

***CONTRACTOR SAFETY HANDBOOK***

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## 1.0 SCOPE AND APPLICABILITY

This safety handbook is intended to provide every Division of Waste Management (DWM) contracted cleanup contractor and sub-contractor employee with basic rules, regulations and instructions pertinent to work safely on all DWM program cleanup sites in Florida. These guidelines are based on Federal, State and local laws, as well as the Department’s and industry’s experience.

This handbook is not intended to be a comprehensive safety guide to address every situation that may arise; rather, it provides guidance on the minimum health and safety requirements for establishing and maintaining a safe working environment during the course of site rehabilitation work. It has been developed with the understanding that all on-site contractors and sub-contractors field personnel will have received 40 hours of training to meet the requirements of **29CFR1910.120 OSHA – General Industry Regulations**, and/or 8-hour supervisory or refresher training prior to commencement of all field work. It is everyone’s responsibility to apply safe behaviors to their work and personal habits and to comply with the requirements of this safety handbook. If a contracted company’s practice exceeds the requirements included herein, that company’s work practices shall take precedence. Information provided in this handbook should be consistent with any program site requiring drilling, operations and maintenance, sampling and remediation.

## 2.0 SAFETY PHILOSOPHY – FIVE KEY PRINCIPLES

Five workplace safety principles are:

* + 1. Always operate in a safe and controlled condition.
    2. Always ensure safety devices are in place and operable.
    3. Follow safe work fundamentals and procedures.
    4. Maintain integrity of all dedicated systems.
    5. Follow written protocols for high-risk conditions.

All injuries, losses and environmental releases are preventable and contractor personnel must work toward the goal of zero incidents.

Contractors and sub-contractors are required to maintain a safe workplace, and to identify and mitigate workplace hazards. Requirements contained in this document are minimum requirements. If other measures are required to maintain a safe workplace, it is the responsibility for contractors to identify and implement protective measures.

The Point of Contact (**POC**) for the Division of Waste Management is:

**Christopher A. Williams**

**Division of Waste Management**

**Christopher.A.Williams@floridadep.gov**

**Florida Department of Environmental Protection**

**2600 Blair Stone Road, MS 4500**

**Tallahassee, Florida 32399-2400**

**850-245-8758**

***At DWM, it is Safety First, Last and Always!***

## 

## 3.0 HEALTH AND SAFETY PLAN

Contractor shall prepare a written Health and Safety Plan (HASP) which complies with OSHA

1910.120 (b) prior to commencement of work on a contracted program site. The HASP must be available on-site for review. It is the responsibility of the contractor to ensure that health and safety procedures are enforced at the site. Project personnel, including subcontractors, shall have a copy of the site-specific HASP for review and must sign to indicate acceptance before on-site project activities begin.

The HASP must be reviewed periodically and updated as needed to reflect current conditions and

site hazards. The HASP must address site security such as barricades, etc.

The HASP must meet the requirements of respective federal and state regulations, industry standards, and accepted safety practices. When working on a site, contractor shall comply with all written policies and procedures specific to that site (emergency management, lockout/tagout, work permits, etc.).

Each and every program site Health and Safety plan shall be consistent with:

* OSHA Regulations, particularly with 29CFR-1910 and 1926
* EPA Order 1440.2 – Health and Safety Requirements for Employees engaged in Field Activities
* EPA Standard Operating Safety Guide (1984)
* EPA Order 1440.3 – Respiratory Protection
* NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985)
* Appropriate State and local government regulations

**NOTE:** **Each and every site Health and Safety Plan must be revised to address any additions and/or changes in planned activity at the site.**

## 4.0 EMERGENCY RESPONSE

The HASP for each program site must include an emergency response plan in case of injury.

For work at all program sites, contractors must have the appropriate training with regard to their conduct during any site emergency.

During the emergency response or incident, the contractor must make every effort to preserve evidence that may be needed in the investigation of the incident.

## 5.0 KEY PROJECT PERSONNEL AND RESPONSIBILITIES

## 5.1 Contractor’s Project Manager

The Project Manager has the ultimate responsibility for the health and safety of his company’s personnel at the site. The Project Manager is responsible for:

* Ensuring that project personnel review and understand the requirements of the HASP.
* Keeping on-site personnel, including subcontractors, informed of the expected hazards and appropriate protective measures at the site.
* Provide resources necessary for maintaining a safe work environment.

