WHITE PAPER

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# How to Enlarge Your Fat Burning Range© with Heart Zone Training

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## INTRODUCTION

Weight management is a complex process. Success in gaining, losing, or maintaining weight is dependent on a combination of emotional, physical, and mental factors. One key to attaining all of these factors is learning the process of change fueled by positive motivation. One of the most important influences a person can have on their personal health is the expansion of the fat burning range, or the exercise intensity best suited to burn fat, long-term, for them.

Appropriate physical activity is central to long-term success in both weight gains and losses. Fueling the body in accordance with its energy needs is essential. In addition, dealing with emotional issues that influence eating and exercise decisions is an important part of any weight control regimen.

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Start living a little differently

HEART Zones

# LEAD PRESS RELEASE

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**Press Release**

July 25, 2001

-For immediate release-

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***Sacramento, CA.*** The statistics are alarming – 16 million people in the United States and others around the world suffer from obesity. Alternatively, obesity is the cause of as much as 90% of the preventable Type II diabetes. Needlessly, the American population is epidemically killing itself when it could be monitoring life with new Heart Zone Training© technology.

"Heart Zone Training is an extremely effective method to reduce the risks associated with obesity and one which can help achieve long-term and lasting weight management results," says Lorraine Brown, an avid Heart Zone Training user. "Nobody else offers a specialized weight loss system like Heart Zone Training; it is unique, it works and it is an application focused specifically on the risk factors rather than the aesthetics of body shape, weight or body composition."

Until recently, there have been very few training models that meld heart rate training with weight loss. In her special report, "How to Enlarge Your Fat Burning Range with Heart Zone Training", Sally Edwards says that "The secret, for most individuals who want to lose body fat more readily, is to expand their fat burning range with Heart Zone Training" Edwards, author of 5 books on training with heart rate monitors, has outlined a concise process that will reverse America's degenerative diseases in three steps.

The first step, for most individuals is to learn their fat burning range by determining their threshold limits. Heart rate monitors, selling for as little as $50, have become the most efficient piece of workout equipment on the market for determining this range. By definition, the fat burning range is the area between two different thresholds: the lower intensity **aerobic threshold,** and the higher intensity **anaerobic threshold**. A threshold, in this case, is the individual heart rate number that one must cross to reach a change in metabolic energy. That is, the aerobic threshold is that percent of one's individual maximum heart rate, usually around 50%-55%, where aerobic benefits occur. The anaerobic threshold is that percent of one's individual maximum heart rate (MHR) where anaerobic benefits occur, usually between 80-90% MHR. To determine and consequentially expand the fat burning range with a heart rate monitor, one may take the simple test using a heart rate monitor, found in the Heart Zones special report called, "Expanding the Fat Burning Range with a Heart Rate Monitor"

The second step to weight loss using a heart rate monitor is to lower body fat and simultaneously increase muscle mass. This can be achieved by training for a period of time, generally 3 months or more, within the fat burning range. By training within the fat burning range, many things happen metabolically to a person's body that prepare them to move on to step three, the expansion of the fat burning zone.

The final step is really the heart of the system. The goal of most people is to burn as much fat as possible, and this can happen for anyone when they seek to expand their fat burning range. "Typically after three or more months of step two training, a person's body is capable of expanding the fat burning range", says Edwards. "This can be achieved by training above the fat burning range once or twice each week."

For more information, please view the Heart Zones special report, "Expanding Your Fat Burning Range using Heart Zone Training", available from Heart Zones. This report shows how to determine the fat burning range, includes a sample training program to increase it's size, and outlines how to burn more fat calories during a workout. Sally Edwards, one of America's leading fitness experts and a 16 time Ironman triathlon record holder says, "If a person wants to get motivated and fit, they need to train in their heart zones with a heart rate monitor."

For more information about the special report, "Expanding the Fat Burning Range with a Heart Rate Monitor", contact Sally Edwards (916)-481-7283. Sally@heartzone.com or visit www.HeartZones.com

