

110 days to **CRUSH** your first century

Interval Description

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Congratulations!

By choosing this professionally written training program, you have now taken a major step towards attaining the fitness and tools you need to unlock more of your potential on the bike! Cycling requires strength and endurance as much from your mind, as from your body. That is a part of why we enjoy and love this sport so much! Whether your goal is to get stronger on the bike, lose a few pounds through the amazing sport of cycling, or simply to have a goal to work towards, Human Vortex Training has a training plan that can help you achieve!

Started in 2008 after realizing that Pittsburgh was lacking Cycling Coaches, and with a desire to help riders of all backgrounds and abilities to enjoy the time they spent on their bikes, Human Vortex Training has grown into an International Coaching brand, helping athletes from countries like the USA, Moldova, Romania, Spain, and more!

Offering endurance sport athletes sports conditioning and strength training, with an extensive background in both Sport and Sports Medicine, athletes of all backgrounds have sought advice, guidance, and coaching from me. From back and neck pain from riding, to Full-Distance Triathletes with shoulder pain, it's incredible to look back and see how many athletes have extended their careers with our help.

With this training plan, YOU are receiving the benefits of the many athletes whom have looked to HVT for help to ride pain free, ride stronger, and to have professional guidance in helping them balance their work-home-sport lives, as well as building up their discipline, mental strength, and motivation to reach their goals.



It's an honor to help you along your fitness and competitive journey.

Thank you for affording me this opportunity.

I look forward to hearing about your accomplishments!

Remember to Train SMARTER, not harder™,

A handwritten signature in black ink, appearing to read 'Menachem Brodie'.

Menachem Brodie,

NSCA-CSCS, USA Cycling Expert Coach,

SICI Certified Bike Fitter

INTRODUCTION

Congratulations on purchasing the 110 Days to CRUSH your first Century Ride.

This pamphlet is here to help you make sense of the specific intervals in YOUR plan, so you can properly execute each and every ride!

The intervals used in Human Vortex Training's Coaching practice have been designed to meet the needs of the most demanding athletes from around the globe: From Orange County, California, to Taipei, Taiwan, and Eindhoven, Netherlands.

These intervals will challenge you to push your limits, try new approaches and ways of doing things, allowing you to discover new strengths you didn't know you possessed, as well as new areas that you'll need to improve.

TRAINING LEVELS

Znoe / Level	Name	Avg. Power %FTP power	Avg. HR %FTP HR
1	Active Recovery	<55%	<68%
2	Endurance	56-75%	69-83%
3	Tempo	76-90%	85-94%
4	Lactate Threshold	91-105%	95-105%
5	VO ₂ Max	106-120%	106%<
6	Anaerobic Capacity	121-150%	N/A
7	Neuromuscular Power	150%+	N/A

1: ACTIVE RECOVERY “Easy Spinning”, or “Soft Pedaling”. There is little, if any sensation of effort or fatigue in legs. Conversation pace. Used between intervals efforts, or for active recovery after hard training days/ sessions.

2: ENDURANCE “All Day”, also known as LSD, or Long Slow Distance pace. Little feeling of effort, but periodic increases in effort may be experienced. Concentration needed at the higher end of the level. Continuous conversation is still possible. Longer sessions may be used, of moderate intensity. Occasional use of back to back training sessions may be done, but not recommended frequently.

3: TEMPO “Brisk ride”, takes concentration to maintain, especially at top end of level. Frequent/ Greater sensation of leg effort/ fatigue. Broken Conversation is possible. Recovery from level 3 takes longer than level 2, but with proper diet/ rest/ hydration, back to back training sessions of level 3 are possible if duration is not too long/ excessive.

TRAINING LEVELS

4: LACTATE THRESHOLD Just above or below Time Trial Pace, dependent upon duration, current fitness, environment, etc. Continuous sensation of greater leg effort/ fatigue. Mentally challenging to maintain effort. Very Broken Conversation is possible. Due to taxing nature, this type of working is done in “intervals”, “blocks” or “repeats” 10–30 minutes in length. Consecutive days of level 4 training are possible, but only when one is adequately rested and recovered from previous training to one is able to maintain intensity.

5: VO₂ MAX Moderate–High intensity, moderate duration (3–8 min) intervals. Strong sensation of leg effort/ fatigue to point that anything more than 30–40 min total training session is difficult at best. Conversation not possible. Should only be attempted when adequately recovered from prior training. Back to back days not desirable.

