

HEATING SYSTEMS SAFETY: PIPES & COMPONENTS

In addition to boilers, there are heating system-related components such as pipes and radiators that may present their own safety hazards to occupants of a building. These components need to be properly serviced, maintained and guarded. This bulletin is intended to provide information that can help prevent injuries to both students and employees.

KEY POINTS

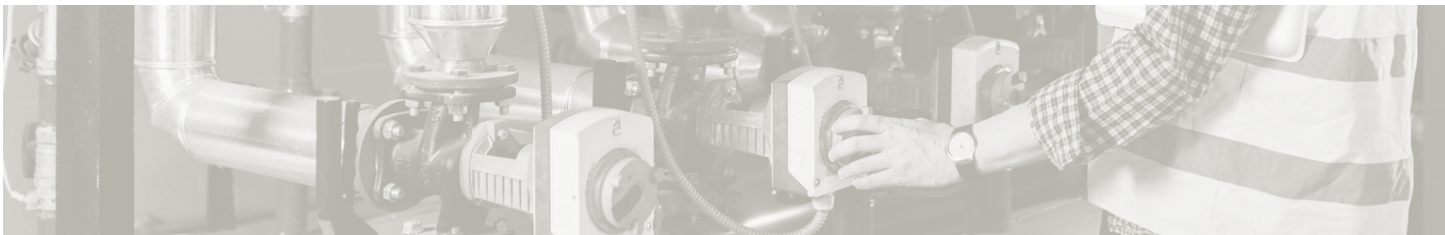
- The safety of students should be the School District’s TOP PRIORITY!
- It is UNACCEPTABLE for portions of the buildings to be dangerous due to hot surfaces.
- Workers should wrap protective insulation around pipes BEFORE the boiler is turned on in mid-October, especially if it’s within seven (7) feet of the floor.

PIPE & COMPONENT HAZARDS

There are major differences between the effects a touch temperature of 113°F vs. 135°F has on the skin during prolonged contact. The table below demonstrates why keeping a hot pipe or component’s touch temperature or “skin temperature” below 120°F is critical:



Pipe/ Component Touch Temperature (°F)	Effect On Skin After Contact
113°F	Minor Damage (threshold of pain)
126°F	First Degree Burns Only Up To This Temp
135°F	Severe Damage, Third Degree Burns
140°F	Complete & Permanent Destruction of Outer Layer of Skin (After 5 seconds +), Industry Standard Max Touch Temp
212°F	Minimum Temperature of Steam Leaving a Boiler



HEATING SYSTEMS SAFETY: PIPES & COMPONENTS *continued*

PROTECTION & PRECAUTIONS

While engineers understand the role of proper insulation for heat conservation and freeze protection, shielding individuals from burns from hot pipes & components is a **top priority**, especially in buildings with children. Heat damage is like frostbite: it creeps up on you, and exposure time is important. Touching a pipe at 113°F for a couple of seconds causes minor damage, while contacting a 135°F pipe even for only a second incurs severe damage. ASTM C1057, “*Standard Guide for Heated System Surface Conditions that Produce Contact Burn Injuries*,” notes that contact with a 140°F surface must be kept to under 5 seconds because longer exposure causes third degree (also known as “full thickness”) burns – i.e., complete and permanent destruction of the outer layer of skin (epidermis) and the entire layer beneath (dermis). Longer exposure times and higher temperatures are prohibited. In addition, always keep in mind that damage doesn’t stop as soon as the person’s skin no longer touches the hot surface.

SAFETY STANDARDS

While OSHA does not have jurisdiction in all cases, OSHA standards have defined minimum safety standards. OSHA standards should serve as a good baseline for safety. We also want to make sure students are learning in a safe environment out of harm’s way. OSHA does consider exposed heated surfaces, if there is a potential for injury, to be a hazard and will issue citations if employees can come into contact with such surfaces. While there are not any specific OSHA standards, there are general standards that address such hazards such as:

- **1910.261(k)(11): Steam and hot water pipes.** All exposed steam and hot water pipes within 7 feet of the floor or working platform or within 15 inches measured horizontally from stairways, ramps, or fixed ladders shall be covered with an insulating material or guarded in such a manner as to prevent contact.
- **1910.262(c)(9): Steam pipes.** All pipes carrying steam or hot water for process or servicing machinery, when exposed to contact and located within 7 feet of the floor or working platform shall be covered with a heat-insulating material, or otherwise properly guarded.

HEATING SYSTEM SAFETY AT THE SCHOOL DISTRICT OF PHILADELPHIA:

- Maintenance personnel should be inspecting all hot surfaces, including pipes and radiators before the boilers are turned on for the season.
- Constant inspection is also required to assure that any missing or damaged protective insulation or guarding is replaced immediately.

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