## 5.2 FIELD SAFETY OFFICER

Contractor shall designate a person that will enforce the requirements of the HASP once field work begins. The field safety officer has the authority to immediately correct situations where non-compliance with the HASP are noted and to immediately stop work in cases where immediate danger to field personnel are perceived. Responsibilities of the field safety officer include:

* + - Limiting access to the site to authorized personnel.
    - Limiting access to the exclusion zone.
    - Monitoring of work activities and correcting any deficiencies.
    - Conducing daily safety inspections and tailgate safety meetings before each day’s activities begin.

## 5.3 SUBCONTRACTORS

Requirements in this handbook also apply to subcontractors working on DWM program sites. As such, subcontractor site workers are expected to perform in a manner consistent with the DWM program safety objectives, policies, and procedures.

## 6.0 INCIDENT REPORTING

An incident is an event where a site worker suffers a work-related injury or illness, property is damaged, an unauthorized spill or release occurs or there is non-compliance with an environmental permit or regulation.

The Contractor shall be knowledgeable of environmental regulatory reporting requirements (i.e. spill and release reporting). With the exception of high risk incidents described in Section 6.2, Contractor will report all incidents to the **DWM POC** within 24 hours of the incident. In addition, site owners and/or responsible parties in the Petroleum Restoration Program and Dry Cleaner Solvent Program will be notified by the Division within 24 hours of the incident taking place.

If an incident or near-miss occurs, and there is a question regarding the need for a substance test, the **DWM Safety Coordinator** (**POC**) must also be notified within 24 hours upon the initiation of post- accident substance testing.

Contractor must report all incidents to the DWM Safety Coordinator as described below:

## 6.1 VERBAL REPORTING TO DWM SAFETY COORDINATOR POC

Contractor shall notify the **DWM POC** of the following incidents:

* Any injury or illness requiring first aid or greater to an employee, contractor, or member of the public.
* Chemical exposure incident.
* Permit exceedance or non-compliance event.
* Any vehicle accident.
* Property damage.
* Fire.
* Odor Complaint.
* Hostile encounter with the public or stakeholder.
* Security breaches, theft, trespass, assault.
* Incidents and near misses with potentially significant or high negative consequences.

## 6.2 HIGH RISK INCIDENTS – IMMEDIATE REPORTING

Contractor shall report immediately by phone to the DWM POC the following incidents:

* + - Any incident involving company personnel, contractor employees and the public that results in a fatality, multiple injuries/illnesses, or a serious individual injury requiring overnight hospitalization.
    - Property damage events (examples include fires, explosions, acts of nature, vandalism, theft, etc.).
* Any incident which requires evacuation of any employees or contractor personnel beyond the facility.
* Any incident that requires the evacuation or sheltering-in-place of the public and of field personnel.
* Any situation that should be brought to the attention of the Department such as:
  + Acts of terrorism (e.g., bomb threats, sabotage, kidnapping, employee violence, etc.)
  + Confrontations with anti-industry groups that could attract media attention.

# Any situation that attracts or is likely to attract adverse media attention.

In the event the **DWM POC** is not immediately available by telephone, then contractor’s project manager must report to the Program Administrator for the Petroleum Restoration Program and Waste Cleanup Program. Should these not be available, the DWM Director’s office should be contacted.