6: ANAEROBIC CAPACITY Short(30 sec–3min) High intensity intervals targeting ATP, ATP-PC energy systems. Heart rate not used as guide due to non– steady–state nature of effort. Extremely strong sensation of leg effort/ fatigue. Conversation not possible. Consecutive days of extended level 6 training usually not attempted.

7: NEUROMUSCULAR POWER MAX EFFORT, very short, very high–intensity efforts (i.e Power Starts, Short Sprints) less than 30 sec. Power may be used as a guide, but only in comparison to previous similar efforts, NOT FTP.

Descriptions and Ranges adapted from “Training and Racing with a Power Meter”, by Andy Coggan and Hunter Allen



TESTING: FIELD TEST

The Field Test allows us to get a really good snapshot of your CURRENT fitness and abilities. It is really important to note that we all have good days and bad days, but what sets the truly exceptional apart, is they push hard to do the best they can, on that day.

- ✓ **Intensity:** For the Endurance segments of the test, it is really important to ride AT ENDURANCE. Don't push too hard, and don't go too easy. Use your Power Meter or Heart Rate Monitor to help you stay on track.
For the TESTING intervals, Make sure you give your absolute best for each effort! Stay true to how YOU ride, and finish each effort as if it is your only one for the day!
- ✓ **Frequency:** ONLY AS PRESCRIBED.
- ✓ **Pedal Cadence:** As you normally would for each effort. During your training plan, we may challenge you to use different cadences for these efforts.

BIG RING ENDURANCE

The Big Ring Endurance rides help us to place more stress on the connective tissues and muscles over a variety of terrain, as well as help you to learn how to better use your gearing and cadence to “steamroll” over terrain, rather than flipping through your gears trying to find that “perfect” gear.

- ✓ **Intensity:** 69-83% of Threshold HR, 56%-75% threshold Power.
- ✓ **Volume:** as prescribed.
- ✓ **Frequency:** At least 18-24 hours in between sessions.
- ✓ **Terrain:** Flat to rolling (some may be prescribed with hills!)
- ✓ **Cadence:** as dictated by terrain, however aim for 90-95+
- ✓ **How to do it:** These workouts can really make riding for longer hours much more fun, and add a level of challenge to endurance rides. We want to make sure that we are keeping a smooth, full circle when we pedal, and DON'T mash!
You'll have to work to find comfortable gears for the rolling and hilly terrains, but you'll learn a lot about how much more a range of terrain you can ride over using fewer gears.

CLIMBING REPEATS (CR)

Should be done as prescribed, and should be done on a steady climb that has no interruptions. Intensity can be dependent upon time of year, and length of climb prescribed. Climbing Repeats should be executed on the same climb, and during the season, practice cresting the hill should be given attention (last 20 seconds ramping up a little). Climbing should be done in the saddle, if possible, as this is most efficient.

- ✓ **Intensity:** 97-100% FTP, unless prescribed otherwise.
- ✓ **Volume:** 3-10 repeats per workout, with a rest time of 1:0.5 -1:2 depending on time of year, pitch of climb, and adaptations desired.
- ✓ **Terrain:** steady, uninterrupted climbs of prescribed time lengths. If target races have
- ✓ **Cadence:** 70-75 (standing), 80+ (Seated).
- ✓ **How to do it:** find a safe climb that you can do, that is of the prescribed length. Try to remain seated, and maintain a constant, steady effort throughout. When cresting, instead of getting into a harder gear, practice increasing cadence (Fast Pedal), and then gearing up over the last 25-50 yards of the climb, accelerating over the top.

EASY RIDE

This ride should be done in an easy gear, that you can keep at the lower endurance level (56-65% FTP) for the entire time. Think of this as a ride with a child: light pressure on the pedals, and you feel like you're site seeing. Don't ride too hard, as these rides are geared at allowing you to keep some training stress on after very high volume or high intensity rides.

- ✓ **Intensity:** 56-65% FTP, 65-72% Threshold HR.
- ✓ **Volume:** 20-60 minutes.
- ✓ **Frequency:** minimum 6-8 hours in between sessions.
- ✓ **Terrain:** Flat to slightly rolling (Aim to avoid hills if at all possible)
- ✓ **Cadence:** 85-95.
- ✓ **How to do it:** While this appears to be a very simple workout, it is also extremely easy to mess up, by riding too hard!

