



TOP COMPLIANCE (Pty) Ltd

Your Business' Safety Is Our Concern

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Fire prevention and safety at work and at home.

In recent weeks, South Africa has been gripped by the devastating impact of fires, leaving a trail of destruction in its wake. From the fierce wildfires raging across the Western Cape, fuelled by relentless winds, to the alarming incidence of building fires in Johannesburg, these infernos have inflicted profound losses on communities. Lives have been tragically lost, livelihoods shattered, and the fabric of daily life torn apart. These incidents underscore the urgent need for heightened awareness, preparedness, and effective response strategies to mitigate the threat of fires in both urban and rural environments. Fire prevention and safety are critical considerations both at work and at home. It is essential to be proactive in identifying fire hazards and implementing preventive measures to minimise the risk of fires. With the increasing prevalence of lithium-ion (Li-ion) and lithium iron phosphate (LiFePO₄) batteries in various devices, understanding their potential fire risks is paramount.

Fires consist of three essential elements, often referred to as the "fire triangle." Each element is necessary for a fire to ignite and continue burning:

1. Heat is the initial energy required to start the combustion process. It raises the temperature of the fuel to its ignition point, where it begins to release combustible gases. Heat can be supplied in various forms, such as flames, sparks, friction, electrical arcs, or radiant heat from nearby sources.
2. Fuel is any material that can undergo combustion and sustain a fire. Common fuels include wood, paper, plastics, gases, liquids (such as LPG, alcohol, sanitiser or oil), and solids (such as furniture or clothing). The type and quantity of fuel present determine the intensity and duration of a fire.
3. Oxygen is necessary for combustion to occur. It chemically combines with the fuel during the burning process, producing heat, light, and byproducts such as smoke and gases. Sufficient oxygen levels are crucial for sustaining a fire, while oxygen depletion can extinguish flames.

The fire triangle illustrates the interdependence of these three elements in the combustion process. Removing any one of these elements can disrupt the fire and extinguish flames. For example, fire extinguishers work by depriving the fire of either heat (cooling), fuel (starving), or oxygen (suffocation), thereby interrupting the combustion process and suppressing the fire.

Class A, B, C, and D are classifications used to categorise different types of fires based on the type of fuel involved. Here is a brief explanation of each class:

1. Class A fires involve ordinary combustible materials such as wood, paper, fabric, plastics, and general waste. These fires typically produce glowing embers and leave behind ashes after burning. Water and dry chemical extinguishers (DCP) are commonly used to extinguish Class A fires by cooling the fuel and depriving it of oxygen.
2. Class B fires involve flammable liquids and gases such as petrol, LPG, oil, grease, solvents, and alcohol. These fires can spread rapidly and produce intense flames and heat. DCP or carbon dioxide extinguishers can be used to smother the fire and interrupt the chemical reaction by separating the fuel from the oxygen.
3. Class C fires involve energized electrical equipment or electrical sources. These fires pose unique hazards due to the potential for electrical shock and the risk of reignition. Use non-conductive extinguishing agents such as carbon dioxide or DCP to extinguish Class C fires without conducting electricity.
4. Class D fires involve combustible metals such as magnesium, titanium, sodium, potassium, and lithium. These fires are rare but can be extremely hazardous due to the high temperatures and reactive nature of the metals. DCP extinguishing agents, specifically designed for suppressing metal fires, are used to smother the flames and cool the metal surface. Lithium fire extinguisher refers to a fire extinguisher specifically designed to extinguish fires involving lithium-based materials. Lithium fires can be particularly challenging to extinguish due to their high energy output and the potential for re-ignition. Specialised extinguishing agents and techniques are required to effectively suppress lithium fires and prevent re-ignition. Aqueous vermiculite is a type of extinguishing agent used in certain fire extinguishers. Vermiculite is a naturally occurring mineral that expands when heated, forming a lightweight and fire-resistant material. Aqueous vermiculite is a water-based solution containing vermiculite particles suspended in water. When applied to a fire, aqueous vermiculite forms a heat-resistant barrier that helps to smother the flames and cool the fuel surface, extinguishing the fire and preventing re-ignition.

