GARAGES

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1.0 SCOPE

This data sheet covers storage garages and repair garages. Storage garages are buildings, structures, or portions of buildings used for the storage of motor vehicles. They include public and private parking facilities, and areas used for the storage of automobiles, trucks, buses, tractors, etc. Vehicle servicing is not done except for refueling facilities that may be present. Parking on a roof is not covered in this data sheet.

Repair garages are areas in which motor vehicles are serviced or repaired. They may be public garages in which work is done on vehicles that are the property of others. They may also be areas, usually within a larger industrial facility, in which maintenance and repair work is done on vehicles that belong to the facility.

The protection recommendations apply to garages with either internal combustion engine or electric vehicles parked in them and garages with electric vehicle charging stations..

This data sheet does not apply to large, mining heavy duty mobile equipment (HDME) shops and garages, guidance for which is provided in Data Sheet 7-12, *Mining and Ore Processing*.

1.1 Hazards

Parking and repair garages present several hazards. Vehicles represent a significant fuel load, and modern vehicles have a relatively large plastic content in their construction. Plastic fuel tanks and the presence of ignitable liquids, such as fuel and oil, can also add to an already dense fuel load. Vehicles have the potential to become an ignition source, while repair garages often conduct hot work such as cutting and welding activities. Unprotected structures are susceptible to thermal damage and potentially collapse. while parking garages often do not directly expose the primary occupancy they serve, significant periods of business interruption can be experienced if parking capability is affected. If parking is within, underneath, or near to a main occupancy, this can result in a direct fire exposure.

1.2 Changes

April 2025. Interim revision. Added recommendations for EV charging stations (Section 2.1.1) for electric vehicles (EV).

2.0 LOSS PREVENTION RECOMMENDATIONS

2.1 Parking Garages

2.1.1 Construction and Location

2.1.1.1 General

Locate vehicle charging stations outdoors; local provisions may require some portion of garage spaces to be dedicated to electric vehicles or be EV ready. If mandated by local provisions, provide indoor charging per the recommendations in 2.1.1.2.2.

2.1.1.2 Vehicle Charging Stations

2.1.1.2.1 External

2.1.1.2.1.1 Locate EV charging points a minimum distance of 10 ft (3 m) from buildings, structures, and equipment.

2.1.1.2.1.2 Locate EV charging points 50 ft (15 m) away from combustible storage, fuel tanks (ignitable liquids and flammable gases), utilities, and transformers.

2.1.1.2.1.3 Locate wall mounted charging units on non-combustible walls.

2.1.1.2.2 Internal

2.1.1.2.2.1 Locate indoor EV charging stations either:

A. On the ground level, around the exterior perimeter of the garage

B. On the top outdoor level of the garage

2.1.1.2.2.2 Do not locate EV charging stations in underground locations.

2.1.1.2.2.3 If the garage is connected to the primary building, locate indoor EV charging stations as remote as possible from the main entrance to the building.

2.1.1.2.2.4 Locate EV charging points a minimum distance of 10 ft (3 m) from fire pumps, generators, transformers, and utility rooms containing critical equipment.

2.1.1.2.2.5 Conduct a structural analysis to account for the additional weight of electric vehicles where EV charging is provided.

2.1.2 Protection

2.1.2.1 Provide automatic sprinklers for a Hazard Category 3 occupancy in accordance with Data Sheet 3-26, *Sprinkler Protection of Non-Storage Properties*.

2.1.2.2 Ensure water supplies are in accordance with Data Sheet 3-26, *Fire Protection for Nonstorage Occupancies.*

2.1.2.3 Provide small hose stations or portable fire extinguishers throughout all parking structures.

2.1.3 Utilities

2.1.3.1 Provide all enclosed, basement, and underground parking structures with mechanical ventilation from near floor level of at least six air changes per hour.

2.1.3.2 Automatically deenergize all charging stations upon operation of a fire alarm or sprinkler flow alarm.

2.1.4 Human Element

2.1.4.1 Ensure the building's emergency response plan includes a discussion with the local fire service to address the following for all associated parking garages:

- Emergency notification
- Fire service access points
- Fire protection water sources
- Hose connection locations
- Specialized equipment needs
- Utility shutoffs, including vehicle charging stations
- EV charging and EV fire service response

2.2 Repair Garages

2.2.1 Protection

2.2.1.1 Install automatic sprinklers throughout all repair garage areas in accordance with Data Sheet 2-0, *Installation Guidelines for Automatic Sprinklers*. Design sprinkler protection and water supplies in accordance with Data Sheet 3-26, *Fire Protection for Nonstorage Occupancies*.

2.2.1.2 Protect areas used for storage of tires in accordance with Data Sheet 8-3, *Rubber Tire Storage*.

2.2.2 Ignition Source Control

2.2.2.1 Open flames or other ignition sources on heating or other equipment should be at least 18 in. (0.45 m) above the floor.

2.2.3 Occupancy

2.2.3.1 Spray painting and metal cleaning should be in accordance with Data Sheets 7-27, *Spray Application of Ignitable Liquids and Combustible Materials* and Data Sheet 7-97, *Metal Cleaning.*

2.2.3.2 Vehicles scheduled for repair should be prepared for safely undergoing servicing before being brought into repair garages. This includes the following:

A. Where fuel tanks or fuel systems below the level of the fuel tank are to be worked on, fuel tanks should be drained and purged.

