

# Small Gears

*Reprinted from ACE (Altitude Climbing Endurance) Training for Cyclists by Arnie Baker, MD*

Make sure you have easy gears. Smaller gears save your muscles. Although you may average a higher cadence over the course of a climb, you want to be able to spin a cadence of at least 50 rpm on the steeper pitches.

Although you may be able to push bigger gears for short periods on training rides, if you do not have easy-enough gears during your event you may not finish an event you otherwise can.

Of course, steeper climbs require easier gears. Although some ACE™ rides have grades no steeper than 4%, most have 6% to 8% climbs. *The Tour of the California Alps—Markleeville Death Ride* has many pitches of 10%. A few short sections are steeper.

Almost every strong rider needs at least a 39-27 on ACE™ rides. That means 39 teeth on the small chainring and 27 teeth on the largest cog on the rear wheel. This gearing may be enough for riders who can sustain climbing rates greater than 3,500 feet per hour up 10% grades. There are generally few such riders in recreational ACE™ events.

Smaller gears are recommended for most riders.

Consider regearing your road bike with mountain bike cogs and a mountain-bike rear derailleur. Or a compact crank that allows for a 34-tooth inner chainring, rather than the standard 39. Or a triple chainring that allows for a 30-tooth inner chainring. Or a combination of a smaller chainring and larger cogs.

## **Gearing Math**

Climb at about 2,000 feet per hour up 10% grades? Let us do the math:

2,000 feet up climbing per hour up a 10% grade means you are riding about 20,000 feet along the road per hour, or about 333 feet per minute.

A 28-inch wheel travels  $28/12 \text{ feet} \times \pi \times \text{cadence} \times \text{gear ratio}$  per minute.

Therefore, for a 10%-grade-2,000-foot-per-hour climber,  $\text{cadence} \times \text{gear ratio} = 45$ .

To keep a cadence above 50 rpm on a 10% grade you need a gear ratio of less than 0.9.

I suggest a 30-34. That is a 30-tooth front chainring (generally the smallest chainring of a road triple) and a 34-tooth rear cog. This is a gear ratio of 0.88.

To make this set-up, you need a triple chainring and a mountain bike derailleur.

## **Perform the ACE™ Gearing Test**

Although you may occasionally allow your cadence to drop to as low as 50 rpm on the steepest pitches, in general you would like to have the option to be able to keep cadence above 70 rpm and your heart rate under 75% on long grades.

Do the ACE™ gearing test: Ride up a long grade similar to ones you will face during your ACE™ event. Can you keep cadence over 70 rpm and heart rate under 75% of max? If not, you need easier gears.

## **The Tour of the California Alps—Gearing Recommendations**

<b>Finishing Time</b>	<b>Gearing at Least</b>
8 to 10 hours	39-29
10 to 12 hours	39-34
12 hours or more	30-34

Table 1. Gearing based on finishing times.

## **Gearing Summary**

I often hear riders complain that they did not have easy enough gears. No one has ever complained to me that they had too easy gears. Even if you end up having a “bail-out” gear you never need, so what? There are plenty of other gears you will probably never use. Like that 53-12.

You are not a wimp to have easy gears—you are smart.