Michelin Technical Bulletin

July 6, 2023

Information Sheet on Tire Fire Hazards

Purpose

This document specifies the main fire risks associated with tires as well as the general prevention measures to be implemented during their use and storage.

The information in this document applies to the main types of tires: passenger, light truck, light commercial vehicle, truck & bus, urban, motorcycle, scooter, bicycle, agricultural, aircraft, earth mover or mining, port, construction, racing and subway tires, as well as Michelin Acoustic tires. Acoustic tires can burn faster than a standard tire and release very large quantities of smoke. One kilogram/2.2 pounds of polyurethane acoustic foam at 300 °C / 570°F can release up to 2,000 cubic meters/70,000 cubic feet of cloudy, toxic and flammable smoke.

It should be noted that the general measures set out in this document may be supplemented by specific recommendations and advice provided in other Michelin technical bulletins, brochures and manuals covering specific tire categories or ranges (e.g. mining tires). Please refer to the MICHELIN EARTHMOVER & INDUSTRIAL, PORT AND INTERMODAL TIRES USE and MAINTENANCE GUIDE. https://www.michelinb2b.com/wps/b2bcontent/PDF/TECHNICAL_Usage_and_Maintenance_Guide.pdf

Fire Hazards

- Under normal conditions of use and storage, tires do not present any particular danger.
- Tires do not ignite easily. A strong ignition source is required to initiate the combustion reaction.
- Tires burn releasing intense heat and dense black fumes containing products such as carbon oxides, hydrocarbons (especially polycyclic aromatic hydrocarbons), nitrogen oxides, halogenated acids and large quantities of soot and unburned material. In some cases, tires burn releasing oily liquids.
- Composition of tire smoke can vary greatly depending on the oxygen supply of the fire (open air or confined space, under-ventilated or over-ventilated) or on the weather conditions (wind, fog, rain, outside temperature, ...).
- The amount of smoke produced by tires can quickly compromise visibility and therefore impede the ability to evacuate. In confined spaces (such as subway tunnels, platforms and underground stations for example), smoke can also compromise the viability of the atmosphere.
- The Michelin Acoustic technology consists of a polyurethane foam strip installed inside the tire to reduce rolling noise radiation. This foam leads to a particular fire behavior. Acoustic tires can burn faster than a standard tire and release very large quantities of smoke (one kilogram (or 2.2 pounds) of polyurethane foam is likely to release in the worst case more than two thousand cubic meters (or 70,000 cubic feet) of cloudy, toxic and flammable smoke at around 300 °C / 570°F).

Prevention

- Tires must be stored in a stable manner, in cool, dry, ventilated areas, far from open flames and heat sources.
- Hot work processes (welding, grinding, cutting, etc.) must not be carried out in the immediate vicinity of tires without suitable shielding and other safety measures in place to prevent both the potential for ignition and the potential for tire rupture. Increases in temperature lead to an increase in pressure inside the tire which can cause the tire to burst. Hot work on wheels or around pressurized tires have led to serious accidents.
- Direct contact with hot surfaces (including heating pipes or radiators) must be avoided.

Flammability parameters of a tire under laboratory conditions

- **Flash point: 288°C / 550°F**
- **Auto-ignition temperature: 315°C /600°F**
- **Heat value: between 24 and 30 MJ/kg (10,300 and 12,900 BTU/lb) depending on the tire range and composition**

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- A Smoking ban should be required when working around tires and for areas where tires are stored.
- Tires should be kept away from most chemicals, including solvents, petroleum, diesel fuel, oils, greases, acids, and disinfectants.
- The reaction to tire fires, and of MICHELIN® Acoustic tires in particular (rapid fire propagation, release of large quantities of smoke), makes it necessary to ensure that all means of evacuating personnel from storage areas are available. Regular evacuation drills are recommended.
- Tire storage in a basement is not recommended.
- Tires must be used under the conditions for which they are designed.

Emergency Response in Case of Fire

- The main agents for extinguishing tire fires are large quantities of water and firefighting foam. At the beginning of the intervention, powder can be used to suppress flames before continuing with water or foam.
- The cooling of a tire that is still under pressure and that has heated up must be done at a reasonable distance (5 to 10 meters / 15 to 30 feet) to minimize exposure to flying debris and the pressure wave released if a tire ruptures. Please note that in the case of a mining tire fire, specific safety protocols must be applied.
  Please refer to the MICHELIN® EARTHMOVER & INDUSTRIAL, PORT AND INTERMODAL TIRES USE and MAINTENANCE GUIDE.
  https://www.michelinb2b.com/wps/b2bcontent/PDF/TECHNICAL_Usage_and_Maintenance_Guide.pdf
- Burnt tires that have been extinguished must be monitored for several hours and cooled continuously to avoid re-ignition. The absence of flames does not mean that the fire is out.
- Self-contained breathing apparatus should be worn when responding to a tire fire.
- Exposure to combustion smoke should be avoided.

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