## BACKGROUND

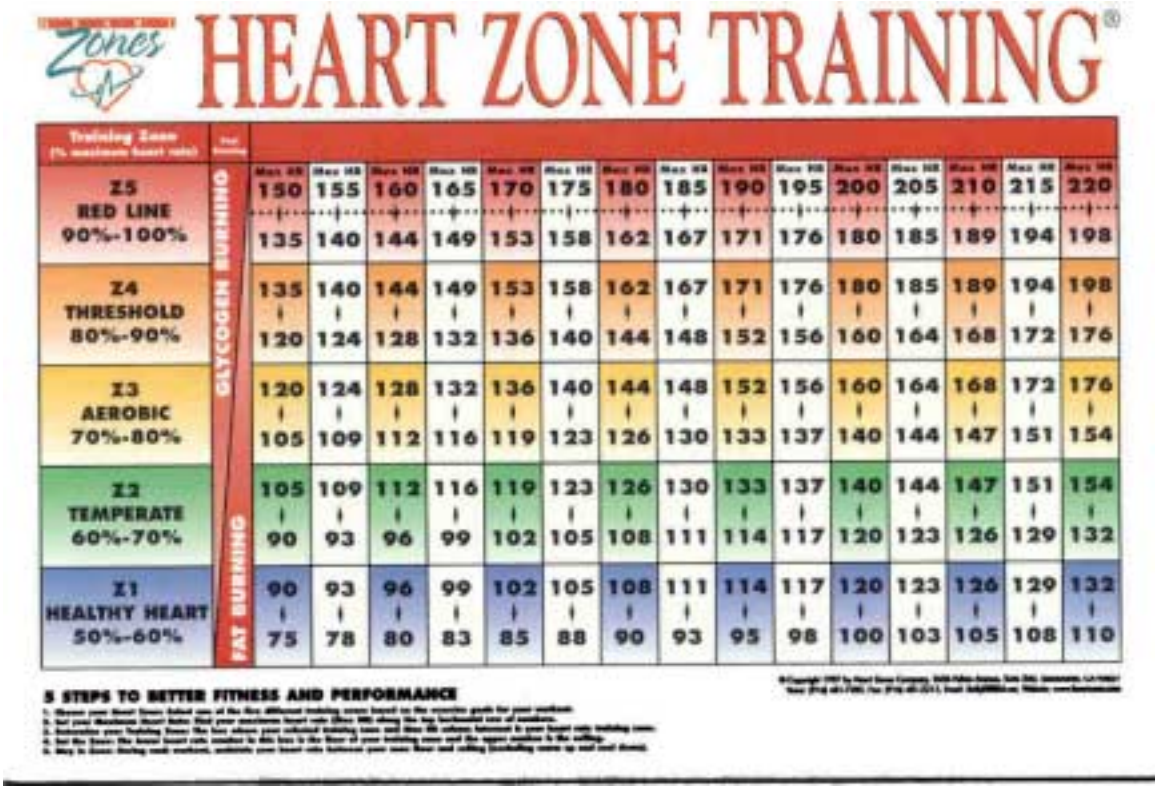
**Fat is Burned in Every Heart Zone**

Heart Zone Training is a physical and emotional program that leads to a healthier lifestyle. The training system is based on exercising in five different heart ranges each 10% of maximum heart rate. After taking a simple and easy test, a person's maximum heart rate is estimated and the five heart zones are set, according to the chart below:

| Zone Number | Zone Name | Zone Percentage of Max Heart Rate | Example of One Individual: Max HR = 200 bpm | Benefit |
|---|---|---|---|---|
| **5** | Red Line Zone | 90%-100% | 180-200 bpm | High Performance |
| **4** | Threshold Zone | 80%-90% | 160-180 bpm | Fitness Improvement |
| **3** | Aerobic Zone | 70%-80% | 140-160 bpm | Better Aerobic Capacity |
| **2** | Temperate Zone | 60%-70% | 120-140 bpm | Improved Health |
| **1** | Healthy Heart Zone | 50%-60% | 100-120 bpm | Healthier Heart Muscle |

Fat burns in each of these five heart zones. It burns in a different percentage and it burns in a different total amount in each zone. Within the boundaries of each heart zone there is a proportion of carbohydrates and a proportion of fat that is simultaneously being metabolized. It is essential to determine each of your individual heart zones.

In her book, *The Heart Rate Monitor Guidebook,* Edwards provides detailed information about the five heart zones. The book is aimed at showing people how to use their heart zones to increase fat burning and performance by increasing anaerobic threshold, the primary index of how large the fat burning range is for an individual. People looking for specific Heart Zone Training know-how should couple this report with said book for a comprehensive training solution.



