# Compliance Overview

## Highlights

### Employer Responsibilities

Each employer is responsible for the safety and health of its workers and for providing a safe and healthful workplace for its workers.

As a result, employers are required to protect workers from the anticipated hazards associated with the response and recovery operations that workers are likely to conduct or encounter.

### Hurricane Warning Terms

- ☑ **Hurricane/tropical storm watches** mean that a hurricane or tropical storm is possible in the specified area.
- ☑ **Hurricane/tropical storm warnings** mean that a hurricane or tropical storm is expected to reach the area, typically within 24 hours.

# OSHA's Hurricane Preparedness and Response Guidance

OSHA provides hurricane preparedness, response and recovery guidance for employees and employers. This guidance includes information on hurricane warnings, hazards and precautions.

Employers preparing for or responding to a hurricane should review OSHA's eMatrix: General Recommendations for Working in All Impacted Areas. OSHA's hurricane eMatrix features information on hazard exposures and risk assessments for hurricane response and recovery work. The information in the eMatrix is organized by activity type to help workers identify what precautions to take based on the tasks they will be performing.

This Compliance Overview is limited to the best practices for hurricane response and recovery operations. For additional information and resources on general hazards, recovery operations, workers' rights, sampling and monitoring, employers should review the eMatrix website.

## Links and Resources

- OSHA's Hurricane eMatrix
- Keeping Workers Safe During Disaster Cleanup and Recovery Fact Sheet
- Disaster Cleanup and Recovery PPE Matrix
- Hand Hygiene and Glove Use in Hurricane-Affected Areas

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# Employer Worker Safety Responsibilities

Each employer is responsible for the safety and health of its workers and for providing a safe and healthful workplace. Employers are required to protect workers from anticipated hazards associated with the response and recovery operations that workers are likely to conduct.

As part of this effort, employers should evaluate each task and operation, identify the hazards associated with them, and establish the exposure controls necessary to adequately protect workers. Employers may accomplish this by developing a job hazard analysis (JHA) for each task workers will conduct and establishing associated safety and health procedures and protocols that protect workers from the hazards identified.

In developing their JHAs, employers should involve a team—ideally composed of safety and health professionals, the workers and their supervisors—familiar with the work to be completed and the hazards associated with that work. Employers using this eMatrix should share it with their workers.

Employers are also responsible for maintaining logs and supplemental documentation for all recordable injury and illness cases when required by OSHA/State Plan recordkeeping regulations. The OSHA Act and OSHA standards and regulations also include reporting requirements. For example, employers must report any fatal accident or one that results in the hospitalization of three or more workers to the nearest OSHA office within eight hours. (See 29 CFR 1904.39 and OSHA Regional and Area Offices.)

Each employer is also responsible for preserving, maintaining and providing workers with access to worker exposure and medical records in accordance with 29 CFR 1910.1020. Employers must tell workers and their representatives where the records collected under this and other applicable standards (e.g., OSHA's comprehensive lead in construction standard 29 CFR 1926.62) will be located, how the data in the records will be communicated to workers, how the records will be maintained and how to access the records.

## Hurricane Preparedness

Businesses should be prepared for natural disasters, particularly those likely to affect the area where they are located. When it comes to hurricane preparation, it is important for businesses to have an evacuation plan in place to make sure workers can get to safety when a hurricane comes. An adequate hurricane preparedness plan should account for adequate supplies and employee training.

Employers, depending on their industry, may be required to have emergency action plans under 29 CFR 1910.38. If this OSHA requirement applies, affected employers should develop and implement emergency action plans before an emergency occurs. These employers should also train individuals who can supervise and coordinate emergency response activities to ensure a safe and successful evacuation.

### Containing Hazardous Waste

Employers must comply with OSHA's Hazardous Waste Operations and Emergency Response (HAZWOPER) standard, 29 CFR 1910.120, if they have workers who will be involved in emergency response operations for actual (or substantial threats of) releases of hazardous substances.

State and local government workers in states with an OSHA-approved State Plan must also follow the U.S. Environmental Protection Agency's (EPA) standard for OSHA's HAZWOPER (see 40 CFR Part 311).

### Understanding Hurricane Threats

To best prepare for and respond to hurricane threats, employers must understand the hurricane warning system. A hurricane or tropical storm watch means that a hurricane or tropical storm is possible in the specified area. A

hurricane/tropical storm warning means that a hurricane or tropical storm is expected to reach the area, typically within 24 hours. Employers must be prepared to follow local authority instructions and evacuate if necessary.