## 7.0 GENERAL HEALTH AND SAFETY

* Contractor shall comply with local, state and federal occupational safety and health regulations and maintain required records available for the Department’s review.
* Contractor shall establish an exclusion zone as appropriate to protect site workers and the public. Contractor shall place suitable barriers at a minimum height of 28 inches, where the potential for site visitation by the public or other pedestrians exists. Also, the Contractor should minimize the number of people in the work zone.
* Required Personal Protection Equipment (PPE) for each job must be specified in the HASP. Contractors must wear proper work clothing and head protection for the task. Shorts are prohibited on any work site.
* Contractor is responsible for fire prevention in the work area.
* Contractor is responsible for providing or arranging emergency medical and first aid care for its personnel, and any follow-up care which may become necessary.
* Workers taking medication which may impair their physical and mental ability must be evaluated by the Contractor to determine if they can perform safety-sensitive work.
* Only use tools that are designed for the desired purpose. After-market modifications to tools (i.e. specialized drilling tools or “fishing” tools) must be identified prior to commencement of work.
* Tools and equipment that do not meet minimum safety standards are not allowed on the jobsite.
* Contractor is responsible for providing Safety Data Sheets (SDS) (also known as Material Safety Data Sheets or MSDSs) for all hazardous substances brought on site by the contractor and keeping them in a location available to site workers. SDSs are to be utilized for evaluating potential hazards in the workplace.
* Contractor must comply with OSHA Fall Protection Standards and provide fall protection for workers at heights greater than 6 feet above ground level. Contractors must provide the OSHA-required training to its employees prior to using aerial lifts. 100% tie-off is required for all work from “tank builders scaffolds” greater than 6 feet above grade. (The term “tank builders scaffold” is defined in OSHA 1926.450(b) and meeting the specifications of OSHA 1926 Subpart L Appendix A.2 (z).)
* Contractors must comply with OSHA standards for working in excavations deeper than 4 feet below ground level.
* Contractor shall ensure no open excavations or trenches are left unattended in public or private property, roadways, trails or walkways unless markings, barricades and detours are provided and approval has been granted from the property owner or facility operator before leaving the site.
* Contractors are required to safely and responsibly manage exposure to bio-hazards (e.g. insects, vegetation, and animals), sharps (e.g. blades) and personal security threats that may be present at project sites.
* Vehicles may be left running only when operating auxiliary equipment or lights, and when the driver can ensure the vehicle is secure with the transmission in park or neutral, the parking brake set and the wheels chocked where required or deemed necessary.
* Firearms are not allowed on any DWM program sites.
* Cell phone use or texting inside the site exclusion zone of a DWM program site is prohibited.
* Cell phone use or texting inside a remedial compound is prohibited.

## 8.0 WORKER HEALTH AND HYGIENE

Contractor must identify, evaluate and control potential workplace health hazards. Each Contractor must provide a Site Assessment Plan (included in the HASP) and strategies to minimize its employees’ risk of exposure to health hazards. The plan shall be reviewed and revised periodically to reflect changes in work environment. The Site Assessment Plan shall address the following:

* + - Identification of agents/stressors that may present adverse health risk factors to workers;
    - Identification of work site staff and/or tasks with potential for exposure;
    - A methodology for evaluating exposure potential or risk factor and prioritizing for evaluation as needed for further risk assessment;
    - Sampling strategies and data evaluation methods used for assessments addressing who, what, when, and at what frequency.

## 9.0 SAFETY TRAINING

Contractor personnel shall be instructed in incident/injury reporting procedures. Contractor shall ensure that personnel conducting work at a DWM program facility have completed the required site-specific safety training and fully understand the policies and procedures.

## 9.1 HAZWOPER TRAINING

Specific training requirements apply to operations which involve a potential for worker exposure to hazardous substances, including hazardous waste, as specified by 29 CFR

§1910.120 Hazardous Waste Operations and Emergency Response (HazWOpER). Sites covered by this rule include:

1. Hazardous substance response operations under CERCLA, including any initial

investigations of the site prior to identification of exposures.

1. Corrective actions involving cleanup conducted under RCRA.
2. Operations at a DWM program cleanup site.
3. Operations involving storage, treatment, and disposal facilities regulated by 40 CFR

§§264 and 265 pursuant to RCRA.

1. Emergency response operations regardless of location when there has been a release

or substantial threat of release of hazardous substances.

Contractors who enter a hazardous waste site must recognize and understand the health and safety hazards associated with the cleanup activity. The level of training provided must consist of the following:

* Be consistent with the worker's job functions and responsibilities
* Identify toxicity of the materials and the levels of potential exposure
* Emergency preparedness.

Refresher training required by §1910.120 must be completed before the end of the twelfth month following initial training or the previous refresher training.

