



Wheels for your Fiero

Wheels

- **Selecting the correct wheels for your vehicle can be confusing. There are many sizes and styles to choose from but just because a wheel has the same bolt pattern does not mean it will fit properly.**



Fiero Factory Wheels

- 13" X 5.5 Steel or Turbo Fin have a 42mm offset.
- 14" X 5.5" Steel Wheels have a 42mm offset.
- 14" X 6" High Tech Aluminum have a 35mm offset.
- 15" X 7" Diamond Spoke for 86 and 87 have a 30mm offset.
- 1988 15" X 6" Diamond Spoke fronts have a 37mm offset.
- 1988 15" X 7" Diamond Spoke rears have a 30mm offset.

Refinishing wheels

- If your wheels are looking old and have dull finish, chipped paint, and minor pitting, you can have your factory aluminum wheels refinished.
- There are a few companies that can do them or you can do it yourself.



Do-It-Yourself Refinishing

- To refinish your wheels you will need 4 cans of Permatex spray-on gasket remover, wet/dry sandpaper in 400, 600, 1000, and 1200 grits, a brass detail brush, a jar of Mother's Aluminum polish, and wheel paint.
- You will need at least the clear coat. If you want to paint colors like the factory you will need them as well.
- You can do this with the tires on or off. The tires off is the easiest.
- Step 1 is to spray the wheels with a thick coating of the spray-on gasket remover on the wheel. Let it sit for 15-20 minutes then scrub it with a brass detail to loosen the stubborn areas, then rinse off with a hose. Use gloves to protect your hands.

Wheel after stripping.



Do-It-Yourself refinishing (cont.)

- Next is to start sanding the aluminum surface. If you have pitting start with 400 grit. If you just want to smooth out the surface start with 600. Continue with the 1000 then the 1200.
- Once all sanding is done wash the wheel off with a mild soap to remove any contaminants.
- Tape off the areas that you want to remain the aluminum finish and spray the color you want.
- Let the paint dry and remove the tape.
- Now take the aluminum polish and begin polishing the bare aluminum. The white polish will turn black as you polish.
- You can polish it for a clean appearance of polish it a couple of times for a mirror finish.

Wheel after sanding and painting.



Do-It-Yourself refinishing (cont.)

- If you polished the aluminum to a mirror finish and want to retain that look, you can skip coating the wheel with a clear coat. The clear coat will dull the mirror finish slightly.
- The disadvantage is that you will need to keep the wheels waxed to protect it from the elements.
- If the car is driven daily and year round, it is recommended to clear coat the wheels to protect the finish.

Completed wheel on car.



Steel Wheels

- To refinish the steel wheels you just need to sand them down and paint them with silver or black wheel paint.
- If you have rust starting, It is recommended to remove the rust with naval jelly and a wire wheel first.



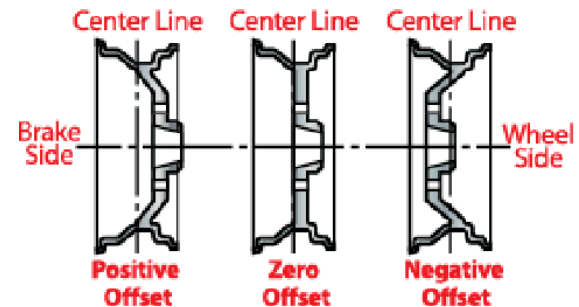
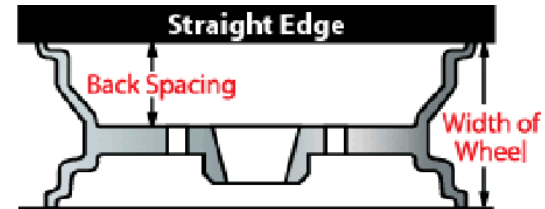
Aftermarket Wheels

- If you want to replace the wheels with aftermarket wheels to enhance handling and or appearance, you will need to understand how to select the proper wheel.
- Wheel offset, size, and weight can affect how your car handles and brakes.