Hurricane strength is rated using the Saffir-Simpson Hurricane Wind Scale. The scale rates hurricane sustained wind speed between 1 and 5. The risk for potential property damage increases exponentially with higher scale ratings. For example, hurricanes that reach Category 3 and higher are considered major hurricanes and may trigger evacuation orders because of their potential for significant loss of life and damage. In contrast, Categories 1 and 2 storms, while still dangerous, may only require preparatory measures.

By convention, these storms are designated as hurricanes if they originate in the Atlantic Ocean and typhoons if they originate in the Pacific Ocean. In the western North Pacific, the term “super typhoon” is used for tropical cyclones with sustained winds exceeding 150 mph.

| Saffir-Simpson Hurricane Wind Scale | | |
|---|---|---|
| Category | Sustained Winds | **Potential Damage** |
| **1** | 74-95 mph<br>64-82 kt<br>119-153 km/h | Very dangerous winds may produce some damage. Well-constructed frame homes could have damage to the roof, shingles, vinyl siding and gutters. Large branches of trees may snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles will likely result in power outages that could last several days. |
| **2** | 96-110 mph<br>83-95 kt<br>154-177 km/h | Extremely dangerous winds may cause extensive damage. Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees could be snapped or uprooted and block numerous roads. Near-total power loss should be expected with outages that could last several weeks. |
| **3 (major)** | 111-129 mph<br>96-112 kt<br>178-208 km/h | Devastating damage should be expected. Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water may be unavailable for several weeks after the storm passes. |
| **4 (major)** | 130-156 mph<br>113-136 kt<br>209-251 km/h | Catastrophic damage should be expected. Well-built framed homes can sustain severe damage with the loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles may isolate residential areas. Power outages may last weeks or months. Most of the area could be uninhabitable for weeks or months. |
| **5 (major)** | 157 mph or higher<br>137 kt or higher | Catastrophic damage should be expected. A high percentage of framed homes may be destroyed, with total roof failure and wall collapse. Fallen trees and power poles are likely to isolate residential areas. Power outages may last for weeks to possibly months. Most of the area may be uninhabitable for weeks or months. |

| Saffir-Simpson Hurricane Wind Scale | | |
|---|---|---|
| Category | Sustained Winds | Potential Damage |
| | 252 km/h or higher | |

# Best Practices for Hurricane Response and Recovery Operations

OSHA has published a hurricane eMatrix that outlines the activities most commonly performed during hurricane response and recovery work. The eMatrix provides detailed information about the hazards associated with those activities. It was designed to help employers make decisions to protect workers and offers recommendations for personal protective equipment (PPE), safe work practices and precautions for each activity. It is intended as a guide and quick reference for employers and response and recovery workers.

The eMatrix captures major activities involved in hurricane response and recovery, highlights many of the hazards associated with them and recommends best practices. Employers should evaluate the specific hazards associated with the jobs and operations performed at the site that is affected by a hurricane watch or warning.

## Worksite Evaluation

Employers should evaluate the work site to identify if the following safety or health hazards are present:

- Fall
- Electrocution
- Noise
- Cuts/lacerations
- High ambient temperatures
- Hazardous substances
- Infectious materials

## Exposure Monitoring

As appropriate, employers should conduct task-specific exposure monitoring during response and recovery activities as follows:

- When required by a specific standard (e.g., as specified in OSHA standards for lead, asbestos, benzene and noise);
- When necessary to assess and evaluate specific worker exposure or to investigate and resolve worker complaints or concerns;
- When needed to verify the adequacy of the implemented hazard control methods; and
- When exposure is reasonably anticipated to be greater than the “action level,” as required by an individual OSHA substance-specific standard. This is recommended for assessing exposure to other chemicals that response and

recovery workers may be exposed to. Screening data, previous sampling results and anecdotal information may be evaluated to assess a worker's anticipated exposure.

If not otherwise established by a standard, the action level can be defined as 50% of an established occupational exposure level. OSHA sets occupational exposure limits called permissible exposure limits

(PELs). PELs are considered legal thresholds and may trigger employer obligations. Employers should also be aware of additional federal and local agencies that may set recommended occupational exposure guidelines for their specific operations.

Occupational exposure levels are set to protect workers from the short- and long-term harmful health effects that may be associated with chemical (e.g., vapors, particulates, fibers) and physical agents (e.g., heat, noise, vibration). Exposure limits may be expressed as eight-hour, time-weighted averages or may be expressed for shorter exposures, such as ceiling levels or 15-minute, short-term exposure levels.

