WHEEL INDUSTRY COUNCIL - General Aftermarket Wheel Installation Guidelines

DISCLAIMER: The information gathered for this poster is believed to be reliable. Every attempt has been made to assure the accuracy of this information but installation problems can occur. You must test fit each wheel before mounting tires to ensure clearance with suspension and braking components. It is your responsibility to double-check all load ratings, offsets and clearance before installation. Neither the Wheel Industry Council nor its affiliates are responsible for installation errors or the information compiled for this poster.

INSTALLATION INSTRUCTIONS

WARNING

READ THE OWNER'S MANUAL AND THE FOLLOWING INSTALLATION GUIDELINES AND WARNINGS BEFORE INSTALLING WHEELS. Failure to comply with these warnings could cause an unsafe condition and result in serious injury or death.

MAXIMUM LOAD RATING & MAXIMUM TIRE DIAMETER

The load rating of a wheel as determined by the wheel manufacturer, either by a stamp on the wheel or in the wheel manufacturer's literature, must never be exceeded. If such a load rating is not available, THE WHEEL SHOULD NOT BE USED ON THE VEHICLE. Wheel load rating requirements are determined by dividing the vehicle's heaviest gross axle weight rating (G.A.W.R.) by 2. The axle weight rating for most vehicles is shown on the identification label located on the driver's side door jamb, gas tank door, trunk lid or glove compartment. *REGARDLESS OF THE TIRE'S MAXIMUM LOAD RATING, DO NOT EXCEED THE MAXIMUM LOAD RATING OF THE WHEEL.*

WARNING

EXCEEDING THE MAXIMUM LOAD RATING OR MAXIMUM TIRE DIAMETER OF THE WHEEL IS UNSAFE AND COULD CAUSE WHEEL FAILURE.

INCREASE OR DECREASE IN TIRE DIAMETER ABOVE OR BELOW THE ORIGINAL TIRE DIAMETER MAY AFFECT ROLLOVER AND HANDLING CHARACTERISTICS.

MANUFACTURERS IDENTIFY A WHEEL'S MAXIMUM LOAD RATING AND TIRE DIAMETER - CHECK THE BACK OF THE WHEEL OR WITH THE WHEEL MANUFACTURER.

WHEEL FIT CHECK

Before mounting tires perform a wheel fit check at each wheel mounting location using the following steps:

1. Remove front wheels from vehicle.
2. Wire brush the wheel mounting surface and threaded studs on vehicle.
3. Remove spring clip retainers, if applicable.
4. Hold the new custom wheel on the hub and check for a flush mount of the wheel to the mounting surface of the vehicle. The back side of the wheel must not rest or touch brake drum balancing weights, any brake caliper, suspension component, rivets or other obstructions. The mounting surface of the wheel must fit flush to the vehicle's hub mounting surface. Note that removing drum balancing weights to solve wheel fitment problem can result in vehicle vibration not remedied by an off-the-car wheel balancer.

POSSIBLE OBSTRUCTIONS TO CHECK FOR:

WARNING

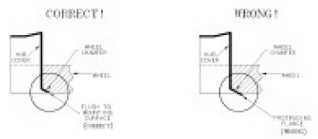
SPRING CLIP RETAINERS ARE OFTEN OVERLOOKED AND MUST BE REMOVED. If clips or other obstructions are not removed, they will not let the wheel sit flush against the mounting surface. This will give you a false torque reading which could cause the fasteners to become loose and result in loss of a wheel. Some vehicle manufacturers do not use spring clip retainers and use nuts that hold the brake assembly together. DO NOT REMOVE THESE NUTS.

5. Install three fasteners finger tight and rotate the wheel to check caliper and suspension clearance and to find bent flanges or axles.
6. Perform the same check for the remaining three wheels on the vehicle, starting in the rear.

WARNING

Do not modify the wheel or use spacers or adapters to resolve clearance or fitment problems.
Modification of the wheel or the use of spacers or adapters to resolve clearance or fitment problems could result in an unsafe condition.
BEFORE INSTALLATION, ALWAYS MAKE SURE YOU HAVE THE CORRECT FASTENERS, WHEEL LOCKS AND CENTER CAPS DESIGNED SPECIFICALLY FOR THE WHEEL AND APPLICATION.

CENTER CAPS: The two basic types of center caps are either inserted from the back of the wheel or attached from the front. For the type inserted from the back, always make sure the flange of the cap matches the wheel's chamfer and is below the mounting surface of the wheel. If the flange of the cap protrudes beyond the mounting surface of the wheel, it will not let the wheel seat properly. If this happens, it will give you a false torque reading and the fasteners may become loose.



TIRES

WARNING

WHEELS AND TIRES ARE CLEARLY MARKED WITH THEIR SIZES. THE WHEEL AND TIRE MUST MATCH BEFORE MOUNTING.