ENDURANCE (E)

Similar to Foundation Miles, The ceiling for both power and heart rate on these, is just a little higher. These rides will continue to help you develop your “aerobic engine”, on which we want to develop most of your abilities. The amount of endurance miles you receive, will depend on how progressed you are, what your current state of fitness is, and what your goals are. We also take into consideration, the amount of time that you have to train. This type of workout is great for group rides, as long as your Heart rate spends 95% of the time in this zone (you may go over this just a little), and your power in this zone, for 95% of the time.

- ✓ **Intensity:** 69-83% of Threshold HR, 56%-75% threshold Power.
- ✓ **Volume:** as prescribed.
- ✓ **Frequency:** At least 18-20 hours in between sessions.
- ✓ **Terrain:** Flat to rolling (some may be prescribed with hills!)
- ✓ **Cadence:** 95+ for beginners, 85-95 for advanced.
- ✓ **How to do it:** These workouts will be a regular staple of your training year. The foundation miles will be during the foundation portion of your year, as the endurance miles will be done at a moderately faster, and quicker pace. Be sure to keep your pedal cadences in the ranges appropriate, and try your best to stay seated on the hills, using smooth, perfectly circular pedal strokes to get you up the hill. Most group rides will fall into the Foundation Miles (FM) category, so be smart! If you are going to do endurance in a group, be sure to stick to your ranges, and if the group is going a little harder, stay out of the wind, and work on keeping your power in endurance range, following wheels, and getting to the front in the mile leading up to the climbs, so you can control the pace, and conserve your energy up and over the climb!



FAST PEDAL (FP)

Fast Pedal intervals will help to increase pedaling efficiency, increase ones range of optimal (and comfortable) cadences, and helps to develop as smooth, well rounded pedal stroke. In order to execute these intervals effectively, one must maintain a consistent pedal stroke, pushing over the top, and pulling through the bottom.

- ✓ **Intensity:** N/A- HR & power will increase, but will not be used as indicator of intensity.
- ✓ **Volume:** As prescribed, with equal amounts of work to rest (for 1 min of work= 1 min of rest), unless indicated otherwise.
- ✓ **Terrain:** Flat to slightly downhill, OR Trainer/ rollers.
- ✓ **Cadence:** Beginners: as fast as can maintain without bouncing in the saddle. Intermediate/Advanced: 120+, or as high as can maintain without bouncing in the saddle.
- ✓ **How to do it:** These workouts should be performed on a relatively flat section of road. The gearing should be LIGHT with low pedal resistance! Begin by SLOWLY increasing you cadence (pedal speed), while staying in the saddle. (TIP: if you do not have a cadence meter, start out with roughly 15-16 pedal strokes on one leg, per 10 seconds – this equals roughly 90-96 rpm). Slowly increase your pedal speed, keeping your hips steady with NO rocking. Concentrate on keeping smooth pedal strokes, pulling through the bottom, and pushing over the top. After 15-20 seconds, you should be maintaining about 18-22 pedal strokes on one leg per 10 seconds (equaling about 108-130rpm). Maintain this cadence for the remainder of the interval. Your heart rate will climb during this workout, but DON'T use it to judge intensity!!!

It is imperative that you perform the fast pedal intervals without any interruptions (Stop signs, traffic lights, etc), since you need to maintain a continuous cadence, while continuously riding. If you are having difficulty doing this outdoors, try them for the first 4-6 sessions, on the Trainer. If you DO use a trainer to perform these, use a mirror(or two), to obtain instant visual feedback and cues, to help you maintain proper pedal stroke, and body positioning.

***Common poor habits during fast pedaling: Bouncing in the saddle, rocking on the saddle, toes pointed down, heels down, arching the back to maintain cadence. It is IMPERATIVE that you MAINTAIN EXCELLENT posture on the bike while performing these!!! ***



GROUP RIDE

Similar in intensity to Foundation Mileage, the only difference is the fact you're able to ride with your group. The challenge of this ride is to keep within your power or Heart Rate target ranges within the ride. Group riding within these limitations offers many advantages: It helps us to see how your strengths and abilities have advanced, consolidate the cadence training you've done to that point, as well as helping in the advancement and development of the mitochondria (the cell's power plant) and capillaries (where oxygen exchange occurs in working muscles).

While out on group rides aim to stay within the limitations for power and HR given, and look to be smart where and when you're riding at intensity.