Employers should try to anticipate what contaminants could be associated with worksites affected by a hurricane (e.g., the release of unknown chemicals or entry into confined spaces that may now be permit-required). To improve this effort, employers may ask workers about how they perform various tasks and operations, obtain useful information about the equipment and materials used for these activities, and strive to understand the conditions under which these activities are performed.

When employers suspect that specific chemical and physical hazards are present and the risk of overexposure cannot be conclusively ruled out, they may confirm their presence or absence by screening for them using direct reading instruments (e.g., oxygen meters, combustible gas indicators and noise meters) or by collecting and analyzing grab samples. Employers should use full-shift or short-term personal monitoring as the primary means of assessing individual exposure, even though the results from grab samples and direct reading instruments can be used to estimate individual exposures. When documenting their sampling process, employers may include a clear description of the tasks and operations performed, an explanation of the samples collected and an evaluation of the results. Employers can also report sampling results, monitoring data and any follow-up to workers and their representatives in accordance with the requirements of any applicable standards. Employers may get contact information for all of the individuals involved so that each can be notified of the results and any follow-up medical surveillance recommended when a sample characterizes the exposure of one or more response and recovery workers are involved in a task.

As past emergency response activities have demonstrated, it is important for employers to share hazard and exposure monitoring data with response and recovery organizations. OSHA has posted summaries of its sampling data and exposure information for Hurricanes Katrina, Rita and Wilma on the OSHA website.

To assist employers and response and recovery workers in assessing risk and making decisions about exposure controls such as personal protective equipment (PPE) and respiratory protection, OSHA has included a detailed discussion of OSHA sampling data in the Summary of Activity Sampling Data and Safety and Health Monitoring Information. This information has also been included, where appropriate, in individual eMatrix activity sheets.

Other agencies, such as the EPA and state environmental and public health agencies, have also posted sampling data on their websites. When employers evaluate sampling data from other agencies, employers should remember that occupational exposure data may need to be interpreted in the proper context. This data may have different risk implications from environmental and public health data, which is collected for comparison with exposure levels established to protect the public or environment.

## Hazard Control

Employers should mitigate hazards according to the hierarchy of controls listed below:

- **Elimination or substitution:** Whenever possible, employers should eliminate the hazard from the work area (e.g., repair or remove fallen electrical power lines before allowing other work to proceed in the area). Although desirable, elimination and substitution may not be options for most airborne or chemical hazards created by a natural disaster.
- **Engineering controls:** Employers should take steps to reduce or eliminate exposure to a hazard, such as by guarding the pinch points associated with a machine's moving parts, providing ventilation to a permit-required confined space, using heavy equipment with temperature-controlled cabs, and placing barriers around the swing radius of rotating heavy equipment.
- **Work practice or administrative controls:** Employers should implement work procedures that reduce the probability of exposure. For example, they should use well-rested crews and daylight hours to perform higher hazard or unfamiliar tasks; take frequent breaks during hot weather; remove nonessential personnel from the area during certain task or operations; and decontaminate equipment and personnel after contact with contaminated floodwater or chemicals. When possible, water should be used to suppress dust and work up-wind in dusty conditions. Where extensive hot work is performed in the form of cutting and burning, employers should use extended-length torch handles to increase the distance from the individual's breathing zone to the generation of toxic fumes. Employers can perform specific Job Hazard Analyses (JHAs) to identify important work practice controls. OSHA provides additional assistance in developing JHAs; see Job Hazards Analysis (OSHA Publication 3071, 2002).
- **PPE:** If other controls are not available, are infeasible or do not provide sufficient protection, employers should select and use PPE appropriate for the hazard and level of exposure. OSHA provides additional assistance in selecting and using PPE. See OSHA's Personal Protective Equipment (PPE) Safety and Health Topics page.

## Work Practices

The following work practices provide basic safety, sanitation and good housekeeping guidelines. These practices also minimize exposure to health hazards and contaminants during most activities.

- Establish and maintain evacuation routes and an alerting system to notify individuals in case an evacuation becomes necessary.
- Provide, maintain and inspect fire protection and suppression equipment for fire hazards in the work area.
- Ensure that first aid supplies and services and medical care are readily available.
- Drink water from sources proven to be safe for drinking.
- Avoid the consumption of food or beverages that were exposed to floodwaters or perishables that may have spoiled. In addition, employees should not eat, drink or smoke in areas containing debris, floodwaters, or sludge
- Wash hands before eating, drinking, smoking or using the restroom. If potable water is not available, employees should use hand sanitizer or commercial sanitizing wipes.
- Minimize the accumulation of trash and keep garbage in closed containers.
- Use insect repellent containing DEET or picaridin to prevent insect bites.
- Minimize the creation or disturbance of dust. Employees should work upwind of dusty activities when possible.
- Provide prompt first aid for cuts and scrapes. Antibiotic-resistant bacteria can result in severe injury and illness. Employees should wash and sanitize cuts and scrapes without delay and report injuries to their supervisors.