HEART ZONE TRAINING®

| Training Zone (% maximum heart rate) | For Fitness | Max HR 150 | Max HR 155 | Max HR 160 | Max HR 165 | Max HR 170 | Max HR 175 | Max HR 180 | Max HR 185 | Max HR 190 | Max HR 195 | Max HR 200 | Max HR 205 | Max HR 210 | Max HR 215 | Max HR 220 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Z5 RED LINE 90%-100% | GLYCOGEN BURNING | 135 | 140 | 144 | 149 | 153 | 158 | 162 | 167 | 171 | 176 | 180 | 185 | 189 | 194 | 198 |
| Z4 THRESHOLD 80%-90% | GLYCOGEN BURNING | 120 | 124 | 128 | 132 | 136 | 140 | 144 | 148 | 152 | 156 | 160 | 164 | 168 | 172 | 176 |
| Z3 AEROBIC 70%-80% | GLYCOGEN BURNING | 105 | 109 | 112 | 116 | 119 | 123 | 126 | 130 | 133 | 137 | 140 | 144 | 147 | 151 | 154 |
| Z2 TEMPERATE 60%-70% | FAT BURNING | 90 | 93 | 96 | 99 | 102 | 105 | 108 | 111 | 114 | 117 | 120 | 123 | 126 | 129 | 132 |
| Z1 HEALTHY HEART 50%-60% | FAT BURNING | 75 | 78 | 80 | 83 | 85 | 88 | 90 | 93 | 95 | 98 | 100 | 103 | 105 | 108 | 110 |

5 STEPS TO BETTER FITNESS AND PERFORMANCE



To use the Heart Zone Training chart, a person must first take a maximum heart rate test (for protocols on this test, visit www.HeartZones.com). Next, a personal must select their individual maximum heart rate in the top row. Following the colored columns below said number, a person will find the five zones and specific training heart rates that correspond to each.

Zone 1, the Healthy Heart Zone is color-coded blue because it is easy and light intensity. Note that in the column "Fuel Burning", approximately 85% of the calories used are fat and about 15% are glycogen (also known as carbohydrates). Within this zone, the blend of fuel burned is a ratio of 85% fat : 15% carbohydrate!

Zone 2, the Temperate Zone is green colored and falls within 60%-70% maximum heart rate. The amount of fat and glycogen changes to a different ratio – approximately 75% fat and 25% glycogen. As exercise intensity increases, the ratio of fuels metabolized shifts away from fat. This pattern continues through Zone 5, the Redline Zone.

What's is significant to know is that "fuel burning" column is cumulative. That is, the amount of calories contributed by fat and glycogen is the sum of the entire column not just the horizontal representation but also the entire vertical column. This is significant because fat, protein, and carbohydrates are burned in all zones but in different ratios.

## UNDERSTANDING THE FAT BURNING RANGE

The fat burning range is the exercise intensity; usually measured by heart rate, where fat as a source of fuel is utilized effectively. One of the common misunderstandings is the nature of the fat burning range. The source of confusion about the three words – fat, burning, and zones – comes from the frequent and disparate information about them.

There are two basic and differentiating concepts about burning fat in the heart zones:

1. The percentage (%)of fat that is burned as the source of fuel during physical activity
2. The total amount of fat (calories) that is burned during physical activity

These two concepts are quite different. In low intensity physical activity there is a higher percentage of fat calories burned as one of the sources of fuel. The chart below shows fat utilization as a percentage of total calories burned in each of the five different heart zones:

**The Percentage (%)of Fuels and Calories Burned During Exercise**

| Zone Number | Percentage of Fat | Percentage of Carbohydrates | Percentage of Protein | Calories Burned in 30 minutes of Cycling |
|---|---|---|---|---|
| **Zone 5** | 10%-15% | 85%-90% | Approximately 5% | 450-600 calories |
| **Zone 4** | 10%-20% | 80%-90% | Approximately 5% | >450 calories |
| **Zone 3** | 40%-60% | 50%-85% | Approximately 5% | >330 calories |
| **Zone 2** | 50%-70% | 25%-50% | Approximately 5% | >240 calories |
| **Zone 1** | 70%-85% | 10%-25% | Approximately 5% | >180 calories |

Within each heart zone, a different proportion of fuels are utilized. Always, the three basic sources of caloric energy are used: fats, proteins, and carbohydrates. The amount of these three nutrients varies depending on these primary constraints:

- The balance of fuels in a person's diet
- The timing of last meal
- The exercise intensity of the physical activity
- A person's current fitness level
- Whether you eat during the workout

