

# SARATOGA

resort & spa

*Experience the Tradition*



A German scientist once described the bactericidal properties of hot springs:

"The curative properties of natural hot springs are founded in its special physical characteristics, above all in the distribution of its minute particles. Individual clay particles are smaller than many bacteria. If infected mucous membranes are more or less flooded with clay, the bacteria are completely surrounded by clay particles and are thus separated from their source of nourishment and become imbedded in the inorganic material. Growth and the survivability of the bacteria are thus halted almost instantaneously, and from this explained strikingly speedy abatement of the symptoms of infection and/or symptoms of poisoning in acute infectious diseases of the alimentary canal.

-- Julius Stumpf, *Bolus fur medizinische Anwenduno Darmstadt*, 1916, p. 19.

## What Makes a Mineral Hot Spring a Mineral Hot Spring?

In the United States, there are no real standards to classify the properties of hot springs. However, in Europe and Japan, there are general standards that are widely accepted by balneologists.

### The Hot Springs Source

There are two primary classifications of hot springs:

- ***Filtration Hot Springs***
  - A filtration hot spring is a geothermally heated mineral water that is initially fed by rain water that seeps into the Earth through faults and fractures. As it travels into the Earth, it becomes subject to increased energy from natural geothermal heat, and is exposed to gases and an often wide variety of minerals from rock and mineral deposits. The water adsorbs the minerals via leaching, is heated by the geothermal heat source, and then returns to the Earth's surface.
- ***Primary Hot Springs***
  - A primary hot spring is a geothermally heated mineral water, where direct volcanic activity plays a far greater role in the process of the hot springs formation. One of the fundamental physical distinctions between a filtration spring and a primary spring is the mineral and gas content of the water, such as radon and bromide. Primary hot springs are often "powered" by magma chambers which exist miles under the Earth's surface, as well as in volcanically active regions.

### ***What is the Classification of the Tecopa Hot Springs?***

The Tecopa Hot Springs are **primary hot springs**. According to native traditions, the Tecopa hot springs would be considered a **primary water** source, embodied with the living power of Mother Earth. The water that surfaces is estimated to have been deep within the Earth for more than **1.5 million years** ( according to our source at the Bureau of Land Management, Inyo County, California ).

## The Hot Springs Temperature: Cool, Warm, or Hot?

Balneologists generally accept the following classification of mineral springs:

- **Cold Springs** - temperatures below 77° F ( 25° C )
- **Tepid Springs** - temperatures ranging from 77 - 93° F ( 25°-34° C )
- **Warm Springs** - temperatures ranging from 93 F - 108° F ( 34° - 42° C )
- **Hot Springs** - temperatures above 108° ( 42° C )

### ***What is the Classification of the Tecopa Hot Springs?***

The Inyo County Tecopa Hot Mineral Springs are classified as Hot Springs. While the temperature of the water fluctuates between different sources, the water temperature usually measures between 116 - 118° F. The **ambient temperature** of the water in the summer months, however, can be as high as 121 - 135° F.

The temperature of the water for spas is regulated at no hotter than 104° F by the State of California. In order to experience the full therapeutic benefit of the "hot springs" classification, a single use or special use tub must be utilized.

## The Hot Springs Mineral Content

The legal classification of a mineral spring varies in different parts of the world. Generally speaking:

A mineral spring contains greater than 1000 mg/l ( PPM ) of naturally dissolved solids.

### ***What is the Classification of the Tecopa Hot Springs?***

The Tecopa Hot Springs are classified as true mineral springs, and have dissolved solids measuring over 2000 mg/l ( PPM ), based on the assessment conducted at Delight's Hot Springs Resort.

## The Hot Springs PH Level

Waters may be classified as acidic, basic, or neutral, according to the balance of hydrogen in the water.

**Acidic waters** are waters that measure below 7.0 on the PH scale.

**Neutral waters** are waters that measure 7.0 on the PH scale.

**Basic/Alkaline waters** are waters that measure above 7.0 on the PH scale.

### ***What is the Classification of the Tecopa Hot Springs?***

The Tecopa Hot Springs are low sulfur, high sulfate alkaline hot springs, with a ph level between 7.4 - 7.6. The alkalinity is primarily the result of the potassium, calcium, magnesium, and sodium ions.



---

## **Hot Springs Therapy: Mineral Content**

---

European balneologists have extensively studied the therapeutic value of mineral waters. Mineral springs with different mineral content are often recommended above others for various therapeutic uses.

In addition to the value of the trace minerals found in most hot springs, and the stimulating benefits of highly mineralized waters, balneotherapists generally agree on the following observations:

### **Bicarbonate**

In Spain, a bicarbonate water is classified as such if the water contains more than 250 PPM of free carbon gas. However, springs that contain bicarbonate gasses ( sodium bicarbonate, calcium bicarbonate, carbon dioxide, etc. ) may also be utilized for the observed benefits commonly associated with bicarbonate hot springs.

