



A Comparative Analysis of the Steric Process and Other Modifying Methods in the Spirits Industry

Executive Summary:

The Steric Process, a breakthrough technology developed by Steric Systems Inc., employs electromagnetic energy to optimize both aged and un-aged spirits. This unique approach significantly improves the quality of spirits by enhancing their natural flavors while maintaining their authenticity. In stark contrast to older methods still being employed, the Steric process eliminates the use of physical filters, additives, or chemicals, maintaining the spirit in its purest form. Its highly efficient processing rate, from 300 up to 1,000 gallons per hour, makes it a scalable solution for producers of varying capacities. An additional advantage lies in its eco-friendliness, attributed to its low energy usage and zero waste generation.

As opposed to rapid aging methods, the Steric Process focuses on bringing out and enhancing the spirit's inherent qualities, rather than attempting to replicate the natural aging process or altering its character. Steric Systems' nearly instantaneous one-step process appeals to producers who value simplified operations and reduced costs while simultaneously catering to consumers who value authenticity. The Steric Process' pioneering, environmentally-conscious technology offers distillers an opportunity to enhance their spirit's quality and consistency, while preserving its unique characteristics and upholding the spirit's authenticity and tradition.

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I Introduction

This paper will touch on the diverse techniques employed in modifying alcoholic beverages by contrasting older and emerging methods for aging, polishing, finishing, and enhancing spirits, while providing insights into the advantages and potential drawbacks of each approach. Ultimately, this analysis will highlight the distinctive characteristics of the Steric process, showcasing its potential to revolutionize the spirits industry and cater to evolving consumer preferences.

A. Brief overview of the spirits industry

The spirits industry has a rich history dating back thousands of years, with diverse regional influences contributing to the development of various types of spirits, including whiskey, vodka, rum, gin, and tequila. The global market has grown significantly over the years, with key players and brands along with consumer preferences shaping industry trends. The industry is characterized by both large-scale producers and craft distilleries, catering to a wide range of consumer tastes and preferences. Driven by factors such as the constant evolution of consumer tastes, changing demographics, and the new opportunities and economies presented by innovation, the spirits industry continues to evolve to meet consumer demands and expectations.

B. The importance of aging and finishing in spirits

Aging and finishing are essential parts of the production process for many types of spirits, significantly influencing their flavors, aroma, and texture. During aging, spirits are typically stored in wooden barrels or casks which impart unique flavors and characteristics to the product over time. The choice of wood, temperature and humidity of the barrel's location, and the duration of storage are all crucial in building the spirit's overall characteristics.

Finishing involves additional steps that refine and enhance the spirit's quality, such as filtration, blending, or a secondary maturation in different casks. These techniques help to achieve the desired flavor profile, meet consumer expectations for quality, and differentiate products in an increasingly competitive marketplace.

C. Introducing the Steric process

The Steric process is an innovative method of modifying spirits that uses an electromagnetic field to polish and enhance their quality without the need for physical filters or additives. This unique approach offers several advantages compared to traditional aging and finishing techniques, such as maintaining and building on the spirit's natural flavors, improving aroma and mouthfeel, reducing environmental impact, and increasing production efficiency. The Steric process is targeted at both large-scale producers and craft distilleries seeking to optimize and differentiate their products to meet the growing demand for high-quality, innovative spirits.



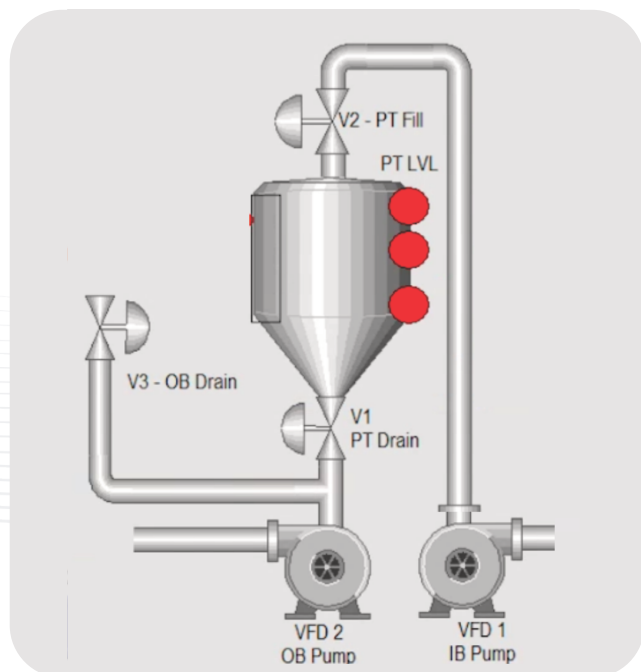
The Steric Process and Molecular Reorganizing of Spirits