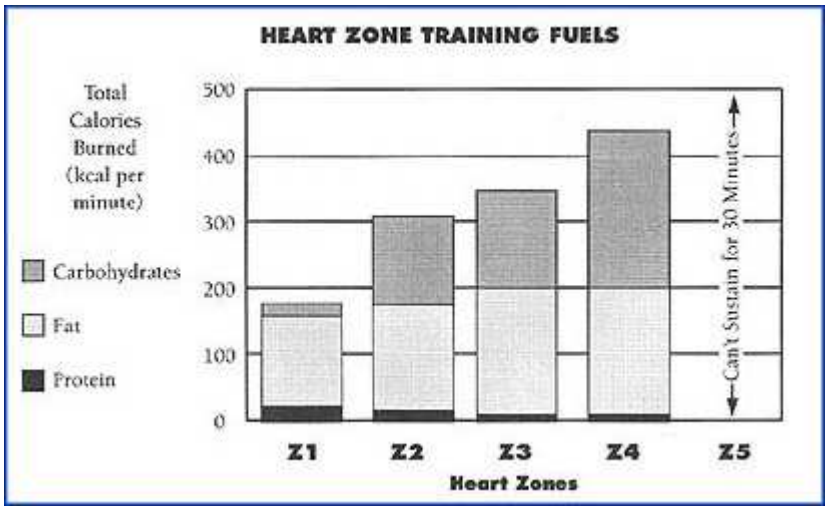
*And, to a lesser extent*

- The amount of alcohol in a person's diet
- A person's gender
- Total number of calories that eaten daily
- Genetic make-up
- Environmental factors
- Past sports experience
- The amount and kind of physical and emotional stress

When any of these primary constraints change, the ratio of fuels burned changes. That is why the percentages of fat, carbohydrates, and protein varies widely and is given as an individual range and not an absolute percentage. How much fat and carbohydrates that are utilized during exercise depends on a person's nutrient intake, timing of the last meal, exercise intensity (heart zone), fitness level, and caloric input during the exercise.

As an example, the chart below shows that as exercise intensity increases from Zone 1 to the highest zones, the ratio of nutrients that are burned changes. In the low heart zones, fat is burned as the primary source of fuels. In the high heart zones, carbohydrates are burned as the main source of fuels. Likewise, as you train in higher training zones, more total calories per minute are burned. Note that in Zone 1 in the chart below, approximately 180 calories are burned during this thirty-minute period. For the same thirty minutes in Zone 4, approximately 430 calories are burned.

**The Total Amount of Fat Calories Burned During Physical Activity***




A relatively fit individual, who exercises continuously for 30 minutes, burns a different ratio of fuels depending on a person's exercise intensity as shown by different heart zones.

As exercise intensity increases so does the number of calories burned per minute. This is called the "burn rate" and measured in calories/minute utilized. The burn rate of one person is different than that of another, depending on the body's current physiology. There is a wide range of fuel utilization differences between individuals. This is known as "fat burning capacity" or a person's ability to utilize higher levels of fat as the primary source of fuels. This difference in fat burning capacity is based on each individual's unique physiology, fitness levels, dietary habits, frequency and time of eating. It is only possible to approximate the energy percentages in each of the heart zones because of these factors. With accurate laboratory testing of the individual, the burn rate and percentage of nutrient contribution can be accurately measured.

*Adapted from Gail Butterfield, Hershey Food Corporation. *Topics in Nutrition and Food Safety*: Fueling Activity, Fall 1994, page 6.

## BURN RATE

The burn rate is the number of calories burned per minute. It is the caloric cost per minute at a person's current intensity level, whether they are active or stationary. Regardless of what type of fuel is burned – fat, carbohydrates, or protein – the burn rate depends on an expanded energy formula:

**Burn Rate (calories/minute) = RMR + $EE_{activity - duration, intensity and type of movement + body weight}$**

The more a person weighs, the higher the burn rate compared to a lesser weighing individual performing the same physical movement. The heavier a person is, the more mass there is to move. For example, if a person's weight fluctuates between 130 to 160 pounds, they have two different burn rates. At 130 pounds and average fitness level, a person can burn approximately 5 kcal per minute in brisk walking as compared with 8 kcal when they weigh more. If a person increases their exercise intensity into Zone 3 by jogging, it would increase their burn rate to approximately 10 kcal and 13 kcal respectively.

The type or mode of exercise is a factor in determining burn rate. Physical activity that includes larger muscles and recruits more total muscles results in a higher burn rate. Cross-country skiing has a higher burn rate than bicycling, for example. As a rule, activities that require an athlete to support their body weight have higher burn rates than those like cycling or swimming that support body weight by the nature of the sport.