Bathing in bicarbonate water, the balneologists believe, assists opening peripheral blood vessels and helps to improve circulation to the body's extremities.

European balneotherapists also utilize bicarbonate waters for bathing to address hypertension and mild atherosclerosis. For these conditions, tepid to warm baths are utilized ( 86 - 100° F ).

Some researchers believe that bicarbonate baths also assist cardiovascular disease and nervous system imbalances.

#### ***How do the Tecopa Hot Springs Rate?***

The Tecopa Hot Springs contain 668 PPM bicarbonate content, although the bicarbonate content does not produce a "carbonated" effect such as the Chatel-Guyon Hot Springs in France.

### **Sulfur and Sulfates**

Hot Springs rich in Sulfur, in France, Spain, and Japan, are used to address a wide variety of conditions, including skin infections, respiratory problems, and skin inflammations.

Hot springs rich in sulfates ( i.e. sulfur compounds ) have a far reduced "sulfur" effect as compared to Sulfur-rich springs. Such waters are often prescribed internally for liver and gastrointestinal conditions, as well as for some respiratory conditions with inhalation therapy, in European spas.

***How do the Tecopa Hot Springs Rate?***

The Tecopa Hot springs contain no free sulfur or sulfurous gas. The Tecopa Hot Springs have been measured to contain 497.5 PPM of sulfate compounds.

**Chlorides**

Saline hot springs are rich in **sodium chloride**. Mineral springs naturally rich in chlorides, in amounts between .5 - 3%, are considered by some researchers to be beneficial for rheumatic conditions, arthritis, central nervous system conditions, posttraumatic and postoperative disorders, as well as orthopedic and gynecological disease.

***How do the Tecopa Hot Springs Rate?***

The Tecopa Hot springs contain 371 PPM chloride content.

**Other Mineral Research:**

- ***Benefits of Arsenic*** - While arsenic in larger doses is toxic in the human body, minute amounts may assist the body with plasma and tissue growth. Foot bathing in mineral waters with a high content of arsenic is used to address fungal conditions of the feet.
- ***Benefits Boron*** - Boron builds muscle mass, increases brain activity and strengthens bones.
- ***Benefits of Magnesium*** - Magnesium converts blood sugar to energy and promotes healthy skin.
- ***Benefits of Potassium*** - Potassium assists in the normalization of heart rhythms, assists in reducing high blood pressure, helps to eliminate body toxins and promotes healthy skin.
- ***Benefits of Sodium*** - Sodium and natural salts assist with the alleviation of arthritic symptoms, and may stimulate the body's lymphatic system when used in baths.

Alkaline water that is high in calcium, magnesium, and potassium may assist the body in cleansing through the skin.

**What do the medical balneologists have to say about the temperature of mineral water for therapy?**

It is believed among some circles that warm spring soaking is more beneficial ( 99 - 101° F ) than thermal therapy. **This is not necessarily supported by independent research and medical scientific analysis.**

European medical doctors have conducted research into thermal therapy, and have found that:

- Hydrostatic pressure in the body is increased
  - This results in increased blood circulation and cell oxygenation
    - The elimination systems of the body are thus stimulated, improving the body's capacity to detoxify



- The body's metabolism is stimulated
  - This results in improved digestion
- 3 to 4 weeks of regular thermal bathing can assist in the normalization of endocrine glands and assist the automatic nervous system

Many of the stimulating benefits of hot springs water are temperature dependent. Balneologists have found that hot springs soaking temporarily relieves chronic pain directly associated with inflammation, even in cases where inflammation has not been reduced. This effect is heavily reliant upon the temperature of the waters.

In Japan, at the famous Kusatsu hot spring, a 3-minute 125° F bath is utilized for an extraordinary therapeutic experience. Each visitor is pre-screened by the "bath master" to determine if such a bath would be safe and beneficial for each individual.

The founder of Delight's Hot Springs Resort kept a private and personal use therapy tub set at a consistent 116° F.

**Not everyone should utilize high-temperature hot springs for therapeutic use.** The state of one's metabolism and the the presence of medical conditions is the determining factor when considering the most safe and healthy water temperature to bath in.

**Contraindications to Hot Water Natural Mineral Springs Therapy:**

- Conditions involving high fevers
- Extreme Hypertension
- Malignant tumors and cancerous conditions ( internal )
- Liver, kidney, or circulation disorders
- Conditions presenting the risk of hemorrhaging
- Anemic Conditions
- Pregnancy
- Congestive heart failure, recent stroke, or recent heart attack
- Bathing under the influence of drugs or alcohol

The existence of these or other metabolic conditions does not necessarily mean that there would be no benefit derived from utilizing mineral waters. It does mean, however, that there is a risk associated that may out way any benefit to utilizing hot waters. In such situations, individuals should consult with a medical doctor before bathing, or consult with a European medical balneologist.

In any case, soaking in mineral waters should not be done at excessively high temperatures without medical clearance when any contraindicated condition exists. A tepid to warm bath ( ~ 95° F - ~ 99° ) is as safe as taking a bath at home.