Wheel Offsets

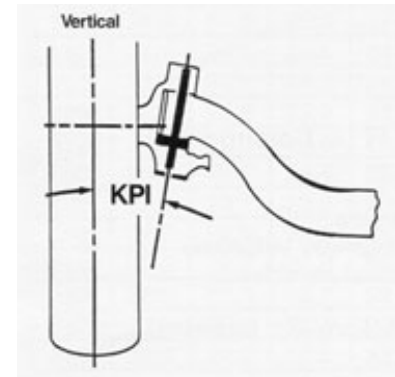
- Production cars are built with wheel offsets that minimize wheel-bearing load. In corners, excessive lateral tire loads add stress to wheel bearings.
- Fiero's have Positive Offset. The hub mounting surface is toward the front or wheel side of the wheel. Positive offset wheels are generally found on front wheel drive cars and newer rear drive cars.
- To convert from inches to mm multiply by 25.4
- To convert from mm to inches divide by 25.4



BACKSPACE	3.25"	3.5"	3.75"	4"	4.25"	4.5"	5"	5.25"	5.5"	5.75"	6"
WHEEL WIDTH											
5.5"	0	6	12	19	25	32	44	52	57	63	69
6"	-6.4	0	6	12	19	25	38	44	51	57	63
6.5"	-12	-6	0	6	12	19	32	38	44	51	57
7"	-19	-12	-6	0	6	12	25	32	38	44	51
8"	-32	-25	-19	-12	-6	0	12	19	25	32	38
8.5"	-38	-32	-25	-19	-12	-6	6	12	19	25	32
9"	-44	-38	-32	-25	-19	-12	0	6	12	19	25
9.5"	-51	-44	-38	-32	-25	-19	-6	0	6	12	19
10"	-57	-51	-44	-38	-32	-25	-12	-6	0	6	12
10.5"	-63	-57	-51	-44	-38	-32	-19	-12	-6	0	6
11"	-69	-63	-57	-51	-44	-38	-25	-19	-12	-6	0
12"			-69	-63	-57	-51	-38	-32	-25	-19	-6