Understanding the different classes of fires is crucial for selecting the appropriate firefighting tactics and extinguishing agents to effectively combat each type of fire. It's essential to match the extinguishing agent to the specific fuel involved to achieve successful fire suppression while minimising the risk of injury or property damage. Additionally, proper training and familiarity with fire extinguishers and firefighting techniques are essential for safely responding to different classes of fires.

Preventing fires is everyone's job. We all need to be alert to anything that could cause a fire and take responsibility to report any problem areas so they can be corrected. Safety measures are crucial to protect employees, assets, and operations. Here are some key considerations:

1. Regularly do a [hazard identification and risk assessment](#) to assess fire risks in the workplace, including electrical hazards, flammable materials, and equipment prone to overheating. Identify areas where lithium-ion batteries are used or stored, such as in portable electronic devices, solar system batteries or electric vehicles.
2. Establish clear fire [safety policies and procedures](#), including [emergency evacuation plans](#), fire [extinguisher training](#), and reporting mechanisms for potential fire hazards. Ensure that employees are trained in fire safety protocols and know how to respond in case of a fire.

3. Store lithium-ion batteries in a cool, dry place away from direct sunlight and heat sources. Avoid overcharging or exposing batteries to extreme temperatures, as this can increase the risk of thermal runaway (is one of the primary risks related to lithium-ion batteries. It is a phenomenon in which the lithium-ion cell enters an uncontrollable, self-heating state) and fire.
4. Only use chargers and accessories recommended by the device manufacturer. Cheap or counterfeit chargers may not have built-in safety features, increasing the risk of battery failure and fire.
5. Never leave batteries unattended while charging. Use charging stations equipped with overcharge protection and automatic shutoff features to prevent overcharging and thermal runaway.
6. Install fire suppression systems, such as sprinklers or specialised extinguishing agents, in areas where lithium-ion batteries are used or stored. These systems can help contain fires and minimise damage in the event of a battery-related incident.
7. Practice good workplace housekeeping, clutter contributes to fires by providing fuel and by preventing access to exits and emergency equipment.
8. Place oily rags in a covered metal container. This waste must be properly disposed of on a regular basis.
9. Maintain machinery to prevent overheating and friction resulting in sparks.
10. Report electrical hazards. Many fires start in faulty wiring and malfunctioning electrical equipment. Never attempt electrical repairs unless you are qualified and authorized.
11. Maintain free access to all electrical control panels. Material or equipment stored in front of the panels would slow down the shutting down of power in an emergency.
12. Use and store chemicals safely. Read the label and the Material Safety Data Sheet to determine flammability and other fire hazards. Provide adequate ventilation when using and storing these substances.
13. Use all precautions to prevent ignition in potentially explosive atmospheres such as those containing flammable liquid vapors or fine particles. (dust, powder, grains, sugar etc.).
14. Use non-sparking tools, and control static electricity as required.
15. Help maintain building security to prevent arson related fires. Lock up as instructed; report suspicious persons; and don't leave combustible rubbish where it can be set afire outside the building.
16. Smoke only in designated areas and extinguish smoking materials safely. Never smoke in storerooms or chemical storage areas.
17. Never block sprinklers, firefighting equipment or emergency exits. Observe clearances when stacking materials.
18. Post emergency telephone numbers as well as the company address by the telephone in your station for quick access if a fire were to start in your work area.
19. Learn how to properly use a fire extinguisher. Training of staff: Formal training and in-service training.
20. [Evacuation planning](#): Signage visible from all angles. Training of all staff regarding the emergency procedures. Yearly practice of the emergency procedures to include both evacuation and lock-down / duress procedures.

Home fire prevention and safety: Fire safety is equally important in residential settings. Questions to consider for your safety at home.

1. Is there at least one exit point in your home which you could use as a fire escape?
2. Do you have smoke detectors at home that can alert you and your family when asleep?

3. Do you have fire extinguishers in your home?
4. Do you have a fire safety plan (or any emergency plan)?
5. Do you know what to do in the event of different types of fires?

