

<p>E1 Aerobic Development</p>	<p>These sessions help improve your body's ability to utilise fat as a fuel source by increasing mitochondrial density in slow twitch muscle fibers. This has the additional benefit of reducing the amount of lactate produced, as well as helping you recover faster from harder efforts during training or racing.</p> <p>Aerobic development sessions are completed at a pace that feels like you are just starting to have to do some work, up to a moderate level of effort. At this intensity you should also notice that your breathing switches from 'hardly breathing at all' to a more constant breathing through the mouth.</p> <p>There are three key points to a good E1 session, these are;</p> <ul style="list-style-type: none"><li>▪ Stay within your E1 zone <u>as much as possible</u>.</li><li>▪ Keep your cadence above 85rpm (ideally between 90-110rpm) as this helps shift the load to your aerobic system rather than fatiguing your legs</li><li>▪ Focus on smooth pedalling and a relaxed upper body. These sessions are ideal for working on your pedalling technique.</li></ul> <p>Generally speaking you should finish an E1 ride feeling pleasantly tired, but also with the view that you could have gone for longer and that if necessary you could complete the same session again with minimal rest.</p>
<p>E2 Tempo</p>	<p>Depending on what 'zone's system you use, the E2/Tempo zone is either directly above the E1 zone or it overlaps the top half of that zone. Training in the tempo zone maximally activates the slow twitch muscle fibers and stresses the fat oxidation process.</p> <p>These sessions are often referred to as 'tempo' sessions. The intensity is moderate to somewhat hard and riders often find a nice constant rhythm to keep the intensity at the right level. A lapse in concentration during a tempo session often sees the intensity drop below the target zone so it is important to be well aware of the effort being made during the session.</p> <p>Tempo sessions are also good for building muscular endurance - which is the ability to cope with pressure in your legs (from pushing a big gear or climbing a hill) for prolonged periods. Long tempo sessions are ideal for preparing for long road races, especially ones that include long climbs.</p> <p>The cadence for these sessions will depend on where you are at in your program, with the earlier sessions at slightly lower cadences (75-85rpm) and the sessions closer to your race at 85+ rpm.</p> <p>As with the E1 sessions, the key to a good E2/Tempo session is spending as much of the effort time in the zone as possible. If the program calls for a cumulative time in zone this is best completed as a single or smaller intervals, for example a training session that asks for 1hr of cumulative E2 time should be done as either a straight 1hr effort, 2 x 30min, 3 x 20min or 4 x 15min.</p> <p>The overall fatigue from a Tempo session will be moderate to high, depending on what the duration was. Unlike the E1 sessions, most tempo sessions will require some recovery time but could be completed on subsequent days if required.</p>

## E3 Threshold

While the E1 and E2 sessions primarily focus on the utilisation of fats, the E3/Threshold sessions are mainly focussed on improving the carbohydrate oxidation. Having a high threshold power is a combination of good fat and carbohydrate oxidation.

Threshold efforts can be quite difficult to get right, even if you have a power meter. The secret is good pacing in the first 1-2 minutes and then pushing hard enough throughout the remainder of the interval. By their very nature, threshold efforts are hard and towards the end of an interval it could well feel like a maximal effort.

The two most important aspects of these intervals are ensuring you get the intensity right for both the interval **AND** recovery period between efforts. The temptation with the interval is to go really hard at the start to get your heart rate up, but this just serves to generate lots of lactate and reduces the quality of the effort. Even with a power meter it is common for the first 30-60 seconds to be way too hard. Ideally the first 30seconds should feel like you are going at 75-80% of race pace, after which the perceived effort will more closely match your normal threshold pace. The second half of the interval is the hardest and it is important to keep pushing until the end. If, after the first minute, your heart rate isn't in the right zone then go slightly harder. Once you find the right intensity concentrate on keeping your cadence up (80-110rpm) and get a good sense of how this effort feels and maintain it.

Once your interval is finished its time to recover. The mistake here is going too hard. You should aim to keep riding during the recovery period but keep the speed quite low (think 10-20kmh).

After a threshold session you will generally feel quite fatigued and you will likely require a day of easier riding or rest before being able to complete another session, although in the lead up to multi-day tours it is quite common to do back to back threshold/hard days to simulate the demands of the competition.

## E4 Max Aerobic

Vo2 intervals are designed to boost your peak aerobic power output (i.e. power at max Vo2) by increasing your ability to utilise oxygen. In many ways these are the hardest intervals to get right – even with a power meter. This is because the intensity is close to or at your maximal aerobic power. Each effort requires a lot of mental and physical effort to maintain the correct intensity and in many ways the secret is accepting how much they will hurt.

As with threshold intervals the temptation is to go too hard from the start. Generally speaking use the same principle for pacing as the threshold efforts, except adjust the feel of the first 30 seconds to around 85-90% of maximum. By 1 minute in you should start to feel the lactate building up and the key is to just keep on pushing. After 1.5-2 minutes it will take everything you have just to maintain this pace so just push as hard as you can without surging. Vo2 intervals are usually 2.5-5 minutes long and have a recovery time of 3-10minutes.