Employees should also bandage or cover cuts and scrapes and keep them from coming in contact with polluted or contaminated floodwater. Employees should also seek medical help at the first sign of infection.

## Recommended Personal Gear

The following personal gear is suggested for hurricane preparation and response:

- Rain gear
- Change of clothing (appropriate for the location, weather and assignment)
- Toiletries (in plastic rather than glass containers)
- Alcohol-based hand sanitizers
- Flashlights with spare batteries
- Prescription medicines for the expected length of stay (with considerable safety margin)
- Over-the-counter medications for minor illnesses (e.g., pain reliever, allergy medication, hydrocortisone cream, antibiotic cream, bandages)
- Sunscreen (SPF 15 or higher)
- Lip salves
- Insect repellent
- Cap or hat for sun and rain
- Extra pair of glasses or contacts (If you wear contacts, anticipate dusty conditions at disaster sites)
- Sunglasses

## Recommended PPE

Employers should select hurricane response PEE in connection with assessed workplace hazards. Selected PPE must be inspected before each use and repaired or replaced as needed (e.g., when ripped or torn). Employers must maintain adequate supplies for the timely replacement of lost, worn or broken PPE.

In addition, employers must ensure that:

- Selected PPE protects workers from identified hazards;
- Selected PPE is properly fitted to each worker;
- Selected PPE is maintained and stored in a clean and sanitary manner;
- Employees are trained in the use, operation and limitations of their PPE; and
- Employees are trained on how to put on and remove their PPE properly (i.e., donning and doffing techniques)

For additional OSHA guidance on selecting and using PPE, see OSHA's Personal Protective Equipment (PPE) Safety and Health Topics page.

| Generally Recommended PPE | Additional PPE for Consideration (provide as required) |
|---|---|
| • **Foot protection:** American National Standards Institute (ANSI)-approved protective footwear for the activity being performed. Give special consideration to water protection in wet or flooded areas.<br>• **Eye protection:** Safety glasses with side shields. (OSHA has published additional guidance on the selection and use of face and eye protection; this is available on OSHA's Eye and Face Protection Safety and Health Topics page.)<br>• **Head protection:** Hard hats or helmets in areas where overhead or electrical hazards exist.<br>• **Appropriate work clothing:** Clothing appropriate for protecting individuals from hazards in the general work environment that may cause cuts, abrasions, irritation or overexposure to sunlight. Consideration should be given to heat and cold stress issues.<br>• **Hand protection:** Gloves specific to job hazards (e.g., heavy-duty leather work gloves for handling debris with sharp edges and/or chemical protective gloves appropriate for chemicals potentially contacted). See the OSHA Fact Sheet on this topic for additional OSHA-published guidance on hand hygiene and glove use in hurricane-affected areas. | • **Eye and face protection (specialty):** Goggles, full-face shields, or other suitable protection as needed to protect against flying objects and liquid splash hazards.<br>• **High-visibility apparel:** High-visibility safety apparel and headwear compliant with ANSI/ISEA 107-2004, along with other traffic safety measures, in areas where vehicles or heavy equipment are used. This is especially important when working in temporary roadway work zones. (See the OSHA Fact Sheet on this topic for additional OSHA-published materials on work zone traffic safety.)<br>• **Hand protection (specialty):** Appropriate gloves suitable for the tasks being performed (balancing dexterity with protection). Considerations include biological hazards (bloodborne pathogens), chemical hazards, and physical hazards (abrasions, cuts, punctures and heat). Vibration-dampening gloves should be used when vibration hazards exist (e.g., during jackhammer use).<br>• **Work clothing and gear (specialty):** Lanyards, harnesses, and supports for fall protection, and chemical protective clothing where contact with chemicals may occur.<br>• **Leg protection:** Snake boots or snake gaiters to protect against snakebites in areas where snakes are indigenous; chaps when using chain saws.<br>• **Respiratory protection:** The mandatory use of respirators requires compliance with the OSHA respiratory protection standard (29 CFR 1910.134), including the development of a written respiratory protection program that describes how respirators will be cleaned, maintained, and stored; a filter or cartridge change out schedule based on the work expected; and how workers will receive medical evaluations, training, and fit testing. Voluntary use of respirators must conform to Appendix D of 29 CFR 1910.134. |

***Respiratory Protection***

While it is the employer's responsibility to determine the appropriate respiratory protection for a given situation, the following general guidance can be used in making risk assessment decisions for hurricane response activities. When airborne contaminants exceed or may reasonably be expected to exceed allowable exposure limits, evaluate the hazard to determine exposure and provide appropriate respiratory protection.

