



Rimmed Wheel Safety Training Program



Goals

The goals of this safety training program are to provide workers who service rimmed wheels on large trucks, buses, and off-road equipment with the information needed to:

- Prevent accidents and injuries that can occur during tire inflation.
- Comply with the Occupational Safety and Health Administration (OSHA) Standard [1910.177](#), titled "Servicing multi-piece and single-piece rim wheels."
- Promote a culture of safety and awareness in the workplace.

Objectives

Participants, by the end of this safety training program, will be able to:

- Understand multi-piece and single-piece wheel assembly.
- Understand the importance of following

safety guidelines when servicing rimmed wheels.

- Identify the key elements of the OSHA standard [1910.177](#).
- Demonstrate the necessary tasks and procedures for safely servicing multi-piece and single-piece rim wheels.
- Recognize potential hazards and risks associated with rimmed wheel servicing.
- Apply safe operating procedures and best practices to prevent accidents and injuries.
- Comply with manufacturer recommendations and guidelines for rimmed wheel servicing.
- Promote a safety-conscious work environment and actively participate in ongoing safety initiatives.

Background

About 322,000 employees in more than 100,000 workplaces service large vehicle tires that are mounted on multi-piece or single-

piece wheels.¹ OSHA [1910.177](#) was established to prevent accidents and injuries that commonly occur during tire inflation on large trucks, buses, and off-road equipment that use either type of rim wheels.

Rimmed wheel servicing poses major risks to workers, including the potential for explosive tire separations, which can result in serious injury or death. To reduce these risks, employers must provide training to all employees involved in rimmed wheel servicing. However, OSHA's standard does not apply to the servicing of rim wheels that use automobile tires or trucks designated "LT" (light trucks).

Key elements

OSHA's safety standard for servicing single-piece and multi-piece rim wheels has the following major requirements:

- Training for all tire servicing employees.
- The use of industry-accepted procedures that minimize the risk of injury.
- The use of proper equipment such as clip-on chucks, restraining devices, or barriers to retain the wheel components in the event of an incident during the inflation of tires.
- The use of compatible components. Employers must provide the necessary equipment and tools recommended by the manufacturers for rimmed wheel servicing.

Definitions to know

Barrier: A fence, wall, or other structure or object placed between a single piece rim wheel and an employee during tire inflation. It is designed to contain the rim wheel components in the event of the sudden release of the contained air from the single-piece rim wheel.

Bead: The tire bead is the reinforced section of the tire that comes in contact with the rim. It is responsible for creating and maintaining a seal between the wheel and tire for it to hold air.

Charts: OSHA requires charts in manual or poster form that provide at least the same instructions, safety precautions, and other information contained in the Agency's publications entitled "[Demounting and Mounting Procedures for Tube-Type Truck and Bus Tires,](#)" "[Demounting and Mounting Procedures for Tubeless Truck and Bus Tires,](#)" and "[Multi-Piece Rim Matching Chart.](#)"

Multi-piece rim wheel: The assemblage of a multi-piece wheel with the tire tube and other components.

Multi-piece wheel: A vehicle wheel consisting of two or more parts, one of which is a side or locking ring designed to hold the tire on the wheel. It is held together by interlocking components when the tire is inflated.

Restraining device: An apparatus such as a safety cage, rack, assemblage of bars, and other components that will keep all rim wheel components contained during an explosive separation of a multi-piece rim wheel. These devices are also designed to provide safety during the sudden release of contained air in a single-piece rim wheel.

Rim wheel: The tire, tube, and liner (where appropriate), and wheel components.

Single-piece rim wheel: The assemblage of a single-piece rim wheel with the tire and other components.

Single-piece wheel: A vehicle wheel consisting of one part, designed to hold the tire on the wheel when the tire is inflated.

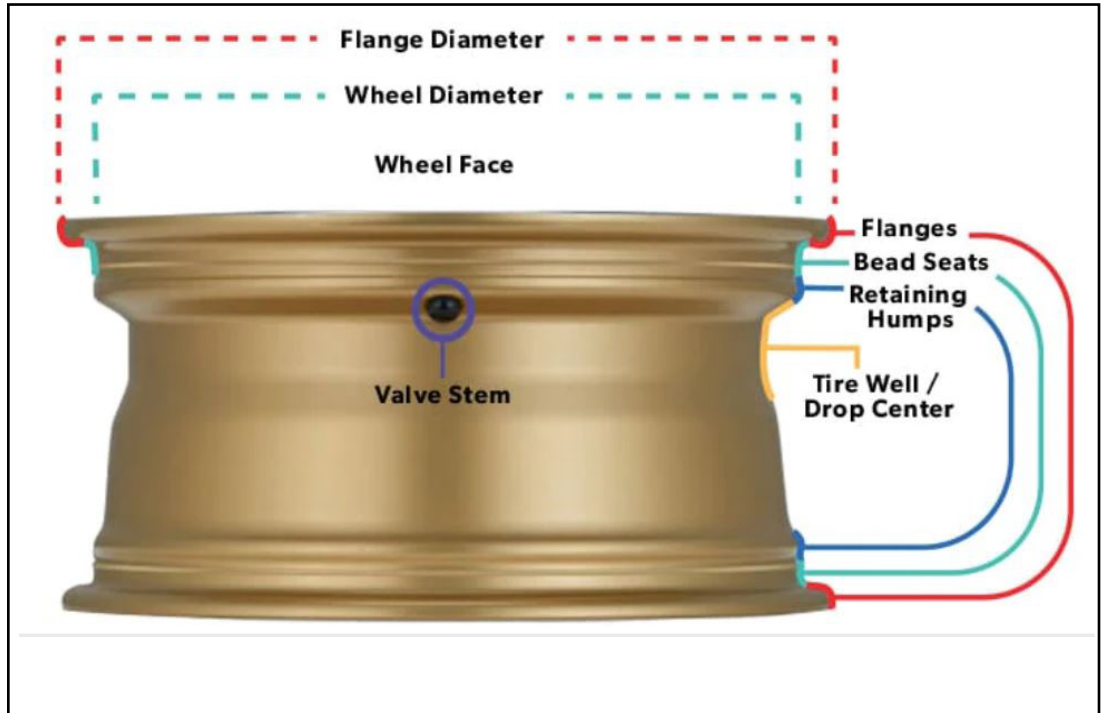
Trajectory: Any potential path or route that a rim wheel component may travel during an explosive separation, or the sudden release of the pressurized air, or an area at which an air blast from a single-piece rim wheel may be released.

Wheel: The portion of a rim wheel that attaches to the axle of a vehicle and holds the inflated tire.

¹ U.S. Department of Labor, "Servicing Single-Piece and Multi-Piece Rim Wheels." PDF. https://safety.army.mil/Portals/0/Documents/ON-DUTY/WORKPLACE/MATERIALHANDLINGANDSTORAGE/Standard/Servicing_OSHA_3086.pdf. Accessed December 12, 2023.

Single-piece rim wheel safe operating procedures

Employers must ensure that each employee working with single-piece wheels demonstrates the following tasks according to the OSHA standard. If they fail to perform the tasks properly, they must be re-trained:



- The tire must be completely deflated by removing the valve core before demounting.
- Mounting and demounting of the tire must be performed only from the narrow ledge side of the wheel. Care must be taken to avoid damaging the tire beads. The tire must be mounted only on a compatible wheel of mating bead diameter and width.
- A nonflammable rubber lubricant must be applied to bead and wheel mating surfaces before assembling the rim wheel unless the tire or wheel manufacturer recommends against the use of any rubber lubricant.
- If a tire changing machine is used, the tire may be inflated only to the minimum pressure necessary to force the tire bead onto the rim ledge and create an airtight seal before removing it from the tire changing machine.
- If a bead expander is used, it must be removed before the valve core is installed and as soon as the rim wheel becomes airtight (when the tire bead slips onto the bead seat).
- The tire may be inflated only when contained within a restraining device, positioned behind a barrier, or bolted on the vehicle with the lug nuts fully tightened.
- The tire must not be inflated when any flat, solid surface is in the trajectory and within 1 foot (30.48 centimeters) of the sidewall.
- The tire must not be inflated to more than the inflation pressure stamped in the sidewall unless a higher pressure is recommended by the manufacturer.
- Employees must stay out of the trajectory when the tire is being inflated.
- Heat must not be applied to a single-piece wheel.



Multi-Piece

VS

Single-Piece



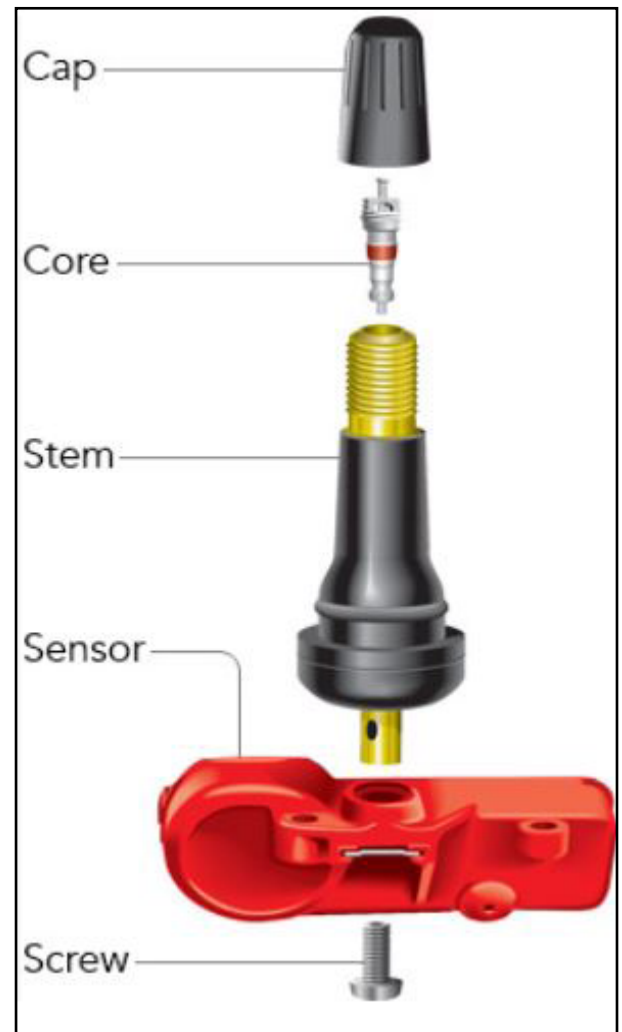
- Cracked, broken, bent, or otherwise damaged wheels must not be reworked, welded, brazed, or otherwise heated.
- The employer must provide a restraining device or barrier for inflating a tire on a single-piece wheel unless the single-piece rim wheel is bolted onto a vehicle during inflation. In all cases, the employee must stay out of the trajectory.

Multi-piece rim wheel safe operating procedures.

- Employees must be instructed in and must use the following steps for safe operating procedures with multi-piece wheels:
- The tire must be completely deflated by removing the valve core before a rim wheel is removed from the axle IF:
 - The tire has been driven underinflated at 80% or less of its recommended pressure.

- When there is obvious or suspected damage to the tire or wheel components.
- The tire must be completely deflated by removing the valve core before demounting.
- A rubber lubricant must be applied to the bead and rim mating surfaces when assembling the wheel and inflating the tire unless the tire or wheel manufacturer recommends against its use.
- If a tire on a vehicle is underinflated but has more than 80% of the recommended pressure, the tire may be inflated while the rim wheel is on the vehicle, provided remote control inflation equipment is used, and no employee remains in the trajectory during inflation.
- The tire shall be inflated outside a restraining device only to a pressure sufficient to force the tire bead onto the rim ledge and create an airtight seal with the tire and bead.

- Whenever a rim wheel is in a restraining device, the employee must not rest or lean any part of his or her body, or equipment, on or against the restraining device.
- After tire inflation, the tire and wheel must be inspected while still within the restraining device to make sure that they are properly seated and locked. If further adjustment is necessary, the tire must be deflated by removing the valve core before the adjustment is made.
- An attempt must not be made to correct the seating of side and lock rings by hammering, striking, or forcing the components while the tire is pressurized.
- Cracked, broken, bent, or otherwise damaged wheel components must not be reworked, welded, brazed, or otherwise heated. Heat must not be applied to a multi-piece wheel.
- Whenever multi-piece rim wheels are being handled, employees must stay out of the trajectory unless the employer can show that the performance of the servicing makes the employee's presence in the trajectory necessary.
- The employer must furnish a restraining device for inflating a tire on a multi-piece wheel. In all cases, the employee must stay out of the trajectory.



would be thrown against it during a rim separation at 150% of the tire's maximum rated pressure. Restraining devices must be visually inspected before the beginning of each workday. If they show any of the following, they must be removed from service until correctly repaired:

- Cracked welds.
- Bent, broken, or corroded components.
- Any damage that would make them less effective.

If repairs require replacement parts or welding, the manufacturer or a

Servicing equipment must be supplied

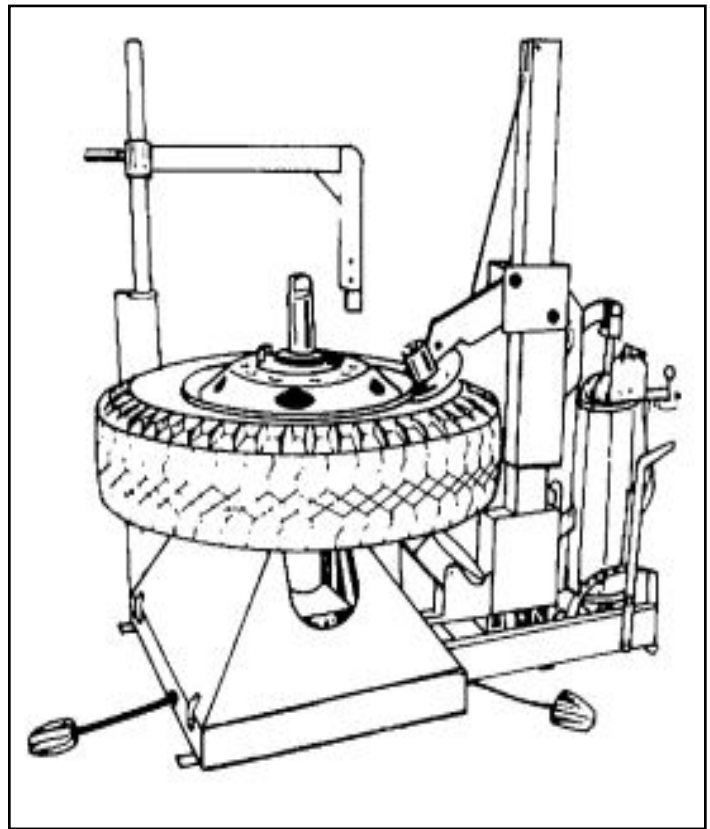
Provide restraining devices and barriers

The employee must furnish a restraining device such as a safety cage for inflating both multi- and single-rim piece wheels unless the single-rim piece wheels are solidly bolted to the vehicle before inflation. Each cage must be able to withstand the force that

professional engineer must certify that the repairs have brought the cage back to its original ability to withstand force. A barrier can be a fence, wall, or other structure or object placed between a single-piece rim wheel and an employee during tire inflation to contain the rim wheel components in the event of the sudden release of contained air. Each barrier must also be able to withstand the maximum force of an explosive rim wheel separation or release of the pressurized air occurring at 150% of the maximum tire specification pressure for the rim wheel being serviced. Damaged barriers must not be returned to service until they are repaired and reinspected. Barriers requiring structural repair such as component replacement or rewelding must not be returned to service until they are certified by either the manufacturer or a Registered Professional Engineer as meeting the strength requirements stated above.

Provide manufacturer-recommended charts, manuals, and tools

Current charts or rim manuals containing instructions for the types of wheels being serviced must be available in the service area and mobile service units. Only tools that are recommended in the rim manual may be used for the type of wheel being serviced. The employer must also supply air line equipment with a clip-on chuck with a sufficient length of hose between the chuck and in-line valve or regulator to allow the employee to stand outside the trajectory, as well as an in-line



valve with a pressure gauge or a pre-set regulator.

Follow the manufacturer's specifications

The size (bead diameter, tire width, and wheel width) and type of tire and wheel must be checked for compatibility before assembly of the rim wheel. Avoid mismatching half sizes such as a 16-inch (40.6 centimeters) tire and a 16.5-inch (42 centimeters) wheel. Multi-piece wheel components must not be interchanged except as indicated in the applicable charts or rim manuals.





Establish regular inspection and maintenance

- Inspect wheel components before assembly, looking for breaks, cracks, out-of-round rings, deep tool marks on rings or gutters, pits from corrosion, and any components that are bent out of shape. Remove and tag damaged wheels for disposal. They may not be repaired or re-used. To reduce possible liability, components should be destroyed before disposal.
- Inspect tires, looking for signs of wear, cuts, bulges, embedded objects, or other damage. Remove damaged or worn tires from service immediately and replace them with suitable replacements.
- Replace damaged or leaky valves.
- Before assembly, the rim flanges, rim gutters, rings, bead seating surfaces, and tire beads must be free of dirt, rust, or loose rubber. Lightly rusted rims can be cleaned and repainted.

- Follow the manufacturer's recommendations for tire rotation, balancing, and alignment.

Training requirements

Employers must provide training to all employees involved in rimmed wheel servicing. Training should cover the information found in the rim manuals, OSHA charts, and in the OSHA standard, [1910.177](#). This should include the correct procedures of mounting, demounting, and safe operating precautions for the type of wheel being serviced. Training should also include education on rim wheel hazards and how to perform the handling, storage, and maintenance of all equipment, vehicles, and machinery used at their worksite.

The employer must ensure that each worker demonstrates and then maintains the ability to service rim wheels safely by correctly performing the following tasks:

- Deflating and demounting tires.
- Inspecting and identifying rim wheel components.
- Mounting tires, including inflating them within a restraining device or other safeguard.
- Handling rim wheels.
- Inflating tires when single-piece rim wheels are mounted on a vehicle.
- Understanding the need to stand outside the trajectory when inflating tires and inspecting rim wheels after inflation.
- Installing and removing rim wheels.

The employer must regularly evaluate each employee's performance and provide additional training, as needed.

Quiz

1. When do most accidents usually occur?
 - a. When tires are being mounted on the rims.
 - b. When tires are being inflated.
 - c. Mondays and Fridays.
2. Employees must be able to demonstrate that they can:
 - a. Read and follow manufacturers' instruction manuals.
 - b. Handle wheels with mechanical lifting and moving devices.
 - c. Mount and safely inflate tires inside a retaining device.
 - d. All of the above.
3. Retaining devices must be inspected before beginning each workday.
True or False?
4. Employers must furnish retaining devices that will withstand a rim being thrown against it at:
 - a. 50% of the tire's maximum rated pressure.
 - b. 100% of the tire's maximum rated pressure.
 - c. 150% of the tire's maximum rated pressure.
 - d. 200% of the tire's maximum rated pressure.
5. Lightly rusted rims:
 - a. Must be cut up and discarded.
 - b. Can be cleaned and repainted.
 - c. Cannot be re-used.

Answers: 1 - b, 2 - d, 3 - True, 4 - c, 5 - b.



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