Here are some common burn rates or caloric costs for different activities[1]:

| | | Body Weight | | | | |
|---|---|---|---|---|---|---|
| **Activity*** | Burn rate per minute** | 110 lbs | 130 lbs | 150 lbs | 170 lbs | 190 lbs |
| **Swimming** | 0.156 | 7.8 | 9.2 | 10.6 | 12.0 | 13.4 |
| **Cycling** | 0.169 | 8.5 | 10.0 | 11.5 | 13.0 | 14.5 |
| **Running** | 0.193 | 9.7 | 11.4 | 13.1 | 14.9 | 16.6 |
| **Basketball** | 0.138 | 6.9 | 8.1 | 9.4 | 10.6 | 11.9 |
| **Aerobic Dancing** | 0.135 | 6.7 | 7.9 | 9.2 | 10.4 | 11.6 |

*All activities are set at approximately 70%-80% maximum heart rate, Zone 3.
**Kcal per minute per pound of body weight

The higher the burn rate, the more total calories expended. Another way to increase the burn rate is to shift body composition to higher muscle mass. Body composition is the ratio of lean mass (also known as fat-free mass) to fat mass (adipose tissue). Body composition is usually expressed as a percentage of total body weight. For example, if a person currently has 30% fat mass the reciprocal of this number is the fat-free or lean body percentage – 70%. By increasing fat-free mass, resting metabolic rates increase and burn rates go even higher.

[1] Data from Bannister, E.W. and Brown, S.R.: The relative energy requirements of physical activity. In H.B. Falls (ed.): *Exercise Physiology*. New York, Academic Press, 1968.

**Burn Rates for Fat**

The question most frequently asked of many teachers is "In what zone do I burn the most fat?" This is an important question. The answer is, "it depends".

The zone that burns the most fat depends on the individual's physiology and factors mentioned above.

1. A different ratio or percentage of fat is burned in every zone.
2. Fat is burned in every zone and at all times.
3. The burn rate is as important as the ratio of fuels.
4. No *additional* fat is burned when exercising above the anaerobic threshold.
5. Oxygen and glucose must be present for *additional* fat to burn.

It is misleading to simply suggest that because the percentage of fat is higher, that it is better for fat burning. At low intensity exercise when fat is burned at the highest percentage and in the smallest amounts. There is an inverse relationship between total calories and percentage of calories used:

**High Intensity → Lower Fat Percentage**
**High Intensity → Higher total amount of fat burned**

**Low Intensity → High Fat Percentage**
**Low Intensity → Lower total amount of fat burned**



Some state that it is better to do "fat-burning exercises of low intensity". This statement is misleading because the higher the heart zone, the higher the energy expenditure or the higher the burn rate.

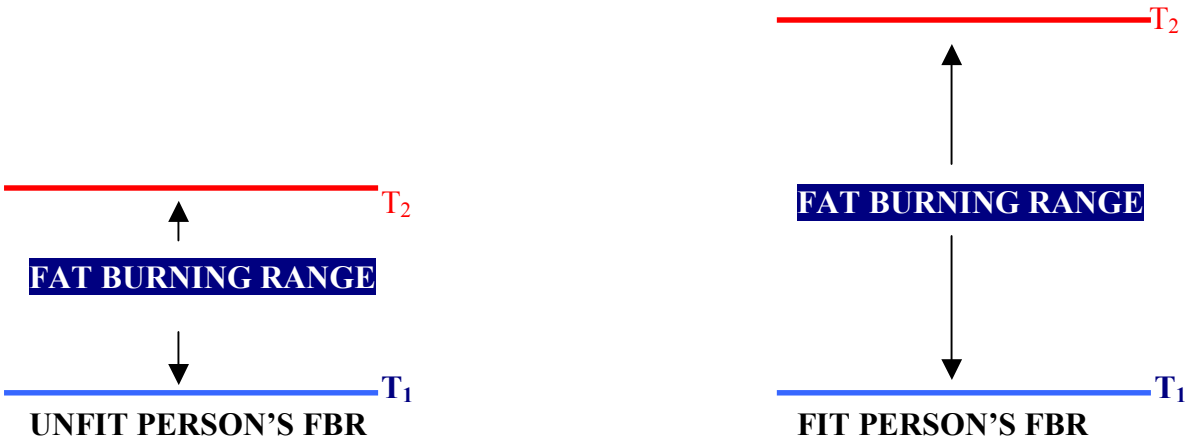
The rate at which a person burns or metabolizes the greatest energy from fat as the fuel source is dependent in part on how fit they are. The fitter they are, the more energy they get from fat metabolism. The less fit they are, the less fat they can burn.