Here are some fire prevention tips for homes:

1. Place smoke alarms on every level of your home, including inside bedrooms and near sleeping areas. Test smoke alarms regularly and replace batteries at least once a year.
2. Create a fire escape plan with multiple exit routes and a designated meeting point outside. Practice fire drills with your family members or roommates to ensure everyone knows what to do in case of a fire.
3. When disposing of lithium-ion batteries, recycle them at designated recycling centres or electronic waste facilities. Avoid puncturing or damaging batteries, as this can lead to thermal runaway and fire.
4. Store spare lithium-ion batteries in their original packaging or in battery cases to prevent short circuits and accidental damage. Keep batteries away from metal objects, coins, or keys that can cause a short circuit.
5. Teach family members, especially children, about the dangers of playing with fire and electrical devices. Emphasize the importance of fire safety practices, such as never leaving cooking unattended and keeping flammable materials away from heat sources.
6. Smoke inhalation is extremely dangerous and can disorient you and cause you to make poor decisions in an emergency. If you are exposed to smoke, attempt to wet a cloth or item of clothing, cover your mouth and nose with it will give you approximately an additional 2 minutes.
7. Doors: If your door is closed, feel it for heat toward the bottom of the door with the back of your hand – If it is cool, open it slowly and look at your surroundings outside. If there is a lot of smoke, keep close to the ground and crawl to get out. If you can get out, try to wake the rest of the household by calling for them or fetching children from their bedrooms. Get outside as quickly as possible! If the door is hot, don't open it, as this means there is too much heat outside. Find another way out. If trapped go into the bathroom and fill the bath with water and get in with your clothes on or stand in the shower. Let the emergency services know you are trapped in the bathroom. Use the laundry basket as a "hard hat" to protect you from the ceiling falling in.
8. Burglar bars: Choose specific exit points that are easy to reach by all members of the household and out of the way of where a fire is most likely to start (i.e. the kitchen, fireplace, etc.) and have an exit strategy planned in the event of a fire.
9. Ensure that you have easy access to keys to open security gates or have a no-key option for opening the gates. Keep the keys away from the door or windows, but within easy reach of the front door in case of an emergency.
10. Fire-proof doors: They are traditionally used in large buildings and for industrial applications, but some have been designed to suit home use. These doors are aimed at limiting the spread of smoke and will withstand a fire for longer than standard doors.
11. Emergency contact numbers: Ensure that they are displayed near your phone and are saved on all your family members' cell phones.
12. Fire extinguishers: Ensure that you have a fire extinguisher handy in at least one high-risk room in your home. Therefore, kitchen and garages are good spots to consider. If you have 2 floors in your home, keep at least one extinguisher per floor.
13. Smoking: It's always best (for health as well as for safety reasons) not to smoke in the home.

14. Electrical outlets: Do not overload these. Ensure you turn switches off at the walls (instead of just turning the item plugged in off) each time you leave the home or go to bed and any time when not in use. This will also save you electricity.
15. Never leave your cooking unattended. Burning oil can be dangerous. If using gas cooking equipment, keep reminders around to check that you turned the gas off as this can be explosive.
16. Children: Keep all dangerous material (matches, etc.) out of reach of children and preferably locked away. Get covers for your electrical outlets to prevent shocking, and child-proof doors and windows.
17. All heating equipment should be kept at least 1m away from flammable items. And don't leave heaters on while sleeping.
18. Do not leave fires going overnight. Also, check that you clean your fireplace regularly and that there is nothing flammable nearby. Keep children far away from fireplaces (including the sharp and hot tools used to maintain fires). Rather replace with oil or panel heaters.
19. Electric blankets: Turn off before getting into bed. Turn off at the wall, not just the blanket switch. Store between the base and the mattress during the summer months to maintain and prevent the wires from bending. Replace every 3-5 years.

With many homes and workplaces resorting to solar, inverters and batteries it is very important to understand the different types of batteries and which is the safest option for your needs.

Lithium-ion (Li-ion) and lithium iron phosphate (LiFePO₄) batteries are two types of rechargeable lithium-based batteries, each with distinct characteristics and advantages. Here are the key differences between the two:

Chemical Composition:

- Lithium-ion (Li-ion) batteries typically use a combination of lithium cobalt oxide (LiCoO₂) or lithium manganese oxide (LiMn₂O₄) as the cathode material.
- Lithium iron phosphate (LiFePO₄) batteries, on the other hand, utilize lithium iron phosphate (LiFePO₄) as the cathode material.