1. Mount all tires according to the tire manufacturer's and the tire machine manufacturer's recommended procedures. There are several brands and types of tire mounting equipment available for mounting tires on aftermarket wheels. They include: rim clamp (euro style) and center-post machines. To avoid scratching or damaging a wheel during mounting/dismounting of tires, make sure the tire machine is properly adjusted and all necessary protective covers are used where metal-to-metal contact is made. Protective eyewear should be used at all times during the mounting/dismounting, installation and servicing of aftermarket wheels and related components.
2. The tire manufacturer's rim width recommendations must be followed in wheel size selection. Reference: *The Tire Guide*.
3. The tire may be labeled with a color dot (painted mark or label, likely in red) that indicates the high spot of the tires maximum runout or the expected force variation location. This should be aligned with the wheel's low-runout spot, which may be identified with a small notch or color dot. Since labeling approaches vary, check with the wheel manufacturer's instructions for low-spot identification.
4. Use approved tire mounting lubricant on both tire beads and apply to bead seat area of the wheel if required.
5. Be careful that the bottom bead breaker on center-post changing equipment does not hit the bottom of the wheel as it travels upwards.

WARNING

6. Do not exceed 40 pounds of pressure when seating the tire to the head of the rim. If tire bead does not seat on wheel with 40 pounds of pressure, DEFLATE, TURN 180 degrees, RELUBRICATE and check for tire/wheel size mismatch before re-inflation. Do not inflate the mounted tire with the center-post hold-down cone or rim clamps tightened on wheel. Loosen the hold-down cone, but do not completely remove, and release the rim clamps to let the tire expand.

WARNING

7. Once beads are seated, install valve core, reconnect the air chuck and continue to inflate the tire until correct pressure is reached according to manufacturer's recommendation. Check the bead edges and the valve for leaks, and then install the valve cap.
NEVER STAND OVER TIRE/WHEEL ASSEMBLY (THE TRAJECTORY ZONE) DURING INFLATION. ALWAYS STAND TO THE SIDE.

TIRE CLEARANCE

Wheel manufacturer warranties do not cover tire-to-fender clearance or tire-to-suspension clearances. These clearances must be fit-checked before mounting all the tires. On some "plus" applications rubbing and scuffing may occur. The following procedures must be followed:

1. Mount one tire on a wheel intended for use on the front of vehicle.
2. Install the tire/wheel assembly on the front hub and with the vehicle still on the lift, turn the steering from extreme right to extreme left while checking for any interference with fender well or suspension components.
3. Lower the vehicle and repeat Step 2 with the weight of the vehicle applied.
4. Have someone 'bounce' the front of the vehicle and check for tire rub. DO NOT PUT HANDS, FINGERS OR ANY BODY PART BETWEEN TIRE AND VEHICLE WHILE CHECKING.
5. Mount one tire on a wheel intended for use on the rear of the vehicle.
6. Install the tire/wheel assembly on the rear hub and check for interference, especially when on the ground and being bounced. Check that wheel balance weights do not contact suspension components and that tires do not contact fenders.

BALANCING WHEELS

1. Balance tire/wheel assembly according to the balancing machine's recommended procedures, following ALL safety precautions.
2. To reduce tire wear, road noise and vibration, all four wheels should be balanced dynamically.
3. Wheels are checked for lateral and radial runout before leaving the factory to minimize balancing problems. If you have problems in balancing, review the instructions for wheel fit check. Some balancing problems may be remedied by deflating the tire and rotating it approximately 180° on the rim, re-inflating the tire and rebalancing.

HUB CENTERING RINGS

Prior to installing HUB CENTERING RINGS be sure to check the following:

1. Verify that the inside diameter of the ring is correct by first placing the ring on the vehicle hub and pushing it on the hub until it touches the base of the hub at the point it meets the mounting surface of the vehicle. A good fit is one where the ring is snug against the diameter of the hub and flush against the mounting surface of the vehicle.
2. Verify that the centering ring fits correctly onto the wheel. A good fit is when the ring can be easily pushed by hand onto the back of the wheel and the ring is snug against the walls of the center hole of the wheel. When fully pushed in, the surface of the hub ring should be flush with or just slightly below the mounting surface of the wheel. The hub ring must not protrude beyond the mounting surface of the wheel.
3. To install the centering ring, place the ring into the center hole on the backside of the tire and wheel assembly and then attach the assembly to the vehicle. (See below.)

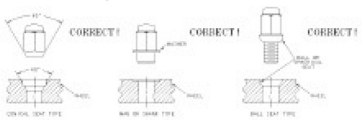
WHEEL INSTALLATION

1. Clean and inspect all stud threads and mounting surfaces before installation. *THREADS MUST NOT BE LUBRICATED,* but must be free of corrosion, rust, burrs, fractures and damaged threads. Replace studs if they are corroded, stripped, damaged, or if any fractures are found. Always use new fasteners (lug nuts or lug bolts) when installing new wheels.
2. Be certain the fasteners are correct for the application. It is critical that the fastener matches the thread diameter, pitch and seat; otherwise the installation will be improper, and may result in damage and could cause a dangerous condition. The basic types of fasteners are: conical seat (60° taper "acorn" and "bulge"), mag or shank style, and spherical or ball seat. Shown below is a drawing of each type in its proper application.