For fat to burn, oxygen must be present. The highest fat burning rate is the one at the top of the oxygen-sufficient zone or that point at or below the anaerobic threshold heart rate. The fat burning zone starts at the beginning of the aerobic zone generally considered to be 50%-55% of maximum heart rate. The ceiling or top of the fat burning range is at the point of anaerobic threshold. When the anaerobic threshold is reached no additional fat is metabolized. Above the anaerobic threshold, the same amount of fat is burned and the balance of the calories are from other nutrient sources.

## ENLARGING THE FAT BURNING RANGE (FBR)

By definition, the fat burning range is the area between two different metabolic thresholds: the aerobic threshold ($T_1$) and the anaerobic threshold ($T_2$). This metabolic threshold is the individual heart rate number that one must cross to reach a change in metabolic energy. By expanding the fat burning range, you burn more fat.

The aerobic threshold is that percent of one's individual maximum heart rate, usually around 50%-55% of one's maximum heart rate, where aerobic benefits first start to occur. The anaerobic threshold is that percent of your individual maximum heart rate where anaerobic benefits occur. By raising the ceiling, fat burning range is enlarged.




What has been missing in weight management programs is an easy and inexpensive tool for people to use to measure these two thresholds. A simple protocol using a heart rate monitor can set both aerobic and anaerobic threshold heart rate values. For unfit people, anaerobic threshold may be as low as 70% of maximum heart rate. For extremely fit and athletic people, the top of the fat burning range may be as high as 95% of your maximum heart rate. The bigger the range of heartbeats, between the $T_{1\ and}\ T_1$, the more total fat burned.

For most people who want to lose body fat and at the same time lose weight, the best way is to expand the fat burning range by smart training. Measuring two numbers does this:

- Measure the aerobic threshold floor, **$T_1$** (50%-55% maximum heart rate)
- Measure the anaerobic threshold, **$T_2$** (70-95% maximum heart rate)

When a person knows their threshold heart rate numbers, then exercising within them results in increased fat losses. By exercising in the fat burning range, the highest percentage and total amount of fat are utilized, both at rest and during training. By increased exercising in the fat burning ranges, the energy equation shifts. That's the key to weight management in the heart ranges, energy shifting.

# SETTING THE FAT BURNING RANGE
## Testing and Workouts

- **Setting the Floor**
- **Setting the Ceiling**

## WORKOUT

### Setting the Floor of the Fat Burning Range:
### 2 x 400 Run/Walk

The fat burning range is a span of heartbeats where fat is used as a primary source of fuel for movement. The fat burning range is metabolically determined. The top and bottom of the fat burning range is based on exercise intensity. This range has two metabolic thresholds that are set according to oxygen utilization. The bottom of the range is known as the aerobic threshold and the top of the range is the anaerobic threshold.

The floor of the fat burning range is considered by most exercise scientists to be that exercise intensity where oxygen consumption improvements first occur. This is generally measured at around 55% maximum heart rate. At this low intensity exercise heart rate, the burn rate measured in calories per minute is low. The metabolic floor of the fat burning range is the first point where cardiovascular fitness improvement can be measured.

The bottom threshold of the fat burning range can be measured using a heart rate monitor. There are two types of tests to determine maximum heart rate. The first is a "sub maximum test" and requires lower levels of exertion that the second type, "true maximum test". Using low intensity exercise to estimate maximum heart rate is an easy way to set the floor of the fat burning range in heartbeats per minute but people given the clearance by their doctor will find more accuracy in the true maximum test.

This is a strenuous workout. It is popular because you can choose whatever activity you prefer and can challenge yourself to see how big a number you can get on your monitor. This number is to be used as near your maximum heart rate. If you say that you could have gone harder and extracted a higher heart rate number then add 5-10 bpm to the number that you saw.

**MATERIALS**: a heart rate monitor and a 400 meter or yard track

**INSTRUCTIONS: Setting the floor of the Fat Burning Range**

1. Warm up adequately using your monitor. For most, the warm up should be about 10% of your total exercise time and your heart rate range should towards the end of the warm up reach 100-120 bpm or until you are comfortable.

2. Find a high school or college track. The distance of all tracks in the USA are 400 meters or ¼ mile.

3. Starting by gradually increasing your speed each 100 yards such that the last 100 yards is the fastest. At the end of the 400-yard run/walk record the highest heart rate number that you see on your monitor.