- ✓ **Intensity:** 56–78% FTP Power, 89% or lower FTP HR (under 35 yrs old), 85% or lower FTP HR (Masters Racers).
- ✓ **Frequency:** 18+ hours in between rides.
- ✓ **Terrain:** Variable, unless specifically stated in your training program.
- ✓ **Pedal Cadence:** 85–100 rpm for those riding seriously for at least 1 year, 90–105 for those new to serious riding.
- ✓ **How to do it:** Riding with a group, aim to maximize your use of cadences, drafting, and using the terrain to your advantage to stay under the upper limits of your programmed Group Ride. Group rides provide incredibly valuable training feedback, and the opportunities to try different things in a dynamic group environment. Programmed Group Rides should NOT be treated as races or hard rides. There is a limit on your efforts for a reason!

LOW CADENCE TEMPO

Designed to improve muscle recruitment, Connective Tissue Strength, refine pedal stroke mechanics, and improve abilities to deal with rolling terrain. By training at the prescribed cadence, one develops the capabilities to handle subtle changes with terrain without having to change gears. As a result, one can improve economy on rolling terrain, as well as recruit more muscle fibers to help develop their strength through the entire pedal stroke. Cadence takes precedence over all, although it is to be noted that HR should not climb into the LT zone. It is important to remain seated on climbs, and focus on proper pedal stroke mechanics.

- ✓ **Intensity:** 88% > HR Power: N/A.
- ✓ **Volume:** as prescribed.
- ✓ **Terrain:** Flat to rolling Cadence: 70–75 rpm.
- ✓ **How to do it:** Can be done on steady climbs, hills, flat, or rolling terrain. One MUST stay seated at all times, and have as few interruptions as possible (stop signs, etc). Focus on keeping a smooth pedal stroke, pushing over the top of the pedals, and pulling through the bottom. Effort should be moderate, and pedaling should not prove to be incredibly strenuous, nor easy. Maintain constant pressure on the pedals.

OVER-UNDER INTERVALS (OUI)

Similar to Steady States in the energy systems trained. These intervals help foster ones capability to slightly vary intensity right around ones Threshold, during hard, sustained efforts, such as those during breaks from the pack, and leading into the finishing stretch. These workouts help the body adjust to functioning with short duration increases in lactate production, while still functioning at a high level.

- ✓ **Intensity:** HR (for OUI): 88–94% FTPHR for Under, 97–102% for Over.
Power (for OUI): 88–94% FTP Power for Under, 103–107% + for Over.
- ✓ **Terrain:** Flats, Rolling, Sustained climbs of shallow grade.
- ✓ **Cadence:** 90–105 for flats or rolling terrain, 80+ if on shallow climbs As with all higher- intensity intervals, you should ramp-up to the prescribed intensity over the first 15–20 seconds, maintain the efforts as prescribed, using CADENCE to change the efforts from Overs to Unders. You can do this by bringing your cadence up 5–10rpm, OR you can utilize two gears (1 for under, 1 for over) keeping the cadence the same for each) ALWAYS end these intervals with “Overs”. Recovery time in between intervals is purposefully short to stress the body to adjust to the buildup of lactic acid in the body, thus allowing for the desired training results.

PLUS POWER INTERVALS

A low level VO₂ Max interval, these intervals are designed to push your bodies ability to handle higher power, thus pushing up your Lactate Threshold FTP. These efforts are also done at a higher than normal cadence than your SSI's (usually 95+ cad.), in order for us to recruit the muscle fibers necessary to push more watts.

- ✓ **Volume:** As prescribed.
- ✓ **Intensity:** 102–110% FTP.
- ✓ **Pedal Cadence:** 95–105 (unless otherwise noted)
- ✓ **How to do it:** After a thorough warm-up, begin by taking the first 10–15 seconds to ramp into the power range, and the cadence range. Find a gear that hits that power range perfectly. Next focus on your position on the bike, ensuring that your upper body is nice and relaxed, and that you are stable on the bike (no bouncing in the saddle, or wiggling around!).

PROGRESSIVE RIDE

Progressive rides are an incredibly useful tool, especially when one either has limited time to train, or needs to maximize their returns for the rides they are doing leading up to a key event. Adding Progressive rides in at strategic points in your training plan gives you additional time at the upper end of your Aerobic and Lactic threshold zones. These efforts also allow us to progressively combine your endurance training rides with developing your fatigue resistance so you can finish your goal event STRONG.