The Steric process uses low power electromagnetic energy to affect the molecular structure of spirits, with different effects occurring at different processing levels. One such possible change, as shown in chemical analysis, appears to be a decrease of long-chain alcohols and a corresponding increase in shorter-chain molecules. For example, when the Steric process interacts with fusel alcohols it appears to result in the production of small amounts of ethyl acetate (a 4-carbon ester). In hedonic terms, this would be perceived by the taster as nuanced flavor changes in the spirit contributing to improved taste, aroma, and mouthfeel, as short-chain esters like ethyl acetate are generally perceived as being smoother and more palatable than long-chain alcohols. It is also possible that the process causes minor concentration changes involving molecules of low detection threshold resulting in an improved hedonic experience for the taster.

II. Steric Systems

Description of the Steric Process

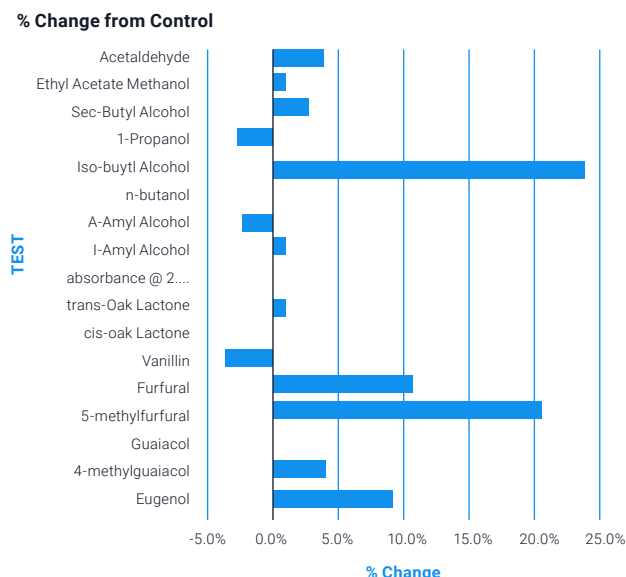
The Steric Process, developed by Steric Systems Inc., is a groundbreaking and patent-pending technique that utilizes electromagnetic fields to modify the characteristics of spirits. By exposing the spirits to a carefully controlled electromagnetic field, the process effectively enhances flavors, aromas, and mouthfeel while reducing the "burn" and harshness associated with alcohol. This process takes only seconds and is compatible with both aged and unaged spirits, making it a valuable tool for a wide range of spirits producers.



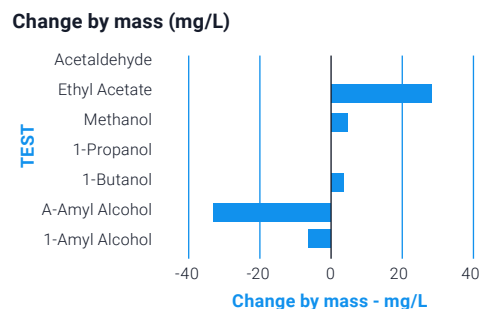
Advantages of the Steric Process

- ★ **Preservation of natural attributes:** The Steric Process maintains the integrity of the spirit's original qualities, ensuring that the unique characteristics of the spirit are not compromised during the process.
- ★ **Enhanced flavor profiles:** By targeting and reducing the levels of fusel and long-chain alcohols, as well as oak volatiles, the Steric Process improves the overall taste and flavors of the spirit without reducing its ethanol content.
- ★ **Eco-friendliness:** The Steric Process's electromagnetic approach eliminates the need for physical filters or additives, reducing waste and minimizing the environmental impact of the production process.
- ★ **Scalable:** Efficiency and scalability are at the heart of the Steric Process's design. With three standard-sized systems, it caters to a wide range of needs: the Steric 1000, the standard distillery unit, can process 1000 gallons per hour (GPH), the smaller Artisan unit processes 500 GPH, and for occasional needs, the traveling Steric Air unit, at 300 GPH, can be brought on-site for a day or two of processing.