## 10.0 CHEMICAL HAZARDS

Hazards of known or expected chemicals of concern will need to be addressed concerning each site-specific plan. As an example: exposure of concern for chemical compounds that may be present at the site are inhalation of airborne contaminants and direct skin contact with contaminated materials. Wearing protective equipment and following decontamination procedures can minimize dermal contact. To minimize inhalation hazards, dust control measures will be implemented, when necessary, and action levels will be observed during scheduled activities.

On-site worker exposure to airborne contaminants should be monitored during intrusive site activities. A calibrated photoionization detector (PID) or flame ionization detector (FID) should be used to monitor changes in exposure to volatile organic compounds (VOCs). Personnel will perform routine monitoring during site operations to evaluate concentrations of VOCs in employee breathing zones.

Material safety data sheets (MSDSs) will be maintained on site for chemical products used by the Contractor at the site. In addition, containers will be clearly labeled in English to indicate their contents and provide appropriate hazard warnings.

## 11.0 CONFINED SPACE ENTRY

A Confined Space is a space that:

* + 1. Is large enough and so configured that a person can enter and perform assigned work
    2. Has limited or restricted means for entry or exit
    3. Is not designed for continuous employee occupancy.

In addition to the criteria listed above, a Permit-Required (if necessary) Confined Space means a

confined space that has one or more of the following characteristics:

1. Contains or has a potential to contain a hazardous atmosphere
2. Contains a material that has the potential for engulfing an entrant
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward to a smaller cross- section, or
4. Contains any other recognized serious health hazard.

All confined spaces must be evaluated to determine if the hazard presents special precautions that are to be specified in a confined space entry permit. Generally, depressions and excavations of depth less than 4 feet are not considered confined spaces.

## 12.0 ENERGY ISOLATION

Contractors are responsible to provide a “lock, tag, and try” or “lock out - tag out” (LOTO) program in accordance with the OSHA standard (29 CFR 1910.147). Contractors shall verify personnel (including subcontractors) involved in LOTO are trained and qualified for such work. Contractor shall comply with any site specific LOTO requirements, which shall be specifically addressed in the HASP and if applicable, in a required addendum.

Contractor shall ensure the electrical lines, air lines, gas lines or other lines containing hazardous materials or energy, shall be rendered safe by emptying, purging, disconnecting or other means before work may begin.

Any electrical installation or repair work must be conducted by certified electricians.

## 13.0 LONE WORKER SAFEGUARDS

No worker should be left alone without means of quickly summoning help should the worker become incapacitated due to injury or illness.

Contractors must carry some form of identification with them on their person and in vehicles (company identification badge, driver's license, etc.).

## 14.0 REMEDIATION SYSTEM OPERATION

Remediation equipment must be maintained to maximize equipment reliability and operating integrity. An effective program will prevent the uncontrolled release of materials and minimize the potential for significant health, safety and environmental impacts while maximizing operating reliability.

**15.0 RECORDKEEPING AND AUDITING**

Contractor shall furnish upon request documentation for all health, safety and applicable training within the previous 12 months. The Department may review compliance with daily tailgate safety meetings and acceptance of the HASP by the Contractor’ and subcontractor’s personnel indicated by signatures on the HASP’s acceptance signature page.

Contractors are encouraged to perform a minimum of one health and safety audit per year at an active site; correct deficiencies found, and report corrective actions and deficiencies to the DWM Safety Coordinator. Contractor must track non-conformances to completion if the item cannot be corrected immediately when noticed.

## 16.0 SPECIFIC SAFETY PROCEDURES

Contractors must follow the specific safety procedures in this section.

## 16.1 EXCAVATION AND BOREHOLE CLEARING

Prior to any work below grade, the Contractor’s Project Manager is responsible for:

* Ensuring that a utility clearance has been performed in the area to be worked. No work below grade should be conducted without a utility clearance. Where available, as-built drawings of underground utilities and structures and interviews with knowledgeable personnel should be utilized to obtain information about underground structures. Operating facilities may have additional requirements and permitting systems that must be considered prior to work.
* Notifying property owners and/or tenants according to the provisions of the applicable access agreement.