---

## What is Balneology?

**Balneology** is the scientific study of naturally occurring mineral waters. In the United States, this science is not very well known, and is even less seldom practiced. However, throughout Europe and Japan, balneology and hot springs therapy is very much a part of routine medical care. Medical prescriptions are given by licensed doctors for the treatment of a wide range of conditions, and utilizing mineral waters as a part of preventative medicine is widely recognized and encouraged. **Balneotherapy** is the practical study and application of the health benefits of water.

Hot springs therapy became popular in the United States in the nineteenth century and reached a pinnacle in the United States in the 1940's. During this brief hot springs era, doctors and resort

owners, as well as an ever-enthusiastic general public, attributed many cures and health benefits to the use of therapeutic geothermally heated mineral waters.

---

However, the hot springs movement did not last long enough to mature into a socio-cultural tradition which would have eventually resulted in formal research and medical acceptance. Furthermore, the FDA eventually stepped in and prohibited organizations from making unsubstantiated health claims concerning the medicinal value of natural mineral waters.

These facts notwithstanding, hot spring soaking has a deep and far reaching tradition in North America, starting with the indigenous North American Native Tribes who considered choice hot springs to be "power spots" in nature. Native cultures universally utilized the natural waters for healing, purification ceremonies, sacred gatherings, and tribal meetings.

Although the brief hot springs movement in the United States faded, enough interest remained by way of naturalists, enthusiasts, and especially those more spiritually inclined, to keep many small resorts in operation throughout the country during the later part of the 20th century.

What remains universally true is the ignorance associated with potential healing powers of natural mineral waters. When questioning Native American healers, therapists, resort owners, and enthusiasts, vague opinions and unsubstantiated "facts" are often prevalent, some of which are contrary to established scientific fact.

The rest of this article is designed to "clear away the pervasive fog" associated healing waters, as much as possible based on scientific research and prevalent scientific theory. Most of the information included is derived from European and Japanese medical sources. Links, as they become available, will be included to more advanced topics concerning more esoteric subjects, including the hot springs effect on the human bio energy system, flow forms, structured water, and more.

Our own personal and independent research was and is being conducted at the Inyo County "Tecopa" Hot Springs, located on the southeast edge of Death Valley, in the Mojave Desert.

---

## **Other Interesting Notes on Balneology & Balneotherapy**

---

### **Severe Chronic Illness: The Three Stages of Spa Therapy Response**

Researchers and Balneotherapists in Poland have identified three possible response stages to hot springs therapy, where chronic illness spa programs lasting three to four weeks are utilized for a wide variety of conditions.

#### **1. Spa Adaptation**

A period of 3 to 7 days of environmental adjustment. This is both a psychological and physiological stage where the mind and body go through a period of adjustment to the external environment, including a physiological response to hot spring therapy.

#### **2. Spa Crisis**

A possible spa crisis has been observed approximately two weeks into therapy. Symptoms include malaise, fever, tachycardia, headache, fatigue, insomnia and pain. An acute flare-up of a dormant condition may occur. In some cases, medication may be required to control symptoms, and traditionally, spa treatment is reduced or temporarily suspended during this period. This response is similar to a herxheimer reaction, or the "externalization of

symptoms" extremely common as a part of natural healing in natural medicine.

### 3. **Regeneration**

Balneotherapists have noted that the final stage of spa therapy results in an overall improvement in the indicated condition, and that beneficial results may not be noticeable by the individual for many weeks after the treatment program has been completed.

Balneotherapists have noted that benefits derived from spa therapy can be extended for up to 10 to 12 months after treatment.

### **Mineral & Water Adsorption - Toxic Waste / Metabolic By-Product Elimination**

The movement of minerals into the body as the result of mineral water therapy is dependent upon:

1. The fat/water solubility due to the structure of the skin membrane.

The movement of water into and out of the body during mineral water therapy is dependent upon:

1. The osmolality of the bath and the fluid condition of the individual.

Depending upon the osmolality of the bath, water is either adsorbed into the body or pulled from the body. Although we do not have a tonicity report to classify the Tecopa Hot Springs as hypotonic, isotonic or hypertonic, we believe that the Tecopa Hot Springs water provide a slightly hyperosmotic bath; water is pulled from the body.

Mineral adsorption via hot springs soaking is extremely small, and the amount adsorbed into the body is concentration dependent and varies depending on the mineral and its chemical form. Even so, medical balneotherapists have noted that even minute amounts of therapeutic minerals adsorbed into the body via the skin have a significant therapeutic value.

The ion exchange capacity of hot springs mineral waters also influences mineral and water adsorption, and is defined by the ionic dissociation of the minerals in the water. A higher free ion content equates to a greater ion exchange capacity.

In short, the osmotic qualities, the mineral concentration, the PH level, and the mineral form effect the transdermal carrier effects of any mineral waters, as well as the fluid conditions of the individual soaking.





SRS Summer 2012