Because of how and when these are programmed in, there is little or no need to change the preceding or upcoming training weeks load, thus allowing us to make the absolute most of your time available to train.

- ✓ **Intensity:** Beginning at low-endurance, and progressively getting harder throughout the ride.
- ✓ **Frequency:** Allow 36–48 hours between efforts, unless otherwise prescribed.
- ✓ **Pedal Cadence:** 85–105.
- ✓ **Terrain:** Varies, Follow your training program.
- ✓ **How to do it:** Following the workout outline, use your gearing, power meter/Heart Rate meter to ensure that you are staying within the guidelines for that specific ride. Make sure that you are fueling and drinking properly through your ride to ensure that you have what you need in the tank to NAIL IT at the end!

ALL OUTS

Geared to help increase the strength and repeatability of the ATP-PC and Glycolytic Energy Systems, All Outs can be done in a variety of time lengths, and thus their power ranges can vary significantly. Below are a few of the common time lengths, drawn out to help you understand how to execute them properly. Most important for these efforts is that you treat EACH ONE as if it is the ONLY effort you'll have to do at that level of the day. We want to avoid “Saving something in the tank” for the end of the workout/ efforts, as this is part of what these efforts are designed for: to expose your weaknesses in repeated efforts at these levels.

- ✓ **Intensity:** All out!
- ✓ **Volume:** As Prescribed.
- ✓ **Terrain:** Ideally Uphill, Flat, or into the wind. Not recommended to do downhill.
- ✓ **How to do it:** Start off by finding a gear you can comfortably spin at 90–95 rpm for the terrain you are on. When the interval is to start, HIT IT HARD!!!! Jump HARD and maintain a max effort all the way through!! Rest between intervals vary from 10 seconds– 6 minutes. Follow recovery periods as prescribed.

POWER STARTING (PS)

These are designed to develop and train the ATP/PC energy system. PS efforts are short, maximal bursts consisting of 8–12 seconds with complete (5–10 min) recovery in between, so the ATP levels have time to be restored. Gearing needs to be relatively large (Big ring x 12–16), depending on your level of development, but if it is too big, you won't be able to generate enough power to properly execute the workout. Because the efforts are so short, and require max power, there are no ranges for power or HR. These are a harder relative of Big Ring Over-gear Sprints (BROS)

- ✓ **Intensity:** Maximal
- ✓ **Volume:** As prescribed. Efforts should be 8–12 seconds each, with FULL recovery in between.
- ✓ **Pedal Cadence:** NA
- ✓ **How to do it:** Gearing should be large, and appropriate based on your level of physical development. On a relatively flat road, slow to a near-standstill stop, gearing into your gear choice prior to doing so. Jump out of the saddle driving the pedals down as hard as possible. Perform entire exercise out of the saddle, and make every attempt to keep your upper body stationary as you go through the effort. Effort should last no longer than 10 pedal strokes of 12 seconds. By the end of the effort, you should feel as if you are just getting on top of the gear.

STEADY STATE INTERVALS

Designed to improve your ability to buffer lactic acid and other byproducts at your lactate and anaerobic threshold. By training just below your threshold, one develops the ability to work harder without increasing the lactate and other byproduct levels. As a result, you can produce more power at a given heart rate, which is necessary for endurance sport success.

- ✓ **Intensity:** FTP HR: 88–96% FTP POWER 92–100%
- ✓ **Volume:** as prescribed, with 1:1 rest to work ratio, unless otherwise prescribed.
- ✓ **Terrain:** flat to rolling.
- ✓ **Cadence:** 85–95 rpm on the flats, Hills: 80–95 rpm (seated), 70–75 (standing)
- ✓ **How to do it:** can be done on long steady climbs, on hills, or on flat terrain. MUST stay within HR and Power Ranges for ENTIRE interval. Cadence on short hills for SSI should be 80–95 rpm (seated) & 70–75 (standing), on flat terrain we want a cadence of 85–95 rpm.

SHORT STEADY STATE INTERVALS

Designed to help us increase the amount of time you can spend at Lactate Threshold, these efforts have you working at your Lactate Threshold for shorter periods of time with very short rest intervals.

- ✓ **Intensity:** 92–100% of FTP Power, 88–96% FTP Heart rate.
- ✓ **Volume:** as prescribed, sticking to the programmed rest periods between efforts and sets.
- ✓ **Terrain:** flat to rolling unless otherwise prescribed in your training program.
- ✓ **Cadence:** as prescribed for given time periods within your training program.
- ✓ **How to do it:** These efforts MUST stay within HR and Power Ranges for ENTIRE interval, and you must stick strictly to the short rest periods. These intervals are very challenging on the physiological, psychological, and physical aspects. These efforts will challenge you to learn how to meter your efforts, and to see that you CAN do more!

SHORT STEADY STATE INTERVALS @ CADENCES

Designed to improve your ability to buffer lactic acid and other byproducts at your lactate and anaerobic threshold, but even more specific to racing and riding in groups, these efforts will push you to use different cadences than you may be used to, or to hold a given cadence for longer than you normally would, thus increasing your ability to deal with terrain and changes within the group as you ride along.

These intervals allow us to work on speed–strength as you keep a constant velocity on the pedals through an effort.

- ✓ **Intensity:** 92–100% of FTP Power, 88–96% FTP Heart rate.
- ✓ **Volume:** as prescribed, with 1:1 rest to work ratio, unless otherwise prescribed.
- ✓ **Terrain:** flat to rolling unless otherwise prescribed in your training program.
- ✓ **Cadence:** as prescribed for given time periods within your training program.
- ✓ **How to do it:** These efforts MUST stay within HR and Power Ranges for ENTIRE interval. The cadences chosen may have you slightly above your Power Range, and that is ok. Focus on keeping as close to your power ranges as possible (Do not exceed 10w over top or bottom of your range. These efforts are geared to help you develop the ability to produce significant power at cadences that will be useful for your goal event. If you are training with a LEOMO–Type R, these efforts will be designed to hit on both your strengths and your weaknesses.

SMALL RING SPRINTS

These are designed to develop and train the ATP/PC energy system. Small Ring Sprints are short, maximal bursts consisting of 8–12 seconds with short to full recovery in between. Gearing needs to be Small ring up front (If you have 3 gears in the front, use the MIDDLE Gear) and the 14–16 gear in the back (usually 3rd or 4th to hardest), depending on your level of development, but if it is too big, you won't be able to generate enough power to properly execute the workout. Because the efforts are so short, and require max power, there are no ranges for power or HR.

- ✓ **Intensity:** Maximal.
- ✓ **Volume:** As prescribed. Efforts should be 8–12 seconds each.
- ✓ **Pedal Cadence:** Starting from 80–85 rpm.
- ✓ **How to do it:** Gearing should be appropriate based on your level of physical development, Small ring in the front (or MIDDLE gear if you have 3!), and 14–16 in the back. On a relatively flat road, slow down to 10–12 mph, and make sure your is set properly for you, as YOU DON'T CHANGE GEARS DURING THESE EFFORTS. Jump out of the saddle driving the pedals down as hard as possible. Perform entire effort out of the saddle, and make every attempt to keep your upper body stationary as you go through the effort, while working the bike side to side under you! These Effort should last no longer than 8–12 seconds, or about 120–175 feet (100–150m). By the end of the effort, you should feel as if you are just getting on top of the gear and wanting to go to a harder gear.

TRESHOLD BOOSTERS

Similar to Steady States in the energy systems trained. These intervals help foster ones capability to slightly vary intensity right around ones Threshold, during hard, sustained efforts, such as those during breaks from the pack, and leading into the finishing stretch. These workouts help the body adjust to functioning with short duration increases in lactate production, while still functioning at a high level, and thus allow you to apply enough pressure to see your FTP numbers increase!

- ✓ **Intensity:** HR (for Power Boosters): 88–94% FTP HR for Under, 97–102% for Over
Power (for Power Booster): 88–94% FTP Power for Under, 103–107% + for Over.
- ✓ **Terrain:** Flats, Rolling, Sustained climbs of shallow grade.
- ✓ **Cadence:** 90–105 for flats or rolling terrain, 80+ if on shallow climbs As with all higher intensity intervals, you should ramp-up to the prescribed intensity over the first 15–20 seconds, maintain the efforts as prescribed, using CADENCE to change the efforts from Overs to Unders. You can do this by bringing your cadence up 5–10rpm, OR you can utilize two gears (1 for under, 1 for over) keeping the cadence the same for each)
Recovery time in between intervals is purposefully short to stress the body to adjust to the buildup of lactic acid in the body, thus allowing for the desired training results.