General Requirements

Physical site clearing to expose subsurface features to the perimeter and planned depth of an excavation is not required but should be considered if warranted by risk.

Methods used to remove concrete or other surface cover should consider the potential for encountering subsurface features. A concrete saw must be operated according to the operation manual. The blade’s features and specifications must match the sawing operation. Inspect blade prior to use. Do not use a blade with any cracks, discoloration or missing segments. Apply coolant as required during operation and do not remove the blade from the cut line until it has stopped spinning.

Open holes must be covered or barricaded when left unattended or overnight. Operating facilities may have additional requirements for unattended boreholes or excavations.

Field crews must immediately stop work and reevaluate the work plan if unexpected fill material or structures are encountered. On operating sites, notify the Operating Facility Contact. If damage has occurred, immediately notify the Site Manager.

**Boreholes**

Pre-clear holes to 120% of the drill diameter to a minimum depth of 5 feet below ground surface. Consider pre-clearing to greater depths in close proximity to process piping such as loading racks.

Locate boreholes a minimum distance of 5 feet perpendicular from utility mark-out lines.

## 16.2 SAFETY KNIFE USE

**Definition**

Fixed Open Blade Knife (FOBK) – A hand tool that has an exposed, prominent, sharp-edged blade that is fixed, or can be held/locked into a fixed position. Note that machetes, hatchets and axes are examples of FOBKs.

Safety Knife – A hand tool that has an automatically retractable blade or a blade that is shielded to protect a body part from contact with the blade.

## Tool Selection and Use

Use of shears or scissor-type cutter is preferred over use of a safety knife. Multipurpose shears come in a wide variety of shapes and sizes and can perform virtually all the same cutting tasks as a knife, but with a lower degree of risk.

In choosing a safety knife, preference should be given to the tool that is designed such that the auto-retractable feature cannot be overridden. Do not disable or disconnect the safety feature of a safety knife. If the safety feature of the knife is broken or no longer functioning properly it must be removed from service.

Always cut away from the body. When cutting right to left, use your left hand. When cutting left to right, use your right hand. If possible, use a vise or clamp to hold the item to be cut instead of attempting to hold it with your hands. Look for pinch points when using shears or cutting devices.

## Requirements

Workers must be knowledgeable in the operation of the safety knife. Willfully overriding the safety features of a safety knife may result in bodily injury and may result in discipline, up to and including dismissal from the job site. When cutting, cut resistant gloves appropriate for the task must be worn when using a cutting tool.

Examples of **acceptable** auto retractable or shielded safety knives:

 Blade auto-retracts when it loses contact with the cutting surface.

Concealed blade

Auto-retracting blade guard

Examples of **prohibited** Fixed Open Blade Knives:

Utility Knife Pocket Knife Multipurpose tool

Machete Axe

## 16.3 SAFE DRIVING

**Scope**

This procedure applies to drivers operating vehicles on projects actively managed by

employees, contractors and subcontractors. This procedure does not apply to:

* Employees and contractors who do not operate vehicles as part of their job duties.
* Third party deliveries and shipments when not fully dedicated to the site project.
* Service vendors for things such as vending machines, laundry/uniform service, copier repair, automobile service, compressed gas deliveries and other similar incidental service vendors.
* Service contractors such as waste haulers and materials delivery with limited site access.
* Parties contracted to do work on our locations which are not under contract, subcontract or purchase order to the Contractor.

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## Requirements

* The driver is responsible for safe operation of the vehicle at all times.
* Drivers shall have appropriate licenses, and are recommended to have received defensive driving training.
* Driver shall require occupants of the vehicle to wear seat belts at all times during vehicle operation.
* Driver should avoid distractions while driving. It is recommended that drivers not use Portable Electronic Devices or Cellular Phones, even if the device is equipped with a “hands-free” option. If it is necessary to use such a device while traveling, the driver should carefully pull off of the road and park in a safe location prior to using.
* GPS devices (portable or factory installed) may be used, but data entry or screen adjustment should only be done when the vehicle is stopped.

## 16.4 DRILLING

**Scope**

These requirements are specific to hollow stem auger, flight auger, air rotary, casing

hammer, mud rotary, sonic, or direct push drilling operations.