4. Repeat this step a second time after a 2-5 minute active rest.

5. Use the highest number as your maximum heart rate.

6. Use the Heart Zones Chart provided below to determine the mid-point of Zone 1.

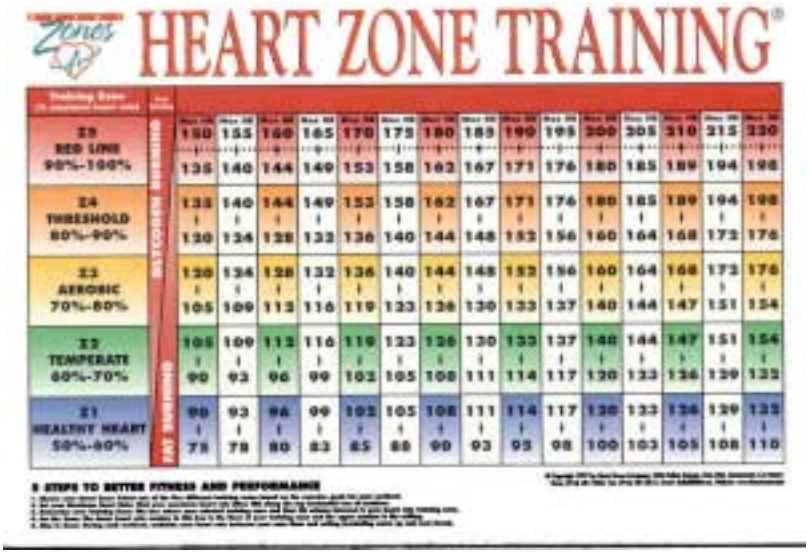
7. The floor of your fat burning range, $T_1$ is 55% of the highest number on your monitor . Calculate 55% of your highest number and write it here: _____bpm.

*Note: If a person knows your maximum heart rate (MHR) already, you may skip this test and instead calculate 55% of your MHR.

**Options:**

Invite a friend to join you, someone who is slightly faster, do this assessment together. See if the effect of competition and cooperation between both athletes will result in a higher number on your monitor.

Have a faster friend as a motivator run/walk next to the testee-- shouting out positive motivational cues like “you can do it” or “you are doing great, go a little faster” and see if this external motivation results in a higher heart rate number for you.



## WORKOUT

### Setting the Ceiling of Your Fat Burning Range
### 2 x 15 Minutes.

The ceiling, or $T_{2,}$ of the fat burning range is the heart rate number at that point called anaerobic threshold. This is also known as the crossover point between aerobic and anaerobic metabolism. After passing over the anaerobic threshold heart rate, there is insufficient oxygen available for the muscles to continue to contract without building up lactic acid. High levels of lactic acid cause interference with the metabolism of fat and result in a shifting away from fat as a source of fuel and toward increased usage of glycogen in the muscle cell.

To determine the ceiling of the fat burning range, you need to measure your anaerobic threshold heart rate number. There are a number of different field assessments to estimate this number. For it to be accurate it is necessary to use sophisticated equipment such as a metabolic cart, which is not precisely available to the public.

This workout is called "Two by 15 Minutes" and is the most accurate test that you can administer to yourself. After warming up for at least 10 minutes, hold a steady state heart rate number for fifteen minutes, two different times with a two-minute rest between the workout sessions. The average sustainable heart rate that you can maintain without letting the heart rate and intensity increase or decrease is one of the best estimates of anaerobic threshold heart rate.

**MATERIALS**: a heart rate monitor and a stopwatch.

**INSTRUCTIONS: Setting the ceiling of your Fat Burning Range**

This is an intensity level in exercise training when you go beyond your aerobic threshold and into a state where the specific muscles that are working have an insufficient amount of oxygen for muscle contraction. At this point, this is called the anaerobic threshold heart rate.

- Warm up adequately. Select an activity that you can maintain a constant pace for fifteen minutes.

- Gradually increase your training intensity until you reach the highest heart rate that you can hold or sustain 15 minutes.

- After you have held the highest sustainable heart rate for 15 minutes, quickly slow for 5 minutes but continue to move. This is your "active" recovery time.

- Again, increase your pace or effort until you reach the same, identical high heart rate number again, and hold it for a second 15 minutes.

- After completing the second 15 minutes ask yourself the question, "Could you have gone harder and held a higher heart rate number?"

- If the answer is "no" record this average heart rate number in your *Heart Zone Training Logbook* as your estimated anaerobic threshold heart rate or the ceiling of your fat burning range. This heart rate number is $T_2$. Write your $T_2$ number here:_____

- If you answered this question "yes" you could have held or sustained a higher number, then rest for a few days and re-take the test to determine the ceiling of your fat burning range.