"Thread diameter" refers to the diameter of the stud measured at the outer edges of the threads.

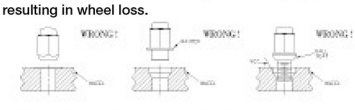
"Thread pitch" for non-metric applications refers to the number of threads per inch; for metric applications, it is the distance between the threads in millimeters.

The "seat" means the area on the wheel where the fastener will clamp down.



WARNING

ONLY USE THE TYPE OF FASTENER COMPATIBLE WITH THE TYPE OF SEAT. Never use a conical seat fastener on a mag or shank type seat. Spherical or ball seat fasteners must be used with spherical or ball seats. Never use a mag or shank type fastener on a conical seat. The different types are not compatible and, if installed incorrectly, the fastener may lose torque, possibly resulting in wheel loss.



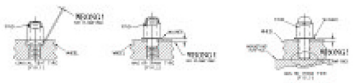
3. When placing the wheel on the studs, there may be an apparent looseness of fit until the fasteners are applied.

WARNING

4. *Check thread engagement.* Every stud or bolt must be long enough to thread a length at least equal to the stud or bolt diameter. For example, a 1/2" thread diameter must thread into the lug nut at least 1/2". Check for this problem on every stud; some may be different lengths. Less than one stud thread diameter engagement is unsafe and will cause loss of torque. IF YOU DO NOT HAVE PROPER THREAD ENGAGEMENT, DO NOT INSTALL WHEELS.

WARNING

5. Do not allow a lug nut to bottom out on the stud or a mag shank or lug bolt to bottom out on the mounting surface. This is extremely dangerous and unsafe because the clamping force of the fastener is not being applied to the wheel. Check for these problems on every stud, some may be different lengths. IF YOU FIND A PROBLEM; DO NOT INSTALL WHEELS.



WARNING

6. Never use fewer fasteners than the wheel and vehicle was designed for. If the wheel has 5 holes, then use 5 fasteners.
7. Fasteners must be tightened in a star or crisscross pattern to ensure uniform pressure and alignment. Apply torque evenly by repeating the star or crisscross pattern until desired torque is reached. Shown below is the numerical sequence.

During installation, gravity causes the wheel to rest upon the highest stud. If the wheel is clamped down off-center, it can be dangerous and damaging to your wheels and tires over time. Do not allow the wheel to "hang" on the studs during the initial tightening; make certain wheel is centered and wheel supported prior to tightening fasteners.

WARNING

8. *A CALIBRATED TORQUE DEVICE MUST BE USED TO ACHIEVE PROPER TORQUE SPECIFICATIONS.*
9. *Use Original Equipment Manufacturer's torque specification. If it is not specified in the vehicle owner's manual contact the vehicle manufacturer. If the Original Equipment Manufacturer does not provide a specification, check with the aftermarket wheel manufacturer for a specification. In the event that neither the vehicle manufacturer nor the aftermarket wheel manufacturer give you the specification, the following may serve as a guideline for passenger cars and light-trucks only:*

STUD DIAMETER	TORQUE RANGE (FT/LBS.)
12mm	75 - 85
14mm	85 - 95
7/16"	70 - 80
1/2"	75 - 85
9/16"	105 - 115
5/8"	125 - 135

10. Check new fasteners against the vehicle wrench making sure they are same size. If the new fasteners have a different hex size than the original equipment wrench provided with the vehicle, be sure to advise the customer that a correct size wrench will be required to remove the new aftermarket fasteners being installed.
11. If the new fasteners have a different seat than the original equipment, make sure you keep enough of the original fasteners with the spare tire/tire changing equipment so if needed the spare tire can be mounted with the correct fasteners.

MULTI-PIECE WHEELS

1. Multi-piece wheels require extra care when mounting tires. These wheels may have a special silicone sealant between the rims and the centers. This seal must not be touched with any tire mounting tools. If a tool contacts this area, the seal may be damaged and cause a leak.
2. When the tire valve is close to the seal, use caution in installing and removing the valve to prevent damage to the seal.
3. *DO NOT TIGHTEN WHEEL ASSEMBLY BOLTS.* They should be torqued at the wheel factory to manufacturer's specifications. If any appear loose, contact the wheel manufacturer for instructions.

AFTER INSTALLATION

WARNING

1. Fasteners should be retorqued at approximately 25 miles. Retorquing must be done any time the fasteners are removed for any reason.
2. Write the specified torque requirement on the owner's wheel documents and review the complete instructions with your customer.
3. Advise the customer to keep the wheel documents with the vehicle owner's manual and that when the vehicle is sold, the customer should give both to the new owner.
4. If wheel locks were installed, make sure you give the key to the customer.
5. Clean tires and wheels (see wheel maintenance information).
6. *Have customer review, initial and sign safety checklist provided on the wheel owner's manual.*

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