## General Safety and Emergency Response

* The minimum drilling rig crew size is two (2) people.
* A first-aid kit must be available in an easily accessible area away from the drilling operation. Its location must be reviewed during the tailgate safety meeting.
* At least one fire extinguisher, minimum 20#, rated for type A-B-C fires must be readily accessible, removed from mounting brackets, at the site away from the drilling rig. Its location must be reviewed during the tailgate safety meeting.
* The crew must have access to cell phone or 2-way radio for communication in case of emergency.
* Work cannot be performed if lightning strikes are observed in the area.
* The use of cell phones is strictly prohibited during drilling. Cell phones must never be used within the exclusion zone.

## Personal Protective Equipment (PPE) for Drilling

* Hearing protection with a minimum Noise Reduction Rating (NRR) of 17 dB must be worn in the exclusion zone or when working within 20 feet of the operating rig. Most foam insert plugs and muffs meet or exceed this requirement.
* Secure loose clothing, hair wraps, strings on jackets and hoods, and shoelaces. Jewelry is not allowed to be worn. Eliminate protruding tools from tool belts.
* A face shield must be worn for splash protection during equipment decontamination and for other activities involving splash hazards.

## Equipment Safety

* A drilling contractor will complete a checklist daily to assure that equipment is in safe and operable condition. The checklist must be available on-site for review.
* There will be no oil, fuel or hydraulic fluid leaks from equipment.
* Deck engine gauges must be in working order.
* Rig controls and levers, including emergency shut-off, must be legibly labeled. Wherever possible, Pinch points should be identified and labeled.
* Adequate cribbing must be in place under the leveling jacks and outriggers to prevent tip-over or sinking into unstable soil.
* Secure the rig when it is in position, but not in use. Set brakes and/or locks, chock wheels or tracks as conditions require.
* The exclusion zone must be clearly marked with a continuous barrier, minimum height of 28 inches, where the potential for site visitation by the public or other pedestrians exists.
* Never travel with the mast of the drill rig in the raised or partially raised position.
* The drilling rig must be equipped with an operable emergency shut-off or “kill” switch. Persons working within the exclusion zone must know the location and operation of the emergency shut-off switch.
* The functionality of emergency shut-off switches should be tested during the duration of the drilling event.
* Augers, drill rods, or any down-hole equipment should be cleaned only when the drill rig is in neutral, the engine is idle, and the machinery has stopped rotating.
* Repair to rigs must be done by a person trained and qualified to perform the repair.
* Small equipment leaks that develop after the start of work must be evaluated. If the leak does not impair the performance of the equipment and the leak can be contained, work may continue.
* Do not perform maintenance or refueling while the equipment is operating.
* Use of catheads or open drum-powered winches is not allowed. A cathead is a spool mounted horizontally on the rear of the drill rig and is used along with a rope to tighten or loosen a section of drill casing to the drill casing string.
* Work must cease if cables or cable clamps become damaged or frayed.
* No body part is allowed within 12 inches of a turning auger.
* Broken or substandard equipment must not be brought to the site. Equipment that becomes broken must be tagged as such and shall not be used for any purpose.
* Equipment must not be used if guards are not in place.
* Vertical storage of drill rods and augers is not allowed unless the rig is specifically designed to accommodate this practice.
* Drilling rods and augers may not be removed in multiple sections. Drilling rods and augers must be broken down at each joint as they are removed from the hole. Manual tools must not be used in combination with powered rotation.
* Rig operator and helpers must be knowledgeable of any after-market modifications to drilling equipment and be trained in its use. Use, purpose and precautions associated with after-market modifications must be specified on the procedures, job hazard analysis, or other documentation maintained at the site.
* If any down-hole equipment becomes stuck and normal rotation, pulling or pushing is not possible, a written procedure for this task (“fishing”) must be followed.