Aftermarket Wheel Offset

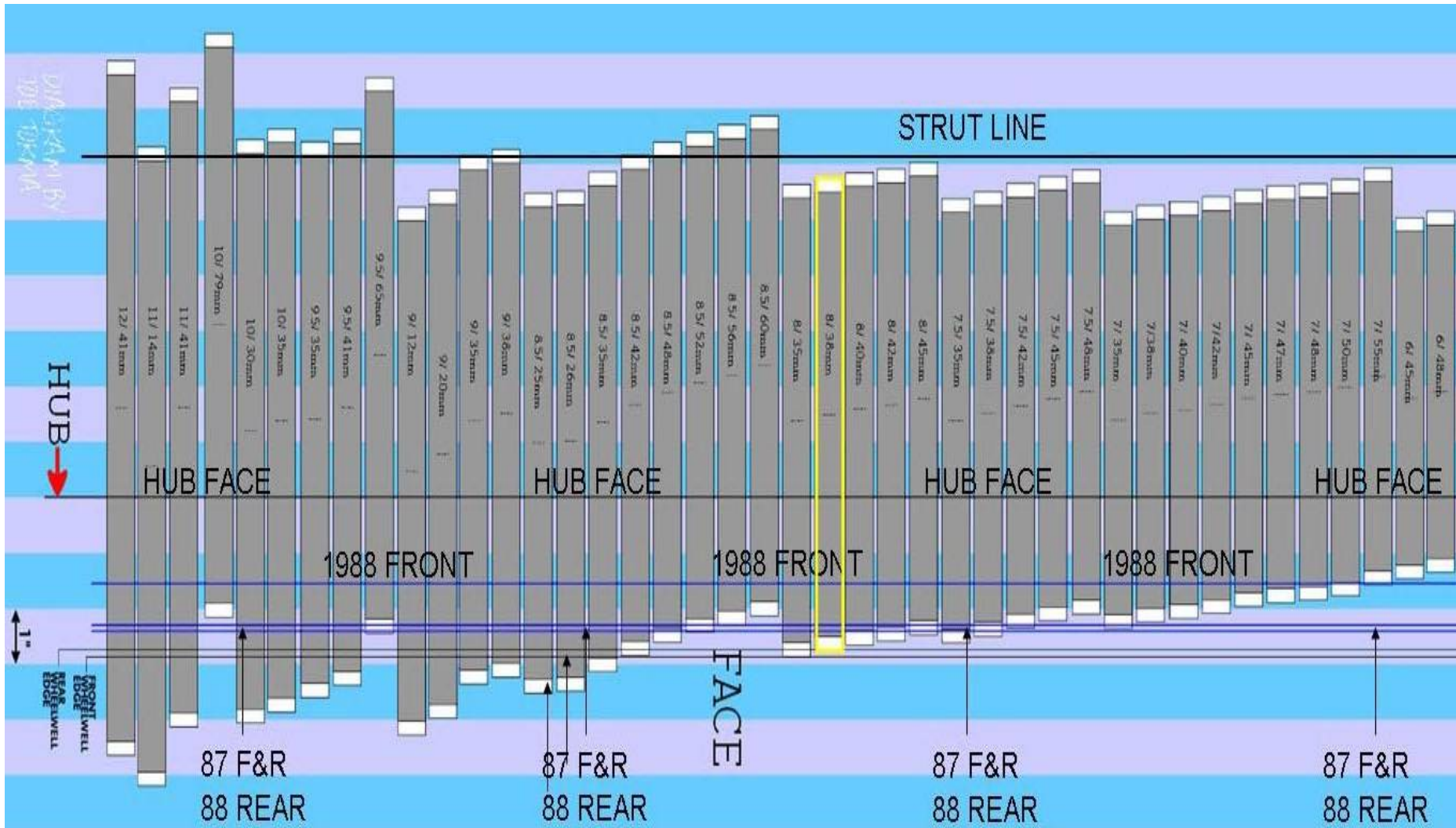
- As wheel widths change, the offset combined with the new width must be chosen properly so that the wheel and tire have enough space within the wheel well to avoid rubbing or unwanted contact with other components.
- Improper wheel offsets can lead to a variety of problems ranging from poor handling characteristics to broken suspension components
- Altering wheel offsets also affects the scrub radius. Recall that the scrub radius is the ground-level measurement between the kingpin inclination axis (KIA) and the tire contact patch's center.
- If the KIA intercepts the ground outboard of the tire contact patch's center, then the scrub radius is negative. On the other hand, if the KIA intercepts the ground inboard of the tire contact patch's center, then the scrub radius is positive. Fiero's are usually set up with a negative scrub radius.
- A negative scrub radius is preferred for front-wheel-drive cars since it gives a stabilizing effect when traction between the left and right wheels varies. If a single front wheel loses traction during acceleration or braking-like what would occur if one tire goes over a patch of ice-the other front wheel will toe-out a certain degree depending on the amount of steering compliance, which will tend to steer the car in a straight line. At the same time, the driver will feel a certain amount of kickback through the steering wheel.
- Offset also affects suspension stiffness through the suspension's motion ratio. With less offset, the wheel's leverage about the inboard lower control arm pivot increases while the suspension spring leverage remains constant. The net effect is a reduction in the effective wheel spring rate.



Measuring Wheel Offset

- To calculate offset you'll need the following measurements:
- Wheel back space, Wheel Width, and Wheel Center line (outboard flange to inboard flange measurement / 2)
- Subtract: Wheel center line from Wheel backspace to get offset. If backspace is less than the wheel centerline the offset is negative If backspace is greater than the wheel centerline the offset is positive
- To maintain handling characteristics and avoid undue loads on bushings and ball joints, the car manufacturer's original offset should be maintained when choosing new wheels unless there are overriding clearance issues.
- Wheels are usually stamped with their offset using the German prefix "ET", meaning "Einpresstiefe" or, literally, "insertion depth". An example would be "ET45" for a 45mm offset.
- Calculating the offset of a wheel is a fairly easy mathematical equation. First, measure the overall width of the wheel (remember, just because a wheel is 18x7.5, does not mean that the OVERALL width is 7.5". It means that the measurement between the outboard flange and the inboard flange is 7.5"). Next, divide that width of the wheel by two; this will give you the centerline of the wheel.
- Overall width/2 = Centerline
- After determining the centerline, measure from the hub-mounting surface of the hub to the edge of the inboard flange (if the wheel were laying flat on the ground – face up – your measurement would be from the ground to the hub-mounting surface). This is your back spacing.
- Back spacing - Centerline = Offset in Inches

