

## Script for Module Six

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### Slide 1

Welcome to Module 6 of our hazard communication training sessions. This training will cover the disinfection and sanitation chemical bleach and other chlorine compounds. During this module, we will review the hazards associated with exposure to sodium hypochlorite and other chlorine disinfectants.

**This material was produced under grant number SH-05046-SH8 from the Occupational Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does the mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.**

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Bleach is the most commonly known chlorine cleaner, used in both home and industrial settings. It is inexpensive and readily available.

Commercial bleach is a mixture of sodium hypochlorite ( $\text{NaClO}$ ) and water, with a range of concentrations so check the SDS for your specific product usage.

Bleach and all chlorine cleaners kill bacteria, fungi, and viruses. However, to be effective they must be applied in a specific concentration, your employer will provide you with instruction on how to achieve those concentrations. Because they degrade over time, bleach solutions must be made up daily.

Your employer should let you know the locations that bleach is being used and the concentration of bleach being applied in each location.

### Slide 3

Chlorine compounds can be used in a wide range of concentrations and require 1–10 min contact time, your supervisor should be able to inform you of the proper concentration used in your workplace. When chlorine is combined with potassium, sodium or calcium it creates a hypochlorite, which is a chemical salt of hypochlorous acid.

The pictogram of the test tubes being poured on a hand and surface represent corrosion. These signify that the chemical may cause eye damage, break down the skin or cause burns, and it may be damaging to certain metals. It is important that whoever is making up or using these compounds ensures that the proper pH (acid or caustic) and concentration levels (% of chlorine) are created, because improperly created mixtures can pose an eye and skin irritation hazard, and potentially even be deadly if mixed with an incompatible chemical. It is important to always wear the proper PPE when handling chlorinated mixtures.

All chlorinated mixtures can produce irritating/corrosive gas if heated to temperatures above 115 degrees F, which poses an immediate health and safety hazards to employee.

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Chlorine gas is also used when cleaning out food processing piping or vessels (enclosed systems). Also referred to as “cleaning in place” or CIP, which means the equipment is not taken apart, but cleaned in place with no employee exposure. Chlorine gas is toxic gas with a yellow-green color of vapor.

#### Slide 5

One advantage of chlorine chemicals is that all of them are effective sanitizers for CLEAN surfaces, especially, stainless steel food contact surfaces. They are inactivated by contact with organic material (i.e., food, blood) so a cleaning step is often required for heavily soiled surfaces before disinfection can occur.

However, the disadvantages include that the mixture/concentration has to be correct for the surface and according to the manufacturer’s instructions. If mixed at the wrong concentration or percentage, these chemicals can be highly corrosive! Remember if heated above 115 degrees Fahrenheit, all chlorine chemicals can produce toxic, corrosive chlorine gas that can be fatal if inhaled.

#### Slide 6

Chlorine based disinfectants and sanitizers are susceptible to losing their disinfecting properties with exposure to temperature, light, and over time. Your employer should ensure that the storage locations meet the storage requirements of the chemicals.

As mentioned in the previous slide, chlorine compounds are inactivated by any organic material (i.e., food, blood) so a initial cleaning step is often required for heavily soiled surfaces before disinfection can occur (second cleaning).

Your employer should let you know the locations that bleach or other chloride-based chemicals are being used and the concentration that should be applied in each location.

#### Slide 7

Even though bleach is readily available and inexpensive, it does have a dangerous disadvantage.

1. Bleach is incompatible with many other chemicals. Examples are: ammonia, acids, hydrogen peroxide, some organic solvents, and some metals.
2. Mixing bleach with ammonia releases toxic gases, and the reaction/release may occur violently!

3. Mixing bleach with acid releases chlorine gas! (acids including vinegar and other industrial acids could cause this reaction)

Bleach's reaction to acids and ammonia produces chlorine and other toxic gases and should be avoided at all times. Employees have been killed breathing the toxic gases produced when bleach is improperly mixed with incompatible chemicals.

The SDS is your best source to verify what chemicals are incompatible with bleach.

#### Slide 8

What are the potential health hazards associated with exposure to bleach and chlorine chemicals? The chemical is slightly corrosive and can irritate the eyes. If you get any of these chemicals in your eyes, get to an eyewash immediately and rinse your eyes! The respiratory systems are also affected by chlorine chemicals and can cause stinging and coughing. It also can irritate or burn the skin.

Finally, if you should experience symptoms of discomfort while working with or around chlorine chemicals, notify your supervisor or employee representative immediately. It is your right to work in an environment free of recognized hazards and you are protected by OSHA for reporting concerns related to health and safety.

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