The Steric Process modifies many other alcohols, congeners and fusel oils as seen in this Gas-Chromatograph Analysis of a single sample of processed Whiskey.



Test	Control	Steric	Units	mg/L Δ
Ethyl Acetate	423	453	mg/L	30
Methanol	52	55	mg/L	3
1-Butanol	481	483	mg/L	2
A-Amyl Alcohol	344	314	mg/L	-30
I-Amyl Alcohol	1440	1433	mg/L	-7



III. Comparing the Steric Process with finishing, polishing, or rapid-aging methods currently in use:

It is important to note that this comparison is not exhaustive of all methods currently available on the market; rather, it is a focused analysis of some common practices, providing a context for understanding the unique advantages offered by the Steric Process.

A. FILTRATION TECHNIQUES

- Activated charcoal:** This method involves filtering spirits through activated charcoal, which has a high adsorption capacity for impurities and unwanted compounds.
 - Advantages:** Activated charcoal is highly effective at adsorbing impurities due to its porous structure and large surface area. This method can significantly improve the smoothness and clarity of spirits, enhancing their overall quality.
 - Disadvantages:** While efficient, activated charcoal filtration can also indiscriminately remove desirable compounds and flavors, potentially affecting the spirit's unique character and complexity. Filtering through activated charcoal is usually a time-consuming process taking anywhere from 1 to 12 hours. Additionally, the charcoal does add an incremental cost and must be properly disposed of, which can pose environmental challenges.
- Cellulose:** Cellulose filtration uses fibrous, plant-derived materials to capture and remove impurities from spirits. This method is often employed for its low cost and high efficiency, making it a popular choice for many spirits producers.
 - Advantages:** Cellulose filters are cost-effective and efficient at removing impurities. Being plant-derived, they are renewable and often considered more environmentally friendly than other filtration media.
 - Disadvantages:** Similar to activated charcoal, cellulose filters may also remove some desirable flavors and aromas. Furthermore, their effectiveness can be limited by the size of the particles they can capture, and they may not be suitable for removing very fine impurities.

- **Diatomaceous earth:** Diatomaceous earth, a sedimentary rock composed of fossilized diatoms, serves as a natural filter medium. Its unique structure and high porosity allow it to effectively capture and remove particles, contributing to the clarity and purity of spirits.
- **Advantages:** Diatomaceous earth is a natural and highly porous filter medium, capable of removing fine particles to enhance the clarity and purity of spirits. It is generally safe and non-toxic, and can be used in a wide range of applications.
- **Disadvantages:** Diatomaceous earth can be difficult to handle due to its fine, dusty nature. It also requires careful disposal to prevent environmental harm. Like the other methods, it may also remove some desirable compounds along with the impurities.

The Steric Process advantage over Traditional Filtration Methods

In comparing the Steric Process to traditional filtration methods, several notable differences stand out.

Traditional filtration methods, such as activated charcoal, cellulose, and diatomaceous earth filtration, or the use of clarifying agents like bentonite and gelatin, are time-tested and effective at improving the quality and appearance of spirits. However, these methods may inadvertently remove desirable flavor compounds along with impurities, potentially altering the spirit's taste profile. Moreover, the use of physical filters and additives can generate waste and increase the environmental footprint of spirit production. Furthermore, these methods can be somewhat inefficient, often requiring extended processing times or frequent filter replacements.

On the other hand, the Steric Process employs an innovative and unique electromagnetic field process that improves the quality of spirits without the need for physical filters or additives. This approach not only enhances the aroma and flavor of the spirit, but also significantly reduces harshness. The Steric Process also has the advantage of being eco-friendly, as it does not produce physical waste from filter media or additives. Efficiency in terms of time and energy is another strong point of the Steric process, as the Steric Process takes only seconds and can process over 1000 gallons per hour in production-level, high-volume machines, while consuming minimal energy.

While the Steric Process represents a departure from traditional methods, its benefits in terms of preservation of natural flavors, enhanced clarity and purity, eco-friendliness, and efficiency position it as a promising new alternative in the spirit production industry.