Note: The highest heart rate that you can sustain for fifteen minutes with a brief rest is your best estimate for anaerobic threshold.

## Sample Workout:

### Zig Zagging Your Fat Burning Range

Spending time in your metabolic range, the fat burning range, results in positive training outcomes. For example, training in the fat burning range teaches your metabolism to preferentially choose fat as the source of calories rather than carbohydrates. By using fat calories for fuel, you can spare your carbohydrates and improve your metabolic pathways to fat burning.

**PURPOSE:** To teach you to increase your activity intensity and recover quickly.

**MATERIALS:** A heart rate monitor and stop watch.

**WORKOUT**

1. Have your Fat Burning Range set and know the floor and ceiling of it. If you have a zone heart rate monitor, program your $T_1$ and $T_2$ heart rate numbers into it. ($T_1$ is the lower limit, $T_2$ is the upper limit).

2. Warm up adequately with the heart rate monitor displaying heart rate.

3. Select an activity of your choice such a walk/running on a treadmill or any cardio-machine and increase your exercise intensity until you hit the ceiling of your fat burning range. You can increase intensity by going faster, changing your body position, or increasing your cadence or turn over rate.

4. Immediately after kissing the ceiling of the fat burning range, decrease the exercise intensity by slowing the rate of exertion until you reach the floor of your fat burning range. You should not stop doing the activity as this is "complete" recovery and it is usually advisable to follow an "active" recovery warm down.

5. Continue this pattern of zig zagging from the floor to the ceiling of each your fat burning range for 15-30 minutes. Rest and if there is time, repeat again using a different mode of activity. Count the number of times you hit the ceiling of your fat burning range. You may then test yourself in 4-6 weeks by doing the exact same workout but aiming for more zigzags than before. The higher the number of times that you can kiss the ceiling of your fat burning floor, the fitter and more competent you become using a heart rate monitor.

6. Cool down after the allotted time has elapsed.

# CONCLUSION

You burn fat at different levels and intensities of exercise. There are many factors that determine how much YOU burn. These factors can be overcome by training in ways that enlarge your fat burning range.

## CONCLUSION

-Lifelong learning is one of the processes that we all should instill in ourselves. Using knowledge and the data from sources such as heart rate monitors is central to establishing lifetime health and fitness skills. With the application of data and knowledge, you have a greater chance of being successful in accomplishing your goals. Change is our charge as human beings

-By using the heart rate monitor, a person can determine their best intensity levels for burning fat, called the Fat Burning Range. The Fat Burning Range is the space between aerobic threshold ($T_1$) and anaerobic threshold ($T_2$)

-The floor of the fat burning range is nearly identical for all, approximately 55% of maximum heart rate. The only way to enlarge the fat burning range is to increase the ceiling, or anaerobic threshold.

-When you are extremely fit, the fat burning range may be as broad as 55% to 90% of your maximum heart rate. When you are unfit, the fat burning range is narrow. This means that when you are unfit you don't burn any *additional* fat when exercising above ($T_2$), which may be as low as 70% of your maximum heart rate.



-The ratio of **fat : carbohydrates** burned during exercise depends on a number of factors including dietary composition, the timing of eating and exercising, fitness level, workout intensity, food intake during the workout. The rate of fat burning depends on a number of factors.

-The number of calories burned per minute of physical activity determines the burn rate during exercise. The higher the burn rate the higher the number of calories burned. To achieve effective training that results in weight loss, it is best to train progressively towards the top of the fat burning range. This results in more total calories burned as well as the highest number of fat calories burned.

-The type of activity a person does affects burn rate. Choosing activities that use large muscle groups and that require you to support your body weight result in the highest energy expenditure (EE).

-People with a higher percentage of fat-free mass have a higher burn rate because the resting metabolic rates (RMR) are higher. The higher the burn rate, the more total calories expended at rest. The formula for determining your rate of caloric expenditure is as follows:

**Burn Rate (calories/minute) = RMR + $EE_{\text{activity – duration, intensity and type of movement + body weight}}$**

-By changing any of the variables in this formula, energy is shifted. For a weight loss program to be successful, energy shifting is essential such that it results in a deficit in the energy intake = energy output equation. One of the best ways to lose weight is to increase your burn rate by exercising within your individual fat burning range.

WHITE PAPER

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# How to Enlarge Your Fat Burning Range

July 2001 Fat Burning Range©
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