## 16.5 HAND PROTECTION

**Requirements**

* The primary focus of hand protection should always be to eliminate hand exposure to pinch points, crush points, impact zones, and other hand hazards. It is fully acknowledged that the use of any glove will not prevent all hand injuries, but their use, in many cases, minimizes the severity of an injury.
* Tasks shall be evaluated to determine what specific hand protection is required. Not all tasks that could occur at a remediation site are addressed in the guidance table below.
* Gloves are required to be worn at all times inside the work/exclusion zone. Gloves may be removed, if necessary, to write, interface with a keyboard, or to see to personal needs.
* Personnel shall wear hand protection appropriate to the hazard. Fingerless

gloves are not allowed. Remediation sites have many ubiquitous cut and puncture hazards and therefore a cut and puncture resistant glove shall be the primary choice for day to day use. Consult applicable Safety Data Sheets when working with chemicals to assist with determining appropriate glove material and type.

* Visually inspect gloves prior to use for signs of penetration and damage due to impact, rough treatment, or abnormal wear that might reduce the degree of safety. Replace gloves when damaged.
* Incident reports for all finger/hand/wrist incidents
* must capture the following data:
  + glove requirements specified in pre-job planning
  + whether gloves were being worn at the time of the incident
  + type, manufacturer and model of glove used
  + area of hand or wrist affected by the incident

Corrective actions must consider improvements in hand protection including glove enhancement suggestions.

## Glove Selection

* Gloves should be selected based on the hazards of the task to be performed. Appropriate gloves (i.e., impact resistant, cut resistant, etc.) for the specific job task shall be worn until that task is completed.
* For cut resistance, glove liners may be worn, or a cut resistant glove may be worn under another glove to provide cut protection.
* The worker should be able to perform their duties without removing their gloves.
* It is unlikely that a single glove will have all the protection characteristics needed for the job. Glove features should be carefully evaluated to determine the best fit. Many gloves are tested for resistance to hazards. See Appendix A for a description of common glove testing programs. ANSI ratings for cut resistance, puncture resistance, abrasion resistance, chemical permeation resistance, chemical degradation resistance, Ignition and Flame resistance, Heat degradation, Vibration Reduction and Dexterity will assist the user in selecting a protective glove. It should be noted that the working surface of the glove is tested. A glove may have a high level of hazard resistance on the palm, but have little or no protection on the back of the hand.
* Glove design will affect the amount of protection provided. Cuff and wrist design should be considered when selecting a glove.
* Gloves selected for protection from chemical exposure should also consider other hazards associated with the tasks, and should also protect against hazards such as cut, puncture or abrasion. A chemical resistant glove may be work over another glove to provide protection from multiples hazards.

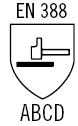
## Glove Selection Guideline (Suggested only; Listing not all-inclusive)

|  |  |  |  |
| --- | --- | --- | --- |
| Hazard | Tasks | Recommended Standard \* | Representative gloves\* |
| Impact Hazards, Med/Heavy Duty, Cut/Puncture | Drilling/direct push activities, staging to breakdown.  Heavy materials handling  Power tools Air knifing  Hydro excavation | Plastic Resin Backhand Protection,  ANSI Cut Level 3 or 4  EN 388 Cut Level 3 or 4 | Hexarmor™ Chrome Hexarmor™ GGT5 Hexarmor™ L5 Hexarmor™ Steel Leather  Ringers Roughneck SuperCuff**™** |
| Med/Heavy Duty, Cut/Puncture, Oil/Solvent Resistant | Tasks where materials are treated with oil or solvents. | ANSI Cut and Abrasion Level 3,  EN 388 Cut Level 3 | Memphis™ Ultra Tech Nitrile Cut & Splash  Best™ Neoprene 6780 Hexarmor™ Ten X Threesixty |
| Medium Duty, | Light materials | ANSI Cut and Abrasion | Best™ Zorb-It Ultimate HV |
| Cut/Puncture, | handling, wet service | Level 3, EN 388 Cut | 4567 |
| Gloves with Oily Surface Grip | Level 3 , Abrasion level  2 or 3 | Ansell™ Cut Protective Glove 97-505 |
| Med/Heavy Duty, Cut/Puncture, Abrasion | Light Materials Handling System O&M  Use of hand tools Hand Auguring Heavy Equipment Operator | ANSI Cut and Abrasion Resistance Level 2, EN 388 Cut and Abrasion Level 2 or 3 | Perfect Fit™ PF570 Hexarmor™ Level Six 9010/9012  Ironclad™ Cut Resistant Glove |
| Light Duty, Cut/Puncture, Abrasion | Handling soil samples or groundwater samples  Opening spoons Well construction | ANSI Cut Level 2, EN 388 Cut Level 2, Puncture Resistance, Abrasion Resistance | Memphis™ Ninja Max N9676GL  Memphis™ UltraTech Dyneema 9676 Memphis™ Ninja Ice (Cold Weather)  Ansell™ Hyflex 11-511. 11-  624  Ansell™ Powerflex 80-813 Ironclad™ Workforce |
| Light Duty | Observation | Cut Resistance, any level |  |
| \* Reference to ANSI and EN 388 glove testing standards. Listed gloves are good choices and generally meet the standards, but are not the only gloves that can be used. | | | |
| This selection chart is not intended to address all chemical hazards. Gloves used for chemical protection or to prevent contamination shall provide cut/puncture resistance or be used in tandem with cut/puncture protection. | | | |
| Gloves available in high visibility colors have shown to be effective and are preferred. | | | |

