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Fire Prevention Best Practices
Wood Chip Piles

Wood chip and bark mulch piles have the tendency to spontaneously combust, posing a risk to loss of property and materials. Fires typically start deep inside wood chip piles due to microbial activity, oxidation, or chemical reactions and may not be detected right away. It is crucial to regularly test the internal temperatures and moisture levels of wood chip piles to help identify and prevent potential fires.

Preventative Measures:

- *Pile Location and Size*: Avoid placing piles near combustible items or ignition sources such as power lines, vehicles, or machinery. Keep pile heights to a maximum of 20-25 ft. Create multiple smaller piles rather than one large one. Ensure that adjacent piles are spaced far enough apart to prevent a fire from spreading from one pile to another. Maintain adequate buffer zones around piles, such as a perimeter of gravel or concrete, to prevent fire spread.
- *Ventilation*: Ensure that there's sufficient airflow to the pile. Stagnant air encourages heat buildup. Ventilated piles (using natural or mechanical means) are safer. Stack wood chips with a slight slope to promote airflow, and regularly turn over the pile to release heat and reduce the risk of hot spots.
- *Moisture Management*: Aim to maintain the moisture content of the wood chips between 20% to 30%. Excessively dry chips ignite easily, while wet chips can promote microbial activity that generates heat.
- *Inspection and Monitoring*: Frequently check the surface and core temperature of the piles. Look for signs of smoke or steam, which may indicate internal heating. There are many tools which can be used to monitor the temperatures of wood chip piles. Options include long probe thermometers, wireless temperature sensors, thermal imaging cameras, temperature-sensitive cables, and remote monitoring systems. A carbon monoxide detector is another great tool to assist in safety monitoring, as carbon monoxide is a byproduct of combustion. High levels of carbon monoxide may help identify smoldering fires before they spread.
- *Emergency Planning*: Equip the site with fire suppression equipment, such as water tanks, hoses, hydrants, and extinguishers, and ensure that employees are trained to use them. Have a formal fire suppression and emergency response plan in place that includes evacuation routes and communication protocols in case of a fire. Ensure the fire department has access to the site if needed.
- *Personal Protective Equipment and Training*: Ensure that all personnel involved in pile management are trained in fire safety, have the appropriate personal protective equipment, and have immediate access to fire suppression equipment. Make sure employees are trained on how to use the tools and are aware of any warning signs and mitigation procedures.

The chart on the following page lists temperature monitoring guidelines that are based on established industry practices and standards. These guidelines should be considered when wood chip piles are present.

Temperature Range	Wood Chip Pile Activity & Corrective Action Required
Below 140°F (Normal)	Microbial activity and decomposition are occurring, but the risk of spontaneous combustion is low.
	Required Action: Continue regular monitoring to ensure the pile is properly managed in terms of moisture content, pile height, and airflow.
140°F to 169°F (Elevated)	Increased microbial activity and possible early stages of self-heating. The pile may be at risk of reaching critical temperatures if no action is taken.
	Required Action: Increase the frequency of temperature checks. Consider turning the pile or aerating it to release trapped heat and reduce internal temperature. Check for signs of hot spots, smoke, or unusual odors (e.g., burnt or musty smell). Moisture content should also be evaluated, as overly dry or wet piles can exacerbate heating.
170°F to 189°F (Critical)	The risk of spontaneous combustion is significantly increased. Oxidation and chemical reactions could lead to ignition.
	Required Action: Increase the frequency of temperature checks. Consider turning the pile or aerating it to release trapped heat and reduce internal temperature. Check for signs of hot spots, smoke, or unusual odors (e.g., burnt or musty smell). Moisture content should also be evaluated, as overly dry or wet piles can exacerbate heating.
190°F and Above (Dangerous)	The pile is in imminent danger of spontaneous combustion. Smoldering or fire may already be occurring inside the pile, even if it's not visible from the surface.
	Required Action: Immediate emergency response. The pile must be broken down as quickly and safely as possible to expose the heated core. Apply water, foam, or other appropriate fire suppression agents to cool down the pile. Notify fire services if there are signs of fire or if the temperature continues to rise despite intervention. This situation can escalate rapidly, so priority should be placed on safety and fire suppression.

Steps to Take Once Action is Required:

- *Turn the Pile:* Turning or moving the pile helps release heat and improves ventilation, allowing heat to dissipate before it can escalate into a fire. Use appropriate equipment (e.g., front-end loaders) to move the material safely.
- *Moisture Control:* Adjust the moisture content of the pile. Adding water to overly dry materials can reduce the risk of fire. Conversely, drying out overly wet materials can reduce the microbial heating that contributes to self-combustion. Aim to maintain the moisture content of the wood chips between 20% and 30%.
- *Fire Suppression:* If hot spots or signs of smoldering are detected, apply water or foam directly to the affected areas. Use caution when applying water, as too much can create steam and pressure, potentially making the situation worse.
- *Break Down the Pile:* In severe cases where temperatures are above 190°F or when fires are already suspected, the pile must be dismantled to isolate the hottest materials. Removing the top layers allows the inner core to cool and reduces the chance of the fire spreading throughout the pile.
- *Call Emergency Services:* If the temperature cannot be controlled, or if fire is observed, contact local fire services for assistance.

For additional information regarding fire prevention guidelines for wood chip piles, please refer to:

- NFPA 1 Fire Code
- FM Data Sheet 8-27 Storage of Wood Chips
- NFPA 61 Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities