2016 Cat® Tire Maintenance Guide

Safety Recommendations

Safety Instructions

Any tire, no matter how well constructed, may fail as a result of punctures, impact damage, improper inflation, or other conditions resulting from use or misuse. Tire failure may create a risk of property damage, personal injury, or death. To reduce the risk of tire failure, read and follow all safety information contained in this manual and in industry publications.

The safety related information provided in this manual is designed to assist supervisory and service technicians in servicing rim wheel assemblies. Responsibility for implementing these safety guidelines rests with supervisors and service technicians doing the actual service work. Read and fully understand all procedures before attempting to service a rim wheel assembly.

These instructions are not designed to apply to any specific tire, rim, or rim wheel assembly. Therefore, contact the tire, rim, or rim wheel assembly manufacturer for correct servicing procedures. Always follow instructions from the manufacturers of the tires, rim, and vehicle for deflating, demounting, and inflating . Always follow applicable industry guidelines when servicing rim wheel assemblies. Also, follow all State and Federal health and safety laws and/or local regulations.

Never perform inspection, service, or inflation operations while in the rim wheel assembly trajectory path.

Misapplication, improper inflation, overloading, and exceeding maximum speed may cause tire failure, possibly resulting in injury or death. Proper care is your responsibility. If you have any doubt about the correct, safe method of performing any step in the demounting, mounting, adding or removing fill, or inflating process – STOP! Seek out expert assistance from a qualified person.

Inspection Checklist

Many tire failures are preceded by vibration, bumps, bulges, or irregular wear. Have vehicle operators report any unusual vibrations and perform regularly scheduled inspections on all tires.

– Inspect tires for excessive wear, damage, or imperfections that may affect the wear life and capacity of tires. Replace any tires that appear to show signs of excessive wear, are damaged, or defective in any way

– Inspect tires for cuts, cracks, splits, or bruises in the tread and sidewall area. Bumps or bulges may indicate tire separation within the tire body.

– Inspect tires for a safe tread depth. Any tire worn to the built-in wear indicators (where available) or less tread groove depth or with a tire cord or fabric exposed must be replaced immediately.

– Inspect tired for uneven wear. Wear on one side of the tread or flat spots in the tread may indicate a problem with the tire or the vehicle.

– Remove water and foreign material from the tire. Tires and tubes with excessive or uneven wear, cracks, tears, punctures, blisters
and /or other damage may explode during inflation of service. If potential failure of a tire or tube is suspected, destroy the tire or tube
and replace it with a serviceable tire or tube of the correct size, type, and manufacture for the assembly, machine, and application.

– When conducting routine tire inspections, also make a visual inspection of tire and rim parts. Always replace any parts found
to have damage or non-conformities. Parts that are cracked, worn, pitted with corrosion, or damaged must be destroyed and
replaced with serviceable parts.

– Always inspect both sides of the tire to assure a proper bead seat. When conducting routine tire inspections also make a visual inspection of wheel and rim components. Always correct any damage found.

Safety Checklist

Rims

– Always use approved tire and rim combinations for sizes and contours.
– Always verify that part umbers and size designations of rims match machine specs.
– DO NOT use a steel hammer on any part of the rim, because this can damage the rim. If you must reposition tire or rim parts, use a rubber, plastic, or brass-faced hammer.
–Never try to repair a rim assembly
– Rims that are cracked, worn, pitted with corrosion, or otherwise damaged must be destroyed and replaced with serviceable parts.
– Destroy old rims. Using damaged rims can result in serious injury or death.

Tires

– Always replace damaged or badly worn tires. When replacing tires, always use the recommended replacement.
– Destroy old tires. Using badly worn or damaged tires can result in serious injury or death.
– Never put flammable substances in a rim wheel assembly, such as starting fluid, ether, gasoline, or any other flammable material to lubricate, seal, or seal the bead of tire. Never attempt to seal tire beads by igniting flammable substances on the rim wheel assembly. These actions can cause an explosion resulting in serious injury or death.

– Never reinflate a tire that has lost air pressure without determining and correcting the problem.

Inflation

– Always exhaust all air from the tire prior to demounting
– Always use restraining devices (safety cages) when inflating tires. Not using a restraining device or safety cage can result in serious injury or death.
– Always use a clip-on air chuck and a hose that is long enough to allow you to stand outside the tire trajectory. The air line must be equipped with an in-line valve with a pressure gauge or a regulator that can be preset.
– Never inflate a tire beyond 2.41 bar (35 psi) to seat a tire bead. Always inspect both sides of the tire to assure a proper bead seat. If the tire bead is not fully seated at 2.41 bar (35 psi): STOP! Deflate the tire and correct the problem.
– Never exceed manufacturer's recommended tire inflation pressure. Misapplication, improper inflation, and overloading a vehicle may cause tire failure resulting in serious injury or death.

Wheel Assembly

– Servicing tires and rims can be extremely dangerous and should be performed by trained personnel only, using the correct tools, and following the procedures presented in this manual, in OEM manufacturers' manuals, or in other industry and
government instructions.
– Never leave a rim wheel assembly unsecured in a vertical position.
– Always be careful when moving tires and rims to prevent endangering bystanders.
– Always use proper lifting techniques or mechanized lifting aids to move heavy objects, assemblies, components, and parts. DO NOT attempt to lift objects that are too heavy.

Safety Recommendations

Safety Checklist (Cont'd.)

– Failure to chock the tires and crib the vehicle can result in serious injury or death. DO NOT work under an unblocked load.
– Several types of tire changing equipment are available. Installers should be fully trained in correct operating procedures and safety instructions for the specific equipment being used. Always read and understand any manufacturer's warning contained in the product literature or attached to the equipment.
– Never hammer, strike, or pry an inflated or partly inflated rim wheel assembly. If any rim part does not seat correctly, deflate the tire and inspect the rim wheel assembly. If any rim part does not seat correctly, deflate the tire and inspect for warped or incorrectly seated parts, such as lock rings.
– If the rim wheel assembly does not slide on the vehicle: DO NOT force the rim wheel assembly by hammering it. Deflate the tire and inspect the rim wheel assembly.
– NEVER weld on an inflated or partially inflated rim wheel assembly, because it may cause an explosion, resulting in serious injury or death.

General Technician Warnings

Training

Servicing tires and rims should only be performed by trained personnel using proper tools and following specific procedures. Servicing tires and rims can be extremely dangerous and failure to follow these warnings could lead to serious injury or death.

Any person assigned to service rim wheel assemblies must be able to demonstrate and maintain the ability to service rim wheel assemblies safely, including (but not limited to):

- handling rim wheel assemblies,
- demounting tires (including deflation),
- installing and removing rim wheel assemblies,
- inspecting and identifying rim parts,
- mounting tires (including tire inflation with the required safeguards),
- inflating a tire on a rim assembly while it is mounted on the vehicle,
- using a restraining device or barrier,
- standing outside the trajectory path during inflation of the tire, and
- inspecting the rim wheel assembly following inflation of the tire.

Slips or Falls

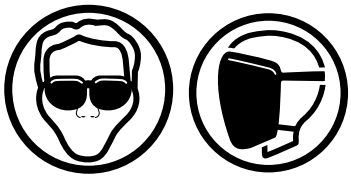
Personal injury can result from slips or falls. DO NOT leave tools or parts laying around the work area and clean up all spilled fluids immediately

General Technician Warnings (Cont'd.)

Pinch Points

Keep loose clothing and fingers away from pinch areas to prevent pinching and crushing. It is recommended to remove finger rings.

Eye Protection

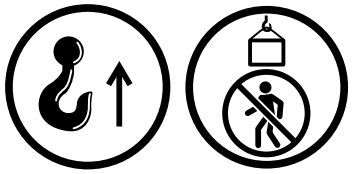


To avoid eye injury, always wear protective glasses or face shield when using any equipment, a hammer, or similar tool. Chips and debris can fly off objects when struck. Make sure no one can be injured by flying debris before striking any object.

Proper Techniques

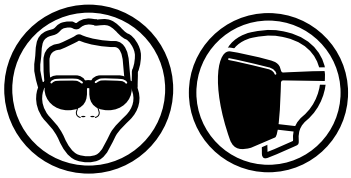
To prevent personal injury, always use proper lifting techniques or mechanized lifting aids to move heavy objects, assemblies, and parts. DO NOT attempt to lift objects that are too heavy.

Hoist Awareness



When a hoist is used to lift any part or assembly, stand clear of the area under the part being raised. Make sure the lifting cables and other lifting devices are strong enough to support the part.

Eye Protection



To avoid eye injury, always wear protective glasses or face shield. Make sure no one can be injured by flying objects or debris when using tools or working on the equipment or the vehicle.

Air Protection

Personal injuries can occur as a result of using pressurized air. Maximum air pressure at the nozzle must be below 205 kPa (30 psi) for cleaning purposes. Wear protective clothing, protective glasses, and a protective face shield when using pressure air or when releasing pressure air from a tire.

Protective Gear

To avoid serious personal injury, always wear proper protective gear, such as hard hats, safety glasses, gloves, steel toe shoes, and hearing protection when servicing tires and rims.

General Technician Warnings (Cont'd.)

Matching Tires, Rims, and Rim Parts
Always use approved tire and rim combinations, sizes, contours, and tapers. Most tires will fit on more than one rim width. Always use the correct tire for the rim.

There is a danger of serious injury or death if a tire of one bead diameter is installed on a rim with a different diameter. Always replace a tire with another tire of exactly the same bead diameter designation and suffix letters.

Example

- Mount a 16 inch tire on a 16 inch rim.
- Never mount a 16 inch tire on a 16.1 inch or 16.5 inch rim.
- Mount a 16.5 inch tire on a 16.5 inch rim.
- Never mount a 16.5 inch tire on a 16 inch or 16.1 inch rim.

Repairing Tires and Rims

DO NOT make any repairs to a tire unless the repairs are authorized and recommended by the tire industry and/or tire manufacturer.

Never drive on an improperly repaired tire, which may cause further damage and eventual tire failure resulting in personal injury or death.

Never repair a tire without removing the tire from the rim assembly and never use a tube as a substitute for a tire repair or replacement. Always use an inside patch and a plug to repair a tire unless the hole is too small to insert a plug. DO NOT use a plug without an inside patch to repair a tire.

Never repair a tire with less tread than the tread wear indicators (where available), with a puncture larger than 6.4 mm (.25 in)diameter, and/or damage outside the tread or sidewall area. These tires must be replaced because they cannot be safely repaired.

DO NOT attempt to repair a tire using an aerosol fixer to inflate and seal the tire. An aerosol fixer may contain highly volatile gas that can be ignited by an excessive heat source, flame, or sparks, Any tire with an aerosol fixer must be removed from all heat sources and be completely deflated before removing the tire from the rim.

Tire Changing Equipment / Tools

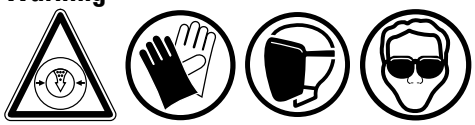
Several types of tire changing equipment are available and service technicians must be fully trained in the correct safety procedures and instructions for any specific tire changing machine. Always read and understand any warnings contained in the manufacturer's manuals or attached to the equipment.

If used, keep a firm grip on tire irons. They may spring back, resulting in personal injury.

When using a bead breaker, always stand to one side of the rim to maintain control of the bead breaker and DO NOT hold the bead breaker when breaking the tire bead. If the bead breaker is not seated properly and flies off the rim, it could cause serious injury or death.

Pressure

Warning



Personal injury can result from pressurized air. When releasing pressure air from the tire, wear a protective face shield or protective glasses.

Pressure

Always purge all air from the tire prior to demounting. Never reinflate a tire that has lost air pressure without determining and correcting the problem. Never exceed 241 kPa (35 psi) or the maximum tire inflation pressure when seating beads. Never exceed the manufacturer's recommended tire inflation pressure. Always use restraining devices (safety cages) when inflating tires.

Misapplication, improper inflation, overloading the vehicle, or exceeding maximum speed may cause tire failure resulting in injury or death.

Never inflate a tire unless it is secured to the vehicle or enclosed in a restraining device. Never reinflate a tire that has lost air pressure or operate a vehicle with a tire that has been reinflated without determining and correcting the problem.

Driving on damaged or underinflated tires is dangerous. Underinflated tires may:
- reduce the wear life of the tire,
- adversely affect vehicle handling,
- increase fuel consumption,
- become overheated, and damage the tire resulting in tire failure.

Check air pressure at least once a week and make sure the air pressure gauge is accurate. If tires lose more than 14 kPa (2 psi) per month, the tire, the valve, or rim assembly may become damaged, creating a dangerous situation, and possibly resulting in serious injury or death.

Check the air pressure when tires are "cold". Tires are "cold" when the vehicle has been driven less than a mile at moderate speed or after being stopped for three or more hours.

Never exceed a manufacturer's recommended tire inflation pressure. If air pressure must be added when a tire is hot, add 28 kPa (4 psi) above the recommended "cold" air pressure and recheck the inflation pressure when the tire is "cold".

Driving on tires with too much air pressure can be dangerous. Tires with too much air pressure are more likely to be cut, punctured, or broken by sudden impact.

Never release air from a "hot" tire to reach the recommended "cold" tire air pressure. Normal driving causes tires to run hotter and air pressure to increase. If air is released from a "hot" tire it may cause the tire to be dangerously underinflated.

Tire Maintenance

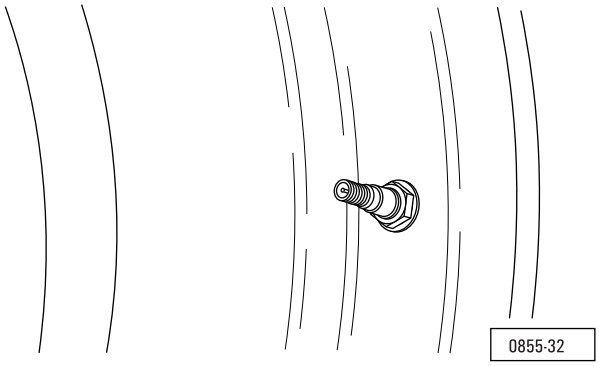
Deflating Tires

⚠ Deflating Tires

To prevent personal injury or death, DO NOT attempt to repair a rim wheel assembly until you are certain the tire has been deflated appropriately. Always remove the valve core and exhaust all possible air from the tire prior to demounting. Always deflate tires before removing the rim or a rim part, such as a rim clamp or nut.

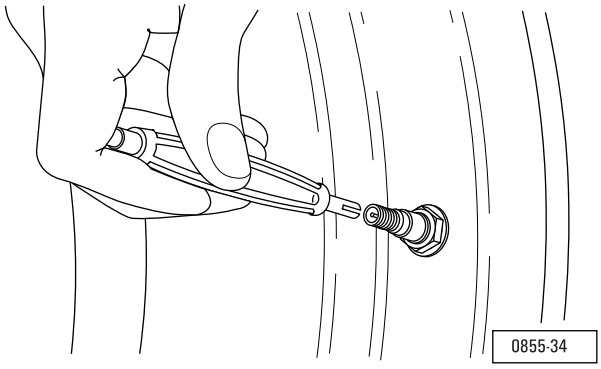
NOTE:

The configuration of the valve stem will not be the same for every tire.



Step 1

Use a valve core removal tool to remove the valve core.

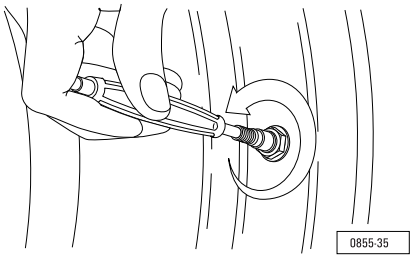


⚠ WARNING

Use extreme caution when removing the valve core from a tire with liquid filler. Pressure on the valve core could cause the valve core to be violently propelled, resulting in severe injury. Avoid standing in the trajectory path of the valve stem when removing the valve core.

Step 2

Turn the valve core counterclockwise for removal and clockwise for installation.

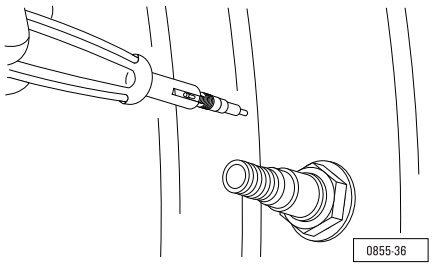


Deflating Tires (Cont'd.)

Step 3

With the valve core removed, run a wire inside the valve stem to make sure the valve stem is not plugged and all possible air is released. If the tire is part of a dual tire assembly, make sure the air is removed from both tires.

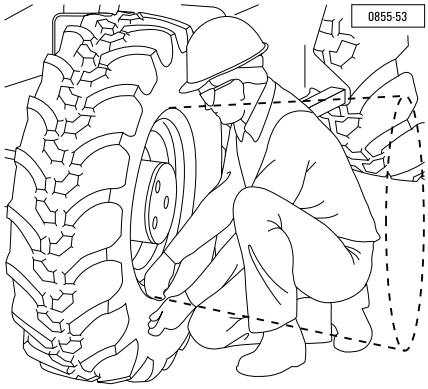
NOTICE: DO NOT puncture, rupture, bend, or twist the valve stem while releasing air from the tire.



Trajectory Path

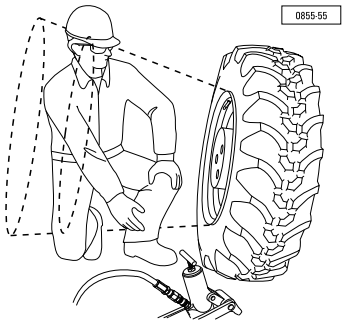
⚠ WARNING

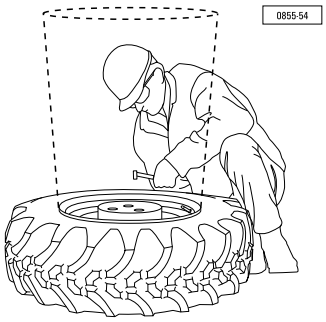
Basic Inspection and Service Principles



Stay completely out of the trajectory path indicated by the marked areas in the following illustrations. NEVER stand, lean, or reach across the rim wheel assembly trajectory path during inspection, service, or inflation operations.

Trajectory Path



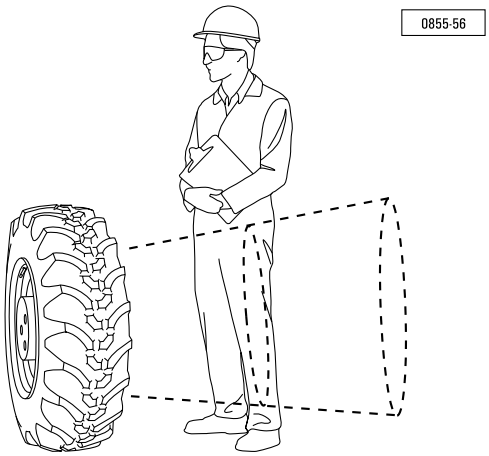


The trajectory path may be the gravest area of danger if a tire bead ruptures and/or a tire violently explodes due to misapplication, improper inflation, overloading, or for any other possible reason.

The trajectory path is any potential path or route that pieces of the rim wheel assembly may travel due to an explosive separation or sudden release of pressurized air, or an area at which an air blast from a single-piece rim wheel may be released. Be aware that under some circumstances, the trajectory path may deviate from the expected trajectory paths, which are perpendicular to the assembled position of the rim wheel at the time of separation or explosion

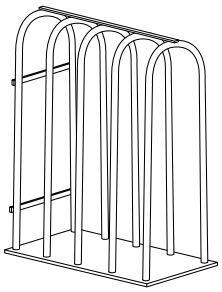
Trajectory Path (Cont'd.)

Bystander Awareness



NEVER allow a bystander to stand, lean, or reach across the rim wheel assembly trajectory path while inspecting, servicing, or inflating a tire.

Restraining Devices



The task of servicing tires and rims can be extremely dangerous and should be performed by trained personnel only, using the correct tools, and following the procedures presented in this manual, OEM manufacturers' instruction manuals, or other industry and government instructions.

Always use restraining devices (safety cages) when inflating tires removed from a vehicle. Not using a restraining device can result in serious injury or death.

Restraining devices are safety cages that are manufactured in a variety of styles and shapes. Restraining devices are designed to reduce the possibility of injury or death from explosive projection from rim wheel assemblies, but should never be relied upon for total protection. Allow as much distance as possible and remain out of the trajectory path while servicing or inflating tires. Not using a restraining device can result in serious injury or death.

Each restraining device or barrier must:

- have the capacity to withstand the maximum force that would be transferred to it during a rim wheel separation occurring at 150 percent of the maximum tire specification pressure for the type of tire being serviced.
- be capable of preventing rim wheel parts from being thrown outside or beyond the restraining device or barrier from any rim wheel within or behind the restraining device.
- be visually inspected prior to each day's use, after any separation of rim wheel parts, or the sudden release of contained air.

Any restraining device or barrier must be removed from service if there is any sign of damage caused by mishandling, abuse, tire explosion, rim wheel separation, or corrosion, such as:

- cracks at welds
- cracked or broken framing
- bent or sprung framing
- corroded framing or parts,
- or any other structural damage which would decrease the effectiveness of the restraining device.

Restraining devices or barriers removed from service must not be returned to service until they are repaired and reinspected. Devices requiring structural repair, such as framing 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 original strength requirements.

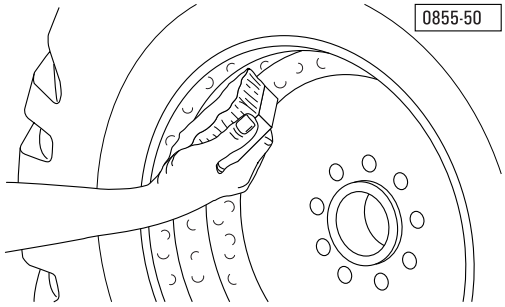
Tire Maintenance

Inspection

Step 1

Inspect the rim for damage or irregular wear.

Step 2

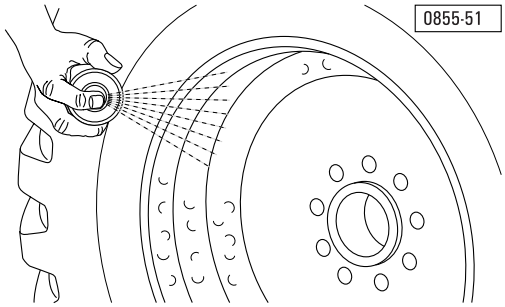


Clean the rim by removing all rust, dirt, and foreign material.

Warning

To prevent personal injury or death, always follow all of the procedures and safety precautions prescribed by the paint manufacturer. Paint may contain products of combustion which are harmful to your health. Only use paint in a well-ventilated area or if in an enclosed area, vent the paint fumes to the outside.

Step 3



Paint bare metal areas on rim parts.

Step 4

Visually inspect the tire and rim to make sure they are seated properly.

Inflating the Tire

Warnings

A service technician should NEVER inflate a tire while remaining in or with bystanders in the rim wheel assembly trajectory path.

To prevent personal injury or death, NEVER inflate a tire beyond 241 kPa (35 psi) or the maximum tire inflation pressure to seat a tire bead. If the tire bead is not fully seated at 241 kPa (35 psi): STOP! Deflate the tire and correct the problem.
To prevent personal injury or death, only inflate and load tires to the manufacturer's specifications. DO NOT over-inflate or overload a tire, which can cause the tire to explode.

Never inflate a tire unless it is secured to the vehicle or enclosed in a restraining device (safety cage).

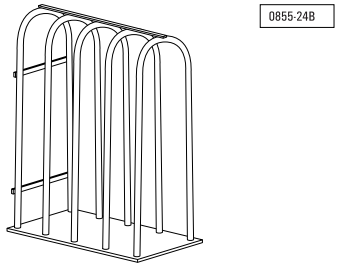
Never exceed 241 kPa (35 psi) or the maximum tire inflation pressure when seating beads.

Always inspect both sides of the tire to assure a proper bead seat.

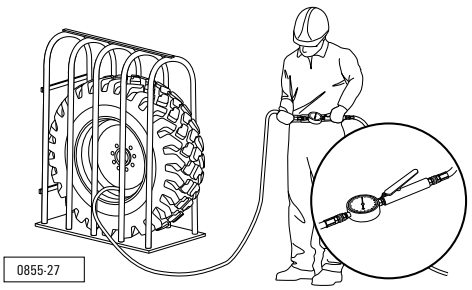
In addition to having the tire in a restraining device, the service technician must use an air line assembly for inflating tires. It should have:

- a clip-on chuck and
- an in-line valve with a pressure gauge or a presettable regulator.
- A sufficient length of air line should be used to allow the service technician to stand outside the trajectory path.

Step 1
Place the tire in a safety cage or other restraining device before inflating the tire, in compliance with OSHA Regulation 29CFR 1910.177.



Note
Use a clip-on air chuck, an in-line valve with pressure gauge or regulator that can be preset, and hose that is long enough to allow you to stand outside the rim wheel trajectory.



Inflating the Tire (Cont'd.)

Step 2
Inflate the tire to 0.345 bar (5 psi)
a. Check all tire and rim parts again for proper positioning.
b. If tire/rim parts are not seated properly, deflate the tire and correct the problem before proceeding.
c. If tire and rim parts are seated properly, continue to inflate the tire.

Step 3

Inflate the tire to 1.38 bar (20 psi)
a. Check the tire bead for proper seating.
b. If tire and rim parts are not seated properly, deflate the tire and correct the problem before proceeding.
c. If tire and rim parts are seated properly, continue to inflate the tire.

⚠ WARNING

To prevent personal injury or death, NEVER inflate a tire beyond 241 kPa (35 psi) or the maximum tire inflation pressure to seat a tire bead. If the tire bead is not fully seated at 241 kPa (35 psi): STOP! Deflate the tire and correct the problem.

Step 4
Inflate the tire to 241 kPa (35 psi) or the maximum tire inflation pressure.
a. Check the tire bead for proper seating.
b. If tire/rim parts are not seated properly, deflate the tire and correct the problem before proceeding.
c. Once the tire bead is fully seated at 241 kPa (35 psi) or the maximum tire inflation pressure, deflate the tire completely.

⚠ WARNING

To prevent personal injury or death, only inflate and load tires to the manufacturer's specifications. DO NOT overinflate or overload a tire, which can cause the tire to explode.

Step 5
Reinflate the tire slowly to a pressure within the manufacturer's specifications. Tire pressures for Cat equipment can be found in the Tire section of the Caterpillar Performance Handbook.

Rotational Direction

Cat pneumatic skid steer and Flexport Construction tread tires are directional tires. The lug or "tread" pattern is designed to enhance traction. By specifying the rotational direction of a tire, cross ribs and grooves are laid out so that traction improves in slippery applications. When ordering a tire and wheel assembly, it is critical to know on which side the tire will be mounted. If an incorrect tire is specified, it will need to be remounted in the correct direction of rotation.

Skid Steer Loader - Determining Inset / Outset

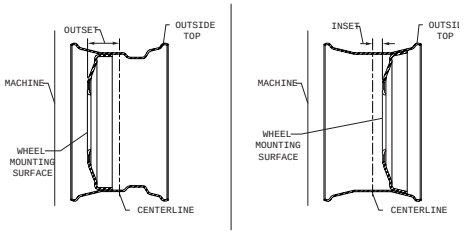
Skid Steer Loaders

Standard Wheel — Definitions

The terms inset and outset are used to describe how much a wheel mounting surface differs from the centerline of the wheel.

When the wheel mounting surface is positioned off of the centerline and toward the machine (pictured), the wheel is outset. This causes the tire to move away from (out from) the side of the machine.

When the wheel mounting surface is positioned off of the centerline and away from the machine, the wheel is inset. This causes the tire to move toward (in toward) the side of the machine.



Standard Wheel — Steps to Determine Inset or Outset

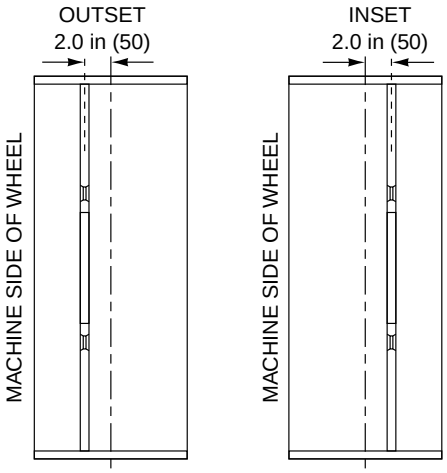
1. Determine the centerline of the wheel. Measure the width of the wheel and divide it by two.

2. Measure the distance from the outside, top (stem side) of the wheel to the face of the wheel mounting surface. Place a flat bar across the wheel and drop the ruler down into the wheel until it hits the face near the bolt holes.

3. Subtract the centerline measurement in Step 1 from the measured distance in Step 2. A positive value is an outset. A negative value is an inset.

Solid Wheels

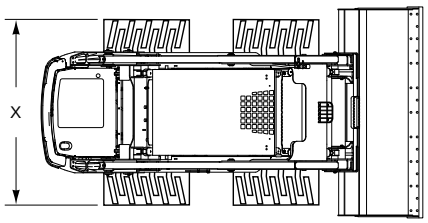
The Cat extreme duty solid tire and wheel assembly has an offset of two inches. The position in which the wheel assembly is installed on a machine depends on the machine's make and model.
The same solid wheel assembly is used with all makes and models that have identical bolt hole patterns and pilot holes. Machines with a pneumatic wheel "inset" will turn the solid wheel assembly position so that the two inch offset is an "inset". Machines with a pneumatic wheel "outset" will turn the solid wheel so that the two inch offset is an "outset".



Skid Steer Loaders (Cont'd.)

Width Over Tire

Cat skid steer loaders can be ordered with varying "widths-over-tire." The width-over-tire measurement "X" can be changed by ordering a different wheel offset.



Various wheel offsets are available for Cat and competitive skid steer models.

Various wheel offset options are available in order to better accommodate varying bucket widths. A skid steer with a larger bucket on the front can perform better with the wider width-over-tire option. Tire clearance, when utilizing the wider width-over-tire option, may be a problem if the outside edge of the tires extend beyond the width of a smaller bucket.

For Cat skid steers it is important to not only know the model, but the width-over-tire dimension "X" when ordering replacement wheel assemblies.