- Where nuisance levels (exposures below the PEL) of dust or mold are present, use of a National Institute for Occupational Safety and Health (NIOSH)-approved N, R or P95 filtering facepiece is recommended. Those with a layer of activated carbon provide an additional level of comfort for workers by controlling nuisance odors.
- Where contaminants such as lead, asbestos, or silica are present, respirators appropriate for the anticipated level of exposure are required. These could include, at a minimum:

- N, R or P100 air-purifying respirators for lead and asbestos; and
- N, R or P95 air-purifying respirators for crystalline silica; N, R or P100 will provide additional protection for documented overexposures.
- Where other contaminants exist, specific filters or cartridges appropriate to the contaminant must be used; combination cartridges and filters must be used, as necessary.

In all cases, surgical masks and dust masks that are not NIOSH-approved are not considered suitable respiratory protective devices.

***Protection From Drowning***

Workers working on, over or near water that presents a drowning hazard (e.g., because of the flow rate, the depth or the presence of rocks) must wear appropriate personal floatation devices approved by the U.S. Coast Guard. Additional devices, such as a lifesaving skiff and a ring buoy, must be provided in accordance with 29 CFR 1926.106.

***Hearing Protection***

Workers should wear earmuffs and/or earplugs when working around potential noise sources. Hearing protection must be worn when noise levels exceed 90 dBA.

When hurricane recovery tasks or operations are covered by OSHA's General Industry Standards, OSHA requires that individuals who have standard threshold shifts use hearing protection when noise levels exceed 85 decibels (dBA). A useful "rule of thumb": If you cannot hold a conversation in a normal speaking voice with a person who is standing at arm's length (approximately 3 feet), the noise level may exceed 90 dBA. (See OSHA's Occupational Noise Exposure Safety and Health Topics page for additional OSHA-published information on noise and hearing conservation programs.)

***Other Hazards***

Specialized PPE ensembles and procedures are required for protecting workers involved in activities that expose them to other hazards for which additional protection and procedures are needed (e.g., structural firefighting, confined-space entry, response to hazardous materials releases, asbestos abatement, lead abatement, welding, cutting and burning). Evaluate working conditions, provide any additional training to address the hazard, and assign appropriate PPE in accordance with applicable standards (e.g., OSHA, NFPA).

## Employee Training

Employers should train workers engaged in hurricane response and recovery operations so they can recognize and avoid the hazards to which they may be exposed while performing their jobs. This training may be composed of the following elements:

- Job-specific training that is necessary for workers to develop the skills needed to perform their assigned task/operation.
- Task- or operation-specific training on how to perform the job safely, including any training mandated by specific standards. This may include training/information related to hazard communication, hazardous waste cleanup and emergency response, selection and use of PPE, work with lead and asbestos, use of tools and work at elevations.
- Training about the general hazards, conditions and work expected to be performed. Training should be conducted before workers are deployed. Discuss common stressors for response and recovery workers, such as extended work shifts, acclimatization issues, less-than-ideal sleeping and eating conditions, and critical incident stress concerns.

- Site-specific training that covers the hazardous conditions and exposures that workers may encounter at a particular location. Identify specific controls such as specialized equipment, work practices and additional PPE necessary for the particular job site. These controls may be identified in a JHA developed for the task or operation.
- Daily job briefings covering the day's work plan, anticipated hazards and required exposure controls.

Employers should maintain records of worker training and make these available for inspection by agencies with jurisdiction. Training records include training certificates, attendance rosters and course curricula.

**NOTE:** Contracts with private employers to assist in the response and recovery should specify the particular safety and health training for which the contractor is responsible.

## Medical Considerations

Medical screenings, physical exams and respirator clearances are required by certain OSHA standards for workers. Examples include workers who routinely use or are exposed to lead, asbestos and other regulated chemicals or are required to wear PPE (e.g., respirators) because of their jobs.

Employers should evaluate the activities that workers will be performing in hurricane-impacted areas. Employers should use this information in consultation with a physician or other licensed health care professional to identify any additional medical examinations, tests or vaccinations that could be required.

*Source: OSHA Hurricane eMatrix*