ppm in 5 min.

The above data confirms the use of appliances and tools powered by small internal combustion engines in confined spaces present a serious health hazard even when general ventilation is used. Permissible exposure limits shown in the box below are quickly exceeded.

### **Symptoms of CO Exposure**

Carbon Monoxide is often called the “Silent Killer”. It is an odorless, tasteless, and colorless gas that is a by-product of combustion. Physiologically, the body’s red blood cells can actually pick up CO gas much quicker than they can pick up oxygen. CO takes the place of oxygen in the blood stream, causing asphyxiation. A person with pre-existing heart disease is at increased risk. Symptoms of carbon monoxide poisoning include:

- Feeling flu-like or sea-sick
- Shortness of breath
- Nausea
- Headache
- Dizziness
- Confusion
- Fainting
- Death

If you think you have been exposed to carbon monoxide - get to fresh air away from the source of CO and seek medical attention.

### **Permissible Limits for Carbon Monoxide (CO)**

- ACGIH TLV® (2007) 25 ppm (8-hour time-weighted average)
- OSHA PEL (29 CFR 1915.1000) 50ppm (8-hour time-weighted average)
- NIOSH REL 35 ppm (8-hour time-weighted average)
- NIOSH Ceiling 200 ppm
- NIOSH IDLH 1200 ppm

### **Preventing CO Poisoning**

- DO NOT allow the use or operation of gasoline-powered engines or tools inside confined spaces unless gasoline engines can be located outside and away from air intakes.
- Always place the pump and power unit of high-pressure washers outside of the confined space and away from air intakes so that engine exhaust is not drawn into the space.
- Recognize the symptoms of CO overexposure.
- Substitute less hazardous equipment if possible. Consider the use of tools powered by compressed air or electricity if they are available and can be used safely (electric-powered tools present an electrocution hazard and require specific precautions).
- Monitor employee CO exposure to determine the extent of the hazard.
- Use personal CO monitors equipped with audible alarms where potential sources of CO exist.
- Conduct a workplace survey to identify all potential sources of CO exposure.
- Train employees about the sources and conditions that may result in CO poisoning as well as the symptoms and control of CO exposure.

## NFPA Maritime Codes & Standards News

**NFPA 301, *Code for Safety to Life from Fire on Merchant Vessel, 2008 edition*** is now available. NFPA 301: Code for Safety to Life from Fire on Merchant Vessels provides minimum requirements, with due regard to function, for the design, operation, and maintenance of merchant vessels for safety to life from fire and similar emergencies. Patterned after the Life Safety Code®, it provides requirements for various types of merchant vessels. Among the changes in the 2008 Code are:

- A new chapter permitting performance-based alternatives for vessel design based upon the Life Safety Code chapter for performance-based options. This new chapter provides vessel designers with a formal method of incorporating novel designs that provide a level of safety that is equivalent to the prescriptive requirements of the Code.
- Revisions to various sections of the Code that incorporate performance-based alternative design options
- Completely revised chapter for towing vessel requirements reflecting current regulatory requirements and industry best practice.

The Code may be viewed and purchased by going to the NFPA web site and typing the document number in the search box.

**NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*** has entered the revision cycle for the 2009 edition. The closing date for public proposals to be submitted to the NFPA Standards Council is 26 November 2007.

**NFPA 306, *Standard for the Control of Gas Hazards*** is currently in the annual 2008 revision cycle. The Technical Committee on Gas Hazards met in February 2007 and acted on 60 proposals. The Report on Proposals (ROP) was published in June 2007 and is available on the NFPA website under the Codes & Standards tab. The committee will meet in Washington, DC on 11 and 12 September 2007 to act on any public comments received by 31 August 2007. The next edition of NFPA 306 is scheduled for release in the summer of 2008.

### Contacting NFPA - Questions or Comments

Any questions or comments regarding this newsletter or the Marine Field Service should be directed to Marine Field Service Newsletter Editorial Staff. Additionally if you would like to contribute to the MFS Newsletter please send articles, pictures, announcements, etc. to the Newsletter Staff care of:

NFPA Marine Field Service

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471

E-mail: [marine@nfpa.org](mailto:marine@nfpa.org)

Phone: (617) 984-7948, Fax: (617) 984-7110

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