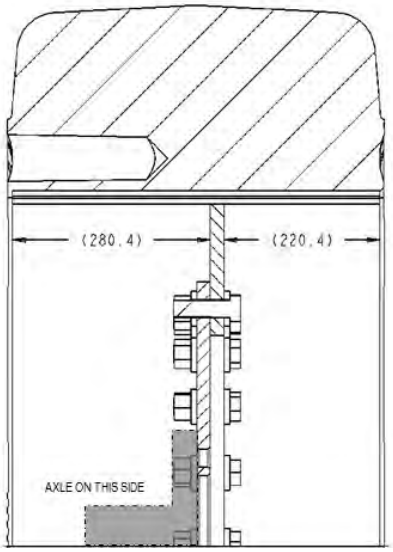
Flexport Two-Piece Assembly for Wheel Loaders and Integrated Toolcarriers

Wheel Loaders and Integrated Toolcarriers

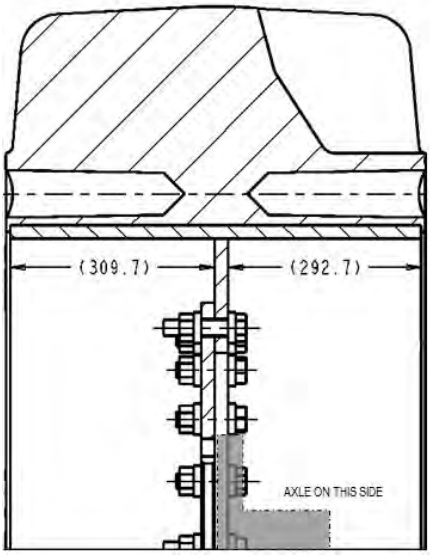
Flexport Tires are available for small and medium wheel loaders and integrated toolcarriers. A mounting disc which attaches to the wheel is required. The tire/wheel assembly is then attached to the machine using Cat mounting hardware.

All mounting discs attach to the tire with 900 ± 100 N·m (664 ± 74 ft. lbs.) of torque. The tire/wheel assembly then attaches to the machine using the specified bolt torque for that particular machine.

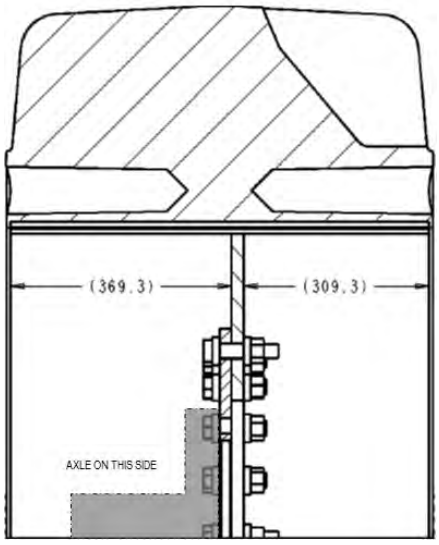
20.5X25 Flexport
926M, 930M, 938M
Bolt Torque: 900+/- 100 Nm
Apply Threadlocker to threads



23.5X25 Flexport
950M, 962M
Bolt Torque: 900+/- 100 Nm



26.5X25 Flexport
966M, 972M
Bolt Torque: 900+/- 100 Nm



Data Codes

How to Find and Read Date Codes

When checking for the date code on pneumatic tires, one side of the tire will have a date code that starts with the letters CF, followed by four numbers. The first two numbers are the week of the year, and the last two numbers are the year of manufacture. These date codes are used in case of a warranty situation.

How to Find and Read Serial Numbers on Cat Flexport Tires

The serial number on a Cat Flexport Tire will be found underneath the Cat part number, just below the elliptical ports. Serial numbers are used in case of warranty situations.

Evaluating Conditions of Cat Tires for Warranty Replacement

Skid Steer Loaders

Reference: Warranty Statement, SELF5330, "Caterpillar Tire Warranty"

Reference: Warranty Bulletin, SELD0869, "Caterpillar Tire Warranty"

This section addresses the conditions of Cat tires as the conditions relate to warranty replacement. Under the subjects of the warranty, tire failures are attributed to one of the following causes:

- Defects in material or in workmanship
- Application

Tire failures that are attributed to defects in material or in workmanship are covered by the warranty. Tire failures that are related to the application are not covered by the warranty. See "Warranty Replacement Guidelines" in the Warranty Bulletin for additional information on the causes of failures.

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