IV. Aggressive Polishing Methods:

Innovation and technology advancements have brought forward a series of intense polishing methods in the spirits industry. These methods, which include ultrasonics, temperature manipulation, pressure changes, vacuum application, gas injection, agitation, spinning, sound/music, and light exposure, each present unique positive features and disadvantages.

Ultrasonics:

Features: Ultrasonic waves create cavitation bubbles within the spirit which can break down impurities and enhance the overall clarity and smoothness of the beverage.

Disadvantages: Ultrasonics can be energy-intensive and may unintentionally modify the spirit's flavor profile due to the intense agitation. Time consuming.

Temperature manipulation:

Features: Altering the temperature of the spirit can speed up chemical reactions or cause certain compounds to precipitate, allowing for their removal.

Disadvantages: Severe temperature changes can lead to undesired alterations in the spirit's character or potential damage to its delicate flavors. Time consuming.

Agitation:

Features: Vigorous stirring or shaking can accelerate the removal of impurities by increasing the contact between the spirit and a filter medium or clarifying agent.

Disadvantages: Overly-aggressive agitation could lead to aeration or oxidation, potentially degrading the quality of the spirit. Time consuming.

Spinning:

Features: Centrifugation can separate particles and impurities from the spirit based on their density, resulting in a clearer and purer beverage.

Disadvantages: The equipment necessary for this method can be costly and complex to operate. Time consuming.

Pressure and vacuum:

Features: Applying pressure or creating a vacuum can enhance the extraction of unwanted compounds and promote the formation of desirable flavors and aromas.

Disadvantages: These techniques require specialized equipment and expertise, which may be a barrier to entry for smaller producers. Time consuming.

Gas injection:

Features: Introducing gasses such as nitrogen or carbon dioxide can help to remove volatile compounds, break down impurities, or create a more desirable mouthfeel.

Disadvantages: Excessive or inappropriate gas injection could introduce unwanted flavors or aromas into the spirit. Time consuming.

Sound/music:

Features: Some producers have experimented with exposing spirits to sound or music, claiming that the vibrations can enhance the aging process and improve the final product.

Disadvantages: This method is not scientifically proven and may be viewed as a marketing gimmick rather than a legitimate polishing technique. Time consuming.

Light:

Features: Exposing spirits to specific wavelengths of light can promote photochemical reactions that break down unwanted compounds or enhance desirable characteristics.

Disadvantages: Excessive or inappropriate light exposure could degrade certain compounds, potentially altering the spirit's color, flavor, or stability. Time consuming.

The Steric System advantage over Aggressive Polishing Methods:

In comparing the Steric Systems' patent-pending electromagnetic process to more aggressive polishing methods, it becomes evident that the Steric process offers unique advantages that prioritize preservation of the spirit's inherent qualities and characteristics.

Aggressive polishing methods such as ultrasonics, temperature manipulation, pressure changes, vacuum application, gas injection, agitation, spinning, sound/music, and light exposure are all aimed at accelerating and enhancing the traditional aging and finishing processes. However, these methods, while innovative, may inadvertently alter the spirit's flavor, remove desirable characteristics, or introduce undesirable ones. Furthermore, they often require advanced technical knowledge, specialized equipment, or significant energy input, potentially posing barriers to entry for smaller producers or increasing production costs.

Unlike aggressive techniques, the Steric process operates at ambient temperature and pressure. It avoids potentially harmful methods like intense heat, significant pressure changes, or heavy agitation that could adversely affect the spirit's quality or result in unintended flavor alterations.

Perhaps one of the most significant advantages of The Steric process is its high efficiency: the current production models process anywhere from 300 to 1,000 gallons per hour. This quick and continuous operation saves significant time compared to more traditional or aggressive methods, streamlining the production process.

Furthermore, the Steric Process underscores Steric's commitment to safety and environmental responsibility. The Steric Process has been confirmed as safe by FDA-approved lab tests and its eco-friendly approach minimizes waste production, supporting sustainable spirit production.

In conclusion, the Steric process offers several advantages over traditional polishing methods, including improved effectiveness in speed of operation, better control over flavor and aroma, reduced environmental footprint, and increased efficiency and scalability. By employing electromagnetic technology, the Steric process provides distillers with a cutting-edge solution for enhancing the quality of their spirits while minimizing environmental impact and ensuring consistency from batch to batch.