B. Ignitable liquids should be removed from cargo tanks of tank trucks. If the tank is to be worked on, it should be purged.

C. Combustible storage should be removed from truck storage compartments.

2.2.3.3 Solvents should not be used for cleaning the structural interior of the repair garage.

2.2.3.4 Small hose as well as fire extinguishers suitable for ignitable liquids should be provided.

2.2.3.5 Protect areas used for the dispensing of fuel or other ignitable liquids in accordance with Data Sheet 7-32, *Ignitable Liquids Operations*.

2.2.3.6 Arrange storage of fuel and other ignitable liquids in accordance with Data Sheet 7-88, *Outdoor Ignitable Liquid Storage Tanks*, and Data Sheet 7-29, *Ignitable Liquid Storage in Portable Containers*.

2.2.4 Human Element

2.2.4.1 Conduct cutting, welding, and other types of hot work in an appropriately arranged, designated area. Use the FM Hot Work Management System for any hot work conducted outside of this area.

3.0 SUPPORT FOR RECOMMENDATIONS

3.1 Parking Garages

Public parking garages may include underground or basement parking areas; open-air parking structures; areas for employees or visitors above, below, or beside office or manufacturing areas; and enclosed buildings for public parking, usually in congested, urban areas. Private parking facilities include buildings or portions of buildings used for storage of new or used vehicles, fleet parking facilities for trucks or buses, and indoor areas used for storage of finished vehicles manufactured at the facility. Parking may be done with normal access aisles, so that any vehicle may be moved without moving other vehicles; or storage may cover the full floor area.

3.2 Repair Garages

The chief fire and explosion hazard in repair garages is ignitable liquids. The most common ignitable liquid involved is the fuel present. Fires or explosions often result if the fuel tank or fuel line is repaired without adequate safeguards. Other ignitable liquids are solvents used for parts cleaning, floor cleaning, and painting; tank vehicle contents; hydraulic fluids; and lubricating oils. The fires are often aggravated when concealed from sprinklers by the body of the vehicle. Rubber tires are another hazard often present. Losses can often be prevented or minimized by taking proper precautions before and during maintenance work.

Often large numbers of sprinklers operate in fires in repair garages. Usually this is due to gasoline vapors or to shielded fires underneath or inside vehicles where they are out of reach of sprinklers.

4.0 REFERENCES

4.1 FM

Data Sheet 2-0, *Installation Guidelines for Automatic Sprinklers*
Data Sheet 3-26, *Fire Protection for Nonstorage Occupancies*
Data Sheet 5-1, *Electrical Equipment in Hazardous Locations*
Data Sheet 7-27, *Spray Application of Ignitable Liquids and Combustible Materials*
Data Sheet 7-32, *Ignitable Liquid Operations*
Data Sheet 7-88, *Outdoor Ignitable Liquid Storage Tanks*
Data Sheet 7-97, *Metal Cleaning*
Data Sheet 8-3, *Rubber Tire Storage*

4.2 NFPA Standards

National Fire Protection Association (NFPA). NFPA 88A, *Parking Structures*.

APPENDIX A GLOSSARY OF TERMS

EV Ready: Having the infrastructure to support electric vehicle (EV) charging. This includes the physical space and wiring for future electricity supply.

Parking garage: A building, structure, or portion of a building used for the storage of motor vehicles. Typically found at retail malls, offices, airports, etc.

Repair garage: Area in which motor vehicles are serviced or repaired, including automotive repair shops, vehicle customizing specialists, car dealerships, agricultural or specialist vehicle repair shops, etc.

APPENDIX B DOCUMENT REVISION HISTORY

The purpose of this appendix is to capture the changes that were made to this document each time it was published. Please note that section numbers refer specifically to those in the version published on the date shown (i.e., the section numbers are not always the same from version to version).

April 2025. Interim revision. Added recommendations for EV charging stations (Section 2.1.1) for electric vehicles (EV).

July 2023. Interim revision. Clarification was made in Section 1.0, Scope.

July 2021. Interim revision. Added a recommendation to ensure the building's emergency response plan includes a discussion with the local fire service to address all associated parking garages. Also made minor editorial changes.

January 2021. Interim revision. Significant changes include the following:

A. Deleted the option to omit automatic sprinkler protection in open-air parking structures meeting certain conditions. Automatic sprinkler protection is now recommended in all parking structures.

B. The hazard category for parking garages has been raised from HC-2 to HC-3.

July 2013. Replaced references to ″flammable″ and ″combustible″ liquids with ″ignitable liquids″.

May 2010. Replaced all references to Data Sheet 2-8N, *Installation of Sprinkler Systems (NFPA)*, with references to Data Sheet 2-0, *Installation Guidelines for Automatic Sprinklers*.

May 2008. Clarification was made to recommendation 2.1.1.1.

January 2000. This revision of the document has been reorganized to provide a consistent format.

APPENDIX C COMPARISON WITH NFPA STANDARDS

Parking structures are covered by NFPA 88A. There is no conflict between this data sheet and that NFPA standard. There is no NFPA standard on repair garages.