



NIRAPON Safety Bulletin on Air Conditioning Units

*The core of Nirapon's Safety Management Program is education and training.
This article is part of Nirapon's Learning Resource Center.*

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Current statistics suggest almost 90% of homes in the US had installed air conditioners by 2015. Despite this, the National Fire Protection Association (NFPA) reports that air conditioners (AC) cause 1% of annual fires with 120 injuries, 40 deaths, and \$82 million in property damage. (<https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Building-and-life-safety/oshomes.pdf>)

There are several reasons why an AC unit may catch fire. These problems influence each other; for example, debris or dust from lack of regular maintenance may cause the air conditioner to overheat, and flammable objects carelessly stored nearby cause the fire to increase.

By following some simple safety advice, you will not only ensure that your AC doesn't pose a threat to life and your workplace. You will also ensure that it operates well, reducing energy consumption and maintenance costs.





Reasons an AC Unit May Overheat

Cause: The unit is blocked by excessive dust, debris or items stored carelessly around the unit.

Solution: The unit must be cleaned regularly, around once per week in a dusty industrial setting such as an RMG factory. Nothing should be stored near the unit to allow a free flow of air. Create a safe zone around AC units.



Cause: A mechanical problem starts a fire; this is usually through heat caused by friction due to lack of lubrication of moving parts.

Solution: A regular preventative maintenance programme needs to be established this will prevent such problems, reduce the risk of fire, extend the life of the equipment, and allow the unit to run more efficiently saving money on replacement parts and utility bills.

Cause: The air conditioner is overworked; the unit is too small for the room and so can never lower the temperature.

Solution: Have a HVAC engineer assess each room so that the right size and number of units are installed.

Cause: Overheating or a fire caused by electrical problems.

Solution: An AC unit requires a large electrical load; factory electrical engineers will need to fully understand the electrical load requirements of installed HVAC systems. This will also require input and regular maintenance by a competent HVAC engineer. The wiring for an AC unit, as with all electrical equipment, should be in good condition properly installed and regularly inspected and tested as part of the factory's preventative maintenance programme. Never connect the AC to an extension cord.



CAUTION

What Can Cause An AC Unit To Explode?

The most common gases used in air conditioners are R12 (Freon) R22 (HCFC) and R134 (HFC). No matter how hot they get, these gases won't catch fire, and so they cannot explode. However, they produce greenhouse gases, which increase global warming and are harmful to health. Because of this, these gasses are now illegal to manufacture, although there are still stocks of these gasses available, including gas that has been recycled from discarded AC units and refrigerators.

Propane is a cleaner coolant with much better thermodynamic properties than the now banned gasses such as Freon. *When propane leaks, it combines with oxygen in the air, which can be ignited by the heat from the compressor or an electrical spark, which can cause an explosion.* This is a clear risk associated with the use of Propane as a refrigerant gas despite this obvious risk Propane is becoming the gas of choice as it is the cheapest and possibly the most efficient available on the market. It is already widely used in new domestic appliances. There are also new inert gasses on the market that are as safe as the old refrigerant gasses that do not cause any harm to the environment.

An AC unit operating with R12, R22 or R134 can be converted to another gas that is not harmful to the environment (and can be inert). However, the AC will need to be retrofitted with some new components so that it can operate with any new gas, but there is no guarantee that the unit will work as efficiently on the new refrigerant gas. It is often more cost-effective to update the HVAC system.

PREVENTION

Nirapon's 90-day Safety Management Guidance and Reporting provides the framework to help factories prevent incidences such as air conditioner explosions.

Follow these steps as outlined in the 90-day Workbook to reduce the likelihood of accidents occurring:

- Schedule and conduct regular AC maintenance to make sure all parts are working properly.
- Keep the AC unit clean of dust, dirt and lint that accumulate. This debris may obstruct the proper air flow and can lead to malfunction.
- Inspect and repair any poor or inadequate electrical wiring.
- Remove and clear any clutter from the area surrounding AC units.
- Clear all flammable liquids that may cause a risk of fire and store them at a safe distance from AC units



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