Aftermarket Wheel Guide

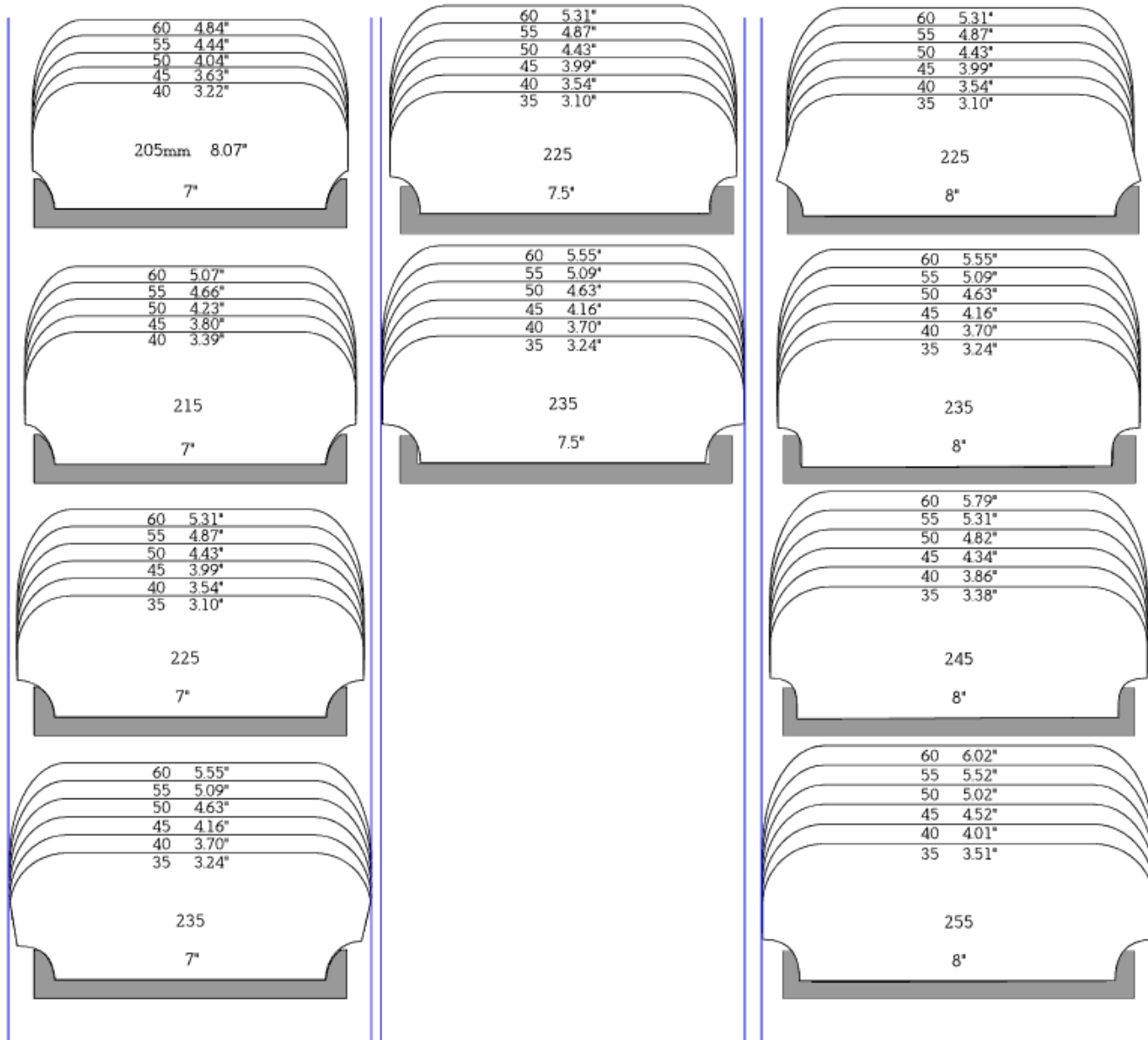


Wheel Size vs. Tire Size

- Selecting the proper size tire to fit your wheel is very important. Incorrect tire size can cause poor handling, undue stress on the suspension, and possible dangerous conditions.
- If the wheel is too wide for the tire, the sidewall bead could break during a turn and cause tire to deflate.
- If tire is too wide, the tire sidewall will not properly support the vehicle and cause too much tire roll.
- If tire has a larger or smaller diameter than stock, acceleration and speedometer accuracy will be affected.