STOMPING (S)

Another way to convert strength gains from weight training to power and strength on the bike. As you get stronger/ better at these, you can increase the resistance by starting at a slower speed.

- ✓ **Intensity:** MAX
- ✓ **Volume:** as prescribed, allowing at least 5 min recovery in between (full recovery)
- ✓ **How to do it:** Gearing should be large 52-53x 12-16, depending on your level of development. While seated, starting at 15-20 mph, stay seated and start to stomp on the pedals as hard as you can, concentrating on pulling through the bottom of the pedal stroke. Keep your upper body as still as possible while using your legs to drive the pedals.

SPIN-UPS

Spin-ups are similar to Fast Pedal intervals, as they will help to increase pedaling efficiency, increase ones range of optimal (and comfortable) cadences, and helps to develop a smooth, well rounded pedal stroke. However, unlike Fast Pedaling, Spin-ups will take your cadence up above the fast pedaling, to the point where you are starting to controllably bounce in the saddle. Make sure to keep your upper body nice and relaxed, and keep a firm, but loose grip on the handlebars. Feel free to move around between the bar tops, the hoods, and the drops for different efforts (Each Spin-up should be done in the same position for its completion).

- ✓ **Intensity:** N/A- HR & power will increase, but will not be used as indicator of intensity.
- ✓ **Volume:** As prescribed, with work to rest periods as indicated.
- ✓ **Terrain:** Flat to slightly downhill, OR Trainer/ rollers.
- ✓ **Cadence:** As high as can maintain slight bouncing in the saddle with control.
- ✓ **How to do it:** These workouts should be performed on a relatively flat section of road. The gearing should be LIGHT with low pedal resistance! Begin by SLOWLY increasing you cadence (pedal speed), while staying in the saddle. Slowly increase your pedal speed, keeping your upper body steady, with controlled bouncing in the saddle. Maintain this cadence for the remainder of the interval. Your heart rate will climb during this workout, but DON'T use it to judge intensity!!!
It is imperative that you perform the Spin-up intervals without any interruptions (Stop signs, traffic lights, etc), since you need to maintain a high cadence while riding. If you are having difficulty doing this outdoors, try them on the trainer. If you DO use a trainer to perform these, use a mirror (or two), to obtain instant visual feedback and cues, to help you maintain proper pedal stroke, and body positioning.

SWEET SPOTS

Sweet spots offer us a great opportunity to consolidate all the work previously done on the Lactate Threshold energy system, as they are done just below the power levels/ effort. Sweet spots are done at 88–94% of Functional Threshold Power, which allows us to load the physiological systems enough to refine the “engine” but not so much that you’ll feel fatigue in the legs as much as Lactate Thresholds. These are a great way to increase your abilities to ride at Threshold, while not taking a huge hit and needing lots of recovery time before training the energy system again.

- ✓ **Intensity:** FTP HR: 86–90%, FTP POWER 88–94%
- ✓ **Volume:** as prescribed.
- ✓ **Frequency:** At least 36 hours between sessions.
- ✓ **Terrain:** flat to rolling, advanced riders may do these on climbs.
- ✓ **Cadence:** 85–100 rpm on the flats, Hills: 80–95 rpm (seated), 70–75 (standing)
- ✓ **How to do it:** can be done on long steady climbs, on hills, or on flat terrain. **MUST** stay within HR and Power Ranges for ENTIRE interval. Cadence on short hills for SSI should be 80–95 rpm (seated) & 70–75 (standing), on flat terrain we want a cadence of 85–95 rpm.

VO₂ MAX INTERVALS

These are Short, High Intensity Intervals, that are used to help make large gains, in both the aerobic and VO₂ energy systems. When used in a training plan focusing on less than 12 hrs a week, these are quite possibly the most important of all workouts. There are 3 different kinds of VO₂ max Intervals (names derived from power-file visuals):

- ✓ **Intensity:** 100% + of FTP for duration of effort.
- ✓ **Terrain:** ANY EXCEPT downhills. These intervals are geared to help your body adapt to being flooded with lactic acid. The rest periods vary dependent on the time of training block. Back to back days are ONLY to be done AS PRESCRIBED.
- ✓ **Flat-Tops:** In these intervals, you should try to reach and maintain as high of a power output/ effort, as possible, for the whole prescribed time of the intervals. For these, take the first 15–45 seconds to slowly ramp up your power, or effort level. The Idea is to maintain a relatively constant, high output. Cadence should be 95+.