Safety:

- Lithium iron phosphate batteries are considered safer than lithium-ion batteries, particularly in terms of thermal stability and resistance to thermal runaway. LiFePO₄ batteries are less prone to overheating, combustion, or explosion under abusive conditions.
- Lithium-ion batteries, especially those containing lithium cobalt oxide (LiCoO₂), have a higher risk of thermal runaway and fire if damaged, overcharged, or exposed to high temperatures.

Cycle Life:

- Lithium iron phosphate batteries typically have a longer cycle life compared to lithium-ion batteries. They can withstand a higher number of charge-discharge cycles before experiencing significant capacity degradation.
- Lithium-ion batteries may experience capacity loss and performance degradation over time, especially with frequent cycling and exposure to high temperatures.

Temperature Performance:

- Lithium iron phosphate batteries exhibit better performance at extreme temperatures, both in terms of charging and discharging. They are more stable and less affected by temperature variations compared to lithium-ion batteries.

- Lithium-ion batteries may experience reduced performance and safety concerns when exposed to high temperatures or extreme cold.

Applications:

- Lithium-ion batteries are widely used in various applications, including consumer electronics (e.g., smartphones, laptops), electric vehicles (EVs), and energy storage systems (ESS).
- Lithium iron phosphate batteries are commonly employed in applications requiring high power output, such as power tools, electric bicycles, backup power systems, and grid energy storage.

Lithium-ion batteries offer higher energy density and versatility, lithium iron phosphate batteries provide enhanced safety, longer cycle life, and better performance in high-power applications and extreme temperatures.

Fire prevention and safety are essential for protecting workplaces and homes from the devastating effects of fires. By implementing proactive measures and adhering to safety guidelines, we can minimise the risk of fire incidents, including those involving lithium-ion and lithium iron phosphate batteries. Stay vigilant, educate yourself and others, and prioritise fire safety in all aspects of life to ensure a safer environment for everyone.

Fire safety begins with awareness, prevention, and preparedness. Stay vigilant, stay informed, and prioritise safety at all times.

<u>Occupational health and safety auditing and consulting</u> 	 <u>Online safety shop</u>		
			
<u>First aid equipment</u>	<u>Signage</u>	<u>Legal posters</u>	<u>Safety Equipment</u>

Courses offered by Top Compliance (Pty) Ltd

ONLINE ACADEMY - https://academy.topcompliance.co.za/
Occupational Health and Safety Courses
Safety representative – Legal Liability
The Occupational Health and Safety Act & responsibilities of management – Legal Liability
Hazard Identification and Risk Assessment
Food facility health & safety course in terms of R638
Basic Ladder Safety Course
Fire Fighting and Prevention Courses

Fire Marshal - Basic firefighting
Fire & Evacuation marshal - Basic firefighting with emergency action planning

ONSITE TRAINING	
First Aid Courses:	
Level 1 - US 119567 - Perform basic life support and first aid procedures	2 days
Level 2 - US 120496 - Provide risk-based primary emergency care/first aid in the workplace	3 days
Level 3 - US 376480 - Provide first aid as an advanced first responder	3 days
Level 1 & 2 - US 119567 & 120496	3 days
Level 1, 2 & 3 - US 119567, 120496 & 376480	5 days
Level 2 & 3 - US 120496 & 376480	3 days
Child and infant CPR & choking	6 hours
Adult CPR & choking	6 hours
Adult CPR & choking and AED	1 day
Occupational Health and Safety Courses	
Safety representative – Legal Liability	1 day
The Occupational Health and Safety Act & responsibilities of management – Legal Liability	1 day
Hazard Identification and Risk Assessment	1 day
Food facility health & safety course in terms of R638	6 hours
Basic Ladder Safety	6 hours
Fire Fighting and Prevention Courses	
Fire Marshal - Basic firefighting	6 hours
Fire & Evacuation marshal - Basic firefighting with emergency action planning	1 day