



UNITED STATES COAST GUARD
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MARINE SAFETY ALERT
Inspections and Compliance Directorate

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Safety Alert 01-20

Danger! Improper Bonding During Gas Freeing Can Have Explosive Results!

These photos from a recent tank barge explosion serve as a stark reminder of how dangerous cargo tank cleaning and gas freeing operations can be if safety regulations under Title 29 Code of Federal Regulations (CFR) Part 1915 and Title 33 CFR Part 154 are not followed, and equipment is not properly maintained and inspected before each use. Although the investigation into this casualty is not yet complete, the following information and best practices are being conveyed with the hope that this alert will prompt companies to review and update their procedures to prevent similar casualties from occurring.

Ballooned/breached cargo tank & damaged external framing



Bulkhead between the #1 from the #2 cargo tank, folded/breached



Increased Risk of Explosion During Gas Freeing Operations

During gas freeing operations, cargo tank manway and butterworth openings are opened and the flammable vapors within the cargo tank are then removed using mechanical air moving equipment. As outside air is introduced into the cargo tank, the vapor/air mixture within the tank, and near the tank openings, will fall into the flammable range. During this time, if the air moving equipment used to gas free the cargo tank is not the proper type, is not properly maintained, or is not properly electrically bonded and secured to the vessel's structure, static electricity generated by the air moving equipment can discharge as an electric arc and ignite the flammable vapor/air mixture.

The following photos are of pneumatic blowers that were recovered on board a recently exploded tank barge. All blowers recovered on scene had either missing or improperly maintained bonding wires.



As a result of this incident the Coast Guard **strongly encourages** all personnel who work at marine facilities or on board vessels involved with cargo tank cleaning and gas freeing operations, to take the following actions:

- Facility Managers, Safety Supervisors, Shipyard Competent Persons (SCPs), and Persons in Charge (PICs) of cargo tank cleaning/gas freeing operations, should review their company Standard Operating Procedures (SOPs) for tank cleaning and gas freeing operations, and ensure the following:
 - Recommendations outlined in Coast Guard **Marine Safety Alert 10-14** have been incorporated into the SOPs used by personnel during cargo tank cleaning/gas freeing operations.
 - Procedures and practices followed by personnel involved in cleaning and gas freeing, meet all the applicable requirements of 33 CFR Part 154 and 29 CFR Part 1915. Note: cleaning and gas freeing operations are defined as “ship repair” under 29 CFR § 1915.4(j). Workers who are not mariners with a substantial connection to the vessel, and are employed in such activities in or adjacent to a U.S. Navigable Waterway or on the Outer Continental Shelf (OCS) fall under the jurisdiction of the Occupational Safety and Health Administration (OSHA), and the regulations under 29 CFR 1915 apply. See OSHA CPL 02-01-047 and CPL 02-01-051 for more information.
- Ensure all personnel are educated on the critical importance of the bonding wire/strap on air moving equipment (blowers/fans). All personnel should understand that the proper bonding of blowers/fans used in cargo tank cleaning and gas freeing operations is a federal requirement under 29 CFR § 1915.13(b)(11).
- Ensure all personnel are specifically trained on how to properly secure blowers/fans in place to prevent movement/rattling due to vibration and how to properly bond blowers/fans to the vessel/barge structure (e.g., ensure bonding wire/strap is tightly secured to the fan/blower housing and that the clamp for the bonding wire/strap is secured to the vessel structure on bare metal, penetrating any paint coatings). Simply touching/resting the blower/fan to bare metal is **NOT** an adequate means of bonding.
- Implement policy/procedures to require inspection of all air moving equipment, such as portable blowers/fans, prior to first use on each workday. Particular emphasis should be focused upon ensuring that all attached accessories (cones, ducting, etc.) are tightly connected to the blower/fan, and that each blower/fan has a bonding wire/strap that is undamaged, free of corrosion, and securely fastened to the housing of the blower/fan. Clamps used with the bonding wire/strap should also be free of corrosion, with adequate tension to ensure a tight grip/connection when clamped to the vessel/barge structure. Loose, poor, and corroded connections greatly increase the risk of an electric arc due to static discharge.
- Implement a policy that requires the site Safety Supervisor, SCP or PIC of the cleaning/gas freeing operation to visually inspect each blower/fan to ensure that they are properly secured to prevent movement/rattling and that they have been securely bonded to bare metal on the vessel structure by use of a bonding wire/strap with clamp (or other mechanical means to provide a secure connection). These checks should be completed before blowers and fans are activated.

This Safety Alert is provided for informational purposes only and does not relieve any domestic or international safety, operational, or material requirement. Developed by the Investigators of the Marine Safety Unit Chicago and the Office of Investigations and Analysis. Questions may be sent to HQS-PF-flr-CGF-INV@uscg.mil.