How Wheel Size affects tires



Plus Size Wheel Sizing

- The Plus concept was developed by performance-minded car owners and tuners who wanted to be able to put wider, bigger wheels and tires on their cars without sacrificing speedometer accuracy.
- **The Problem**
Your car's speedometer is calibrated by telling the needle you see on the dashboard how many times the wheel spins around. The problem is, if you make your wheel diameter smaller, it's going to spin more times to go the same number of miles. Your car doesn't know you changed your tire and wheel size, so it will give you an inaccurate reading.
- **The Solution**
In order to keep your speedometer accuracy, you need to change your tires and wheels in such a way that the overall diameter of the setup does not change significantly. For instance, a 225/60-16 has the same rolling diameter as a 245/50-17. The larger tire will give better traction and cornering because it is wider and has a lower aspect ratio, but won't throw off the speedo.
- **The Plus One**
The Plus concept takes it a step further, and formulates the tire size you'll need if you increase your wheel diameter by an inch, for instance changing from a 15-inch to a 16-inch wheel and tire. As the wheel diameter goes up, the aspect ratio goes down to compensate for the changes. There are also formulas for Plus Two, Plus Three and so on depending on how big you want to go. You can even do a Plus Two or Plus Three, as long as you keep the dimensions under control.

Plus Sizing Pro's/Con's

- **Advantages**

- Larger tires improve handling and cornering, due to wider tread faces and stiffer sidewalls. Wider tires may decrease braking distances on dry pavement.
- Larger wheels with lower profile tires are sometimes aesthetically or culturally desirable.

- **Disadvantages**

- Larger wheels typically cost more. Wider tires tend to be more expensive because they are less common, and there is less competition between brands.
- Performance improvements beyond what is achieved in a Plus One sizing are minimal.
- Lower profile tires tend to have stiffer sidewalls, which might decrease riding comfort.
- During winter, wider tires perform worse. Narrower tires exert more pressure on the contact patch, maintaining better road contact through snow.
- Larger and wider wheels decrease fuel efficiency and increase consumption. A larger tire footprint can increase the time taken for "return to center" (steering) after taking a sharp turn.

Controversial issues

- **Some people claim larger wheels wear faster. Wheels with reduced sidewall heights may increase risk of damaged rims, breaking the bead, and/or damaged sidewalls. The increased width of the contact patch of wider tires may increase the risk of hydroplaning.**
- **Plus sizing tires may enhance the vehicle's value, but altering the vehicle from the factory specifications may reduce value.**
- **The additional height and weight of plus sized wheels may increase vulnerability to rollovers, particularly by changing the center of gravity. During rapid tire deflation at speed, reduced sidewall height may encourage rollovers.**
- **While some research suggests that Plus sizing may reduce acceleration performance and fuel economy, others would argue that the fewer revolutions required to cover the same distance makes poorer fuel economy somewhat questionable. While overall wheel diameter measured at the tread is unchanged, rotating heavier rims outwards from the axis of rotation increases rotating mass. This increases the energy transfer needed to accelerate or decelerate the wheel. When a vehicle's acceleration is limited by engine power, the corresponding result is a decrease in acceleration performance. Higher rotational mass also means increased inertia, potentially increasing heat.**
- **Acceleration is a function of total vehicle mass & force at the tire patch. While wheel weight and mass moment of inertia does have a slight effect on vehicular acceleration/deceleration via inertia, the larger effect of increasing wheel diameter is torque loss. If you install a wheel/tire combo that's 20% larger in diameter, you will have 20% higher output/input effective gear ratio (like shifting into a higher gear), for accelerating and braking. This could make the vehicle accelerate more slowly depending on the torque available, but will also make the brakes feel weaker (more difficult to lock up). Total wheel weight (tire & rim) is part of the unsprung weight of the vehicle and will have a great effect on traction while traveling over uneven terrain as the wheel can respond quicker (lighter weight) to terrain changes. This allows the wheel to get back on the ground more quickly.**



Questions and Comments

