Air Pressure/Load Adjustment for High Speed Driving
Recommended High Speed Pressure & Load Capacity Adjustments

For Y-Speed Rated Tires						
Vehicle Top Speed		Required Tire Pressure Increase		Tire Load Capacity % of Branded Maximum	Y-Speed Rated Tire 35 psi O.E. Example	
mph	km/h	psi	bar	% of value branded on sidewall	psi	lbs.
118	190	0	0	100%	35.0	1000
124	200	0	0	100%	35.0	1000
130	210	0	0	100%	35.0	1000
136	220	0	0	100%	35.0	1000
143	230	1.5	0.1	100%	36.5	1000
149	240	3.0	0.2	100%	38.0	1000
155	250	4.5	0.3	100%	39.5	1000
161	260	6.0	0.4	100%	41.0	1000
168	270	7.5	0.5	100%	42.5	1000
174	280	7.5	0.5	95%	42.5	950
180	290	7.5	0.5	90%	42.5	900
186	300	7.5	0.5	85%	42.5	850

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For W-Speed Rated Tires						
Vehicle Top Speed		Required Tire Pressure Increase		Tire Load Capacity % of Branded Maximum	W-Speed Rated Tire 35 psi O.E. Example	
mph	km/h	psi	bar	% of value branded on sidewall	psi	lbs.
118	190	0	0	100%	35.0	1000
124	200	1.5	0.1	100%	36.5	1000
130	210	3.0	0.2	100%	38.0	1000
136	220	4.5	0.3	100%	39.5	1000
143	230	6.0	0.4	100%	41.0	1000
149	240	7.5	0.5	100%	42.5	1000
155	250	7.5	0.5	95%	42.5	950
161	260	7.5	0.5	90%	42.5	900
168	270	7.5	0.5	85%	42.5	850

Air Pressure/Load Adjustment for High Speed Driving

Driving at high speeds certainly helps make a trip go faster; just ask any driver who has gone "flat out" on the German Autobahn. However with the exception of events like the Silver State Classic's Open Road Rally or a driver's school on a racetrack, it's difficult to find a place that allows unlimited speeds! Remember, the tires on the vehicle should be properly sized, inflated and inspected if you plan to drive fast because the tires will be subjected to tremendous stresses.

Because of the weight they bear, pneumatic tires' sidewalls bulge and their treads flatten as they roll into contact with the road. This results in dimensional difference between the tire's "unloaded" radius (i.e., between the center of the axle and the top of the tire) and its "loaded" radius (between the center of the axle and the road). The engineer's call the difference between the two radii "deflection." Increasing vehicle speed will cause the tires to deflect quicker and increasing vehicle load will cause the tires to deflect farther (if tire pressure isn't increased).

Consider that a 225/45R17 91W Standard Load tire (with a 25-inch overall diameter) will roll about 835 times every mile. Although the number of tire revolutions per mile doesn't change significantly as speed climbs, the revolutions per second become daunting. While the 225/45R17 91W-sized tire rolls a rather comfortable 7 times per second at 30 mph, this same tire will roll about 16 times per second at 70 mph on an American Interstate and an amazing 35 times per second during a 150 mph cruise on the German Autobahn. Thirty-five tire revolutions per second means that the tire is transforming from its unloaded to loaded shape and back every $3/100^{th}$ of a second.

The European Tyre and Rim Technical Organization (ETRTO) establishes the standards for tires sold in Europe, and recognizes that the tire's deflection must be minimized and controlled in order to surpass high speed driving stresses. In order to accomplish this, the tire inflation pressure recommendations and the tire's rated load capacities are customized when speeds exceed 160 km/h (99 mph) for all tires up to and including a V-speed rating, and when speeds exceed 190 km/h (118 mph) for all tires that are Z-speed rated and above.

The Autobahn's unlimited speed opportunities explain why many German vehicles identify alternate tire inflation pressures to accommodate higher than North American highway speeds and heavier than typical two-passenger loads. In order to accommodate higher speeds, the tire size and inflation pressure recommendations are tuned beyond what is branded on the tire's sidewalls. These increases in recommended tire pressure are usually determined by agreement between the vehicle and tire manufacturers. In the absence of such an agreement, apply the following:

Beginning with the vehicle manufacturer's recommended tire pressure for normal highway conditions, tire inflation pressures are initially increased and then the tire's rated load capacities (branded on the sidewalls) are reduced as speeds climb.

In the examples above, the vehicle manufacturer's recommended 35 psi for a 225/45R17 91W Standard Load tire installed on a vehicle initially rises in 1.5 psi increments for every 10 km/h (6.2 mph) increase in speed until the inflation pressures max out with an increase of 7.5 psi when the vehicle's top speed has increased 50 km/h (31mph). Then as the vehicle's top speed continues to climb, the rated load capacity of the tire is reduced in 5% increments for every additional 10 km/h until the vehicle's top speed has increased an additional 30 km/h (18.6 mph). In this case the 225/45R17 91W Standard Load size's rated load capacity of 1,477 lbs. is reduced to 1,255 lbs. when applied to a vehicle with a 270 km/h (168 mph) top speed.