**Appendix A: Glove Standards**

Globally, there are two different performance standards for hand protection, the European Standard EN388 and the ANSI/ISEA 105 Standard for the US. The test methods are not entirely identical and, therefore, cannot be directly correlated. In both standards, a higher rating is a more hazard resistant glove.

Glove ratings by the EN388 Standard are displayed as a four digit number indicating the performance of the fabric in testing for Abrasion, Blade Cut, Tear and Puncture, in that order.

ABCD

Abrasion Blade Cut Tear Puncture

Glove ratings are not always printed on the glove or on a tag on the glove. Standards are usually printed on the box or can be accessed in catalogs, including internet catalogs, and product specification information.

## Cut Resistance

The EN388 Standard uses the Coup test method for cut resistance. A circular blade is moving back and forth across the fabric sample under a fixed load of 500 grams while rotating in the opposite direction of the linear movement. The method simulates the number of repetitive cuts needed to cut through the fabric on the same position of the glove using a constant load. The result of the test referred to as the cut index tells you how much better the sample is compared to a reference cotton fabric. The cut resistance is shown as the **second** digit in an EN388 rating.

|  |  |
| --- | --- |
| **ANSI Cut Resistance Standard** | |
| Level | Weight (g) needed to cut through material with 25 mm of blade travel |
| 0 | < 200 |
| 1 | ≥ 200 |
| 2 | ≥ 500 |
| 3 | ≥ 1000 |
| 4 | ≥ 1500 |
| 5 | ≥ 3500 |

The ANSI standard for measuring cut resistance of materials used in protective clothing is based on ASTM F1790. It measures the amount of force applied for failure to occur at one inch of travel for a standard cutting blade. A higher value indicates a higher level of cut resistance.

## Puncture Resistance

|  |  |
| --- | --- |
| **ANSI Abrasion Resistance Standard** | |
| Level (tested at 500 g load) | Abrasion Cycles to Fail (Newtons) |
| 0 | < 100 |
| 1 | ≥ 100 |
| 2 | ≥ 500 |
| 3 | ≥ 1000 |
| Level (tested at 1000 g load) |  |
| 4 | ≥ 3000 |
| 5 | ≥ 10000 |
| 6 | ≥ 20000 |

The ANSI standard and the EN standard use the same test method for puncture resistance. A higher value indicates a high puncture resistance.

## Impact Resistance

|  |  |
| --- | --- |
| **ANSI and EN Puncture Resistance Standard** | |
| Level | Puncture (Newtons) |
| 0 | < 10 |
| 1 | ≥ 10 |
| 2 | ≥ 20 |
| 3 | ≥ 60 |
| 4 | ≥ 100 |
| 5 | ≥ 150 |

**Abrasion Resistance**

The ANSI standard is based on ASTM D3389-05. The fabric is measured for its ability to resist abrasion from H-18 abrasion wheels with 2 different loads.

There currently are no ANSI or EN standards for impact resistance and backhand protection of gloves. Gloves with thermoplastic resin components on the back hand and fingers provide impact and backhand protection and are marketed as such.