

Combustible Off-Gas Safety Bulletin

Fire, Deflagration and Explosion Risk Management

Facilities that manufacture engineered wood products or wood pellets may be at risk of fire, deflagration or explosion due to the buildup of combustible off-gas (CG) within dryers and associated drying systems during the process of drying wood fibre. Employers must assess the potential hazards and implement control measures to mitigate the risk.



What is combustible-off gas?

Combustible off-gas is produced when drying wood fibre before the manufacture of engineered wood products and wood pellets. Hazardous gases may arise from pyrolysis in a depleted oxygen environment where temperatures are elevated, but not high enough for combustion. If the wood fibres are dried to the point where there is little remaining moisture, then the chemicals within the fibres will decompose, producing a mixture of gases that may include carbon monoxide, hydrogen, methane, and other VOCs.

Risk Management Best Practices:

Training

- Ensure applicable staff members have up to date training regarding start up and shut down procedures, power loss/surge, and alarm management. Prepare detailed written operating and emergency procedures and have personnel periodically retrained and/or evaluated in these procedures. Training will minimize risk and potential damage through effective management and response.

Start up and shut down

- Ensure pre-start up safety reviews are conducted.
- Ensure pre-programmed purge cycles are in place.
- Ensure continuous operation of ID fans.
- Have automated emergency shut down procedures in place.

Power

- Have backup power generation available in case of power loss which is critical in maintaining exhaust fan operation and the venting of combustible off-gas.
- Install surge protection on HMI.

Monitoring/sensors

- Install and monitor CG sensors to allow operators to manage gas levels and fire, deflagration or explosion risk.

Spark detection and extinguishing

- Have spark detection and automatic extinguishing systems installed in areas subject to collection and buildup of wood dust, creosote and related materials. i.e. dryer, duct work, fan housings, etc.

Ducting

- Ensure ducting is sealed, minimizing oxygen ingress.
- Ensure ducting is insulated to minimize temperature variations and potential for buildup of wood dust, creosote and related materials.

Electrical systems

- Ensure electrical systems follow NFPA standards particularly for grounding and bonding.

Frequent inspection, maintenance and cleaning

- Regular inspections are critical.
- Regularly inspect & clean equipment of wood fibre dust, creosote and related buildup.
- Conduct ongoing preventative maintenance.
- Ensure inspection and maintenance procedures are documented.

Confined Space Entry

- Conduct confined space hazard assessments in order to address potential areas of CG collection.
- Utilize continuous venting.
- Utilize continuous detection monitoring for both toxic and explosive gases.

Hot work

- Special procedures in place for hot work in areas of potential combustible gas collection.
- Active monitoring of hot work.