If you do not have a power meter then it will be important to visualise an intensity to ride these efforts at. I recommend thinking of completing a 4km prologue time trial. It will be super hard and max out your aerobic system.

When completing these efforts your breathing should become very heavy, almost to the gasping stage. If it's not then you are either not pushing hard enough or you're pedalling too large a gear – which places more stress on the leg muscles

rather than the aerobic system.

Selecting the ideal terrain for these intervals can also be tricky. Generally speaking keep to flat to slight inclines unless your target races have short 2-3 minute power climbs, in which case you should include a mixture of flats and hills for these efforts.

## Sprint Intervals

Sprint intervals are very short sprints of 5-15 seconds at maximum effort, however the mix of duration and format of the sprints dictates what the training effect is. The following are some of the common sprint efforts included in Argonaut Cycle Coaching training programs

### Power Starts

These are short, 3-6 second intervals completed from a slow or stationary start (under 5kmh) using a very big gear. They are completed out of the saddle and mimic a standing start for a track cycling event.

Due to the nature of these efforts they typically last around 6 pedal strokes (3 on each leg). Anything beyond this and the force requirement reduces considerably and the training effect changes.

It is important to keep the back straight and relatively upright on these efforts and to pull up on the handlebars to achieve maximal downward force on the pedals.

### STOMPS

STOMPS are almost identical to 'Power Starts', with the one key exception that they are completed while staying seated. Technique is important on these efforts and the most important thing is to drive from the core down and to keep the upper body as still as possible.

These efforts are best completed with the hands up on the tops gripping on to the bars quite firmly. Flat to a very slight uphill terrain works best.

As with the power starts, the focus is on maximal force over the first 6 pedal strokes.

### Accelerations

Acceleration intervals involve riding in a moderate to high gear (e.g. 53x13) at around 15kmh and then jumping as hard as you can to accelerate the gear as quickly as possible.

The terrain for these efforts is less important, however special note should be to match gearing and starting speeds. The initial effort needs to be quite hard and you should just be winding out the gear in the allotted time. You should not need to change gears on these efforts. Use your initial effort of a set to determine the right gear for your current ability and then modify the gearing on future efforts to get maximum benefits.

## Max power

Max power sprints are pretty straightforward. Just roll along at a nice pace (can be anything from 15-30+kmh) and pick a suitable gear to sprint in and then GO at max effort.

The gearing of choice should ideally enable you to reach a peak cadence in excess of 100-100rpm (depending on your sprint ability). The initial effort to get on top of the gear should not feel overly hard. If so then you are probably wasting more effort on force at a low cadence rather than achieving peak power. In this case go one gear easier. You should be able to get on top of the gear relatively quickly and may even need to shift up a gear or two during the effort.

## Speed Endurance

Speed endurance is a term used to describe the ability to hold one's maximal sprint speed for long periods. These efforts are just like the max power sprints, except they are longer and usually completed after a few weeks of max sprint power work.

## Anaerobic intervals

Anaerobic, or lactate intervals vary from 30 seconds to 2 minute in duration and are always completed at **maximal** effort.

The purpose of these intervals is to maximum stress the fast twitch muscle fibers (both types) as well as the anaerobic energy systems. Make no mistake about it, these intervals will hurt, but doing them at anything less than 100% will be wasting your time. It's only through a maximal effort that the body will be stressed enough to adapt and improve to this type of work.

Choosing a course for these efforts can be tricky and while you sometimes want a flat course the best results usually come from a short hill (500-1000m) with a gradual slope (1-4%).

At the end of each interval the primary goal is to keep pedalling at a low cadence to help clear out the lactate. Recovery should not be extended beyond that listed in the program, as some accumulation of lactate between efforts is often desired to help maximise the stress.

The most common anaerobic intervals in our programs are:

## Anaerobic power – 20 sec

The easiest way to think of these efforts is a maximal 20-second sprint. If possible, you should aim to vary the terrain for these efforts so that you can learn to generate good power in all situations.

Gearing and starting speed are much the same as the Max Power efforts described in the sprint intervals section. The major difference is that you will most likely need to gear up during the effort. Alternatively choose to start your effort just before getting to a hill, that way the intensity will resistance will increase as you start to climb.

## Anaerobic capacity – 30sec – 2min

These are perhaps the most varied of the anaerobic intervals as you can manipulate the duration of the interval and rest period to have the desired result. The shorter efforts (~30sec) should be completed as per the anaerobic power intervals described above. The longer efforts will require a minimal amount of pacing as jumping too hard at the start can make a 2-minute interval unbearable.

The primary idea is that you should be completely spent at the end of each interval (or set of intervals). To provide an example a 30 sec effort will be completed at a higher intensity than a 2-minute effort, however 4 x 30 sec efforts with a short 2 min recovery time will provide a greater total fatigue than a single 2-minute effort.

Short hills, known as power climbs, are great for completing these efforts, although as with the other intervals, varying your terrain of choice is the best option.

## Lactate Tolerance – 1-1.5mins

These intervals are usually completed in the last few weeks before a big race. These are essentially the same as the anaerobic capacity intervals, however the length is usually kept to 1-1.5 minutes per effort but with shorter recovery times.