

TRISYL® Silica Gel for Oils/Fats and Biofuel Refining



The Cost-Effective Solution for Improving Oil Quality

Conventional Adsorbents perform two basic tasks: color removal and impurity adsorption.

Relatively large quantities of bleaching clays are normally required to perform both these tasks (due primarily to its low surface area). As TRISYL® silica is a far more efficient adsorbent where color removal is not an issue, as well as an adsorbent for polar impurities in lower color oils, TRISYL® silica can easily replace bleaching clay.

In oils for which reduction of color is more critical, the TRISYL® silica is used in combination with clay, preferably in a two-step addition process:

First, TRISYL® silica “cleans the oil” by removing polar impurities. Second, a reduced quantity of bleaching clay is left to perform only one function – to bleach, i.e. color reduction.

This significantly reduces the total quantity of adsorbent used and enhances oil quality by improving oxidative stability.

TRISYL® Silica Product Portfolio

Our product portfolio includes several TRISYL® silica products both treated and untreated, able to respond to both regional and global needs and made available in a variety of different packaging. Our globally available TRISYL® silica product range includes: TRISYL® silica, TRISYL® 300 silica and special products like TRISYL® CP2-7887 silica. For further and more detailed information on our entire product portfolio do not hesitate to contact us and our technical experts.

Benefits of TRISYL® Synthetic Amorphous Silica

- Reproducible quality
- High degree of chemical purity
- Amorphous silica, without crystalline quartz species
- Safe to handle
- Non-dusting, low product loss during handling
- Massive internal particulate surface area
- Small quantity, highly efficient
- No negative effects on oil chemistry

TRISYL® Silica Makes Your Processes
Environmentally Friendly.

Conditions, Functions and Use

Optimum conditions for the use of TRISYL® Silica during the refining process are:

- Oil temperature 70 – 90°C
- TRISYL® Silica added under “atmospheric” pressure
- The contact time between the TRISYL® Silica and the slightly moist oil 10 – 15 minutes.
- The moisture in the oil plays an important role in the mechanism responsible for transporting the polar contaminants from the oil to the TRISYL® Silica, where they are then trapped. The optimum moisture content of the oil should be between 0.2 – 0.5%.
- Following the removal of polar contaminants by the TRISYL® Silica, the oil should be dried if clay is to be used in the bleacher.
- During the drying process (drier/bleacher vessel) under vacuum, water is removed from TRISYL® Silica and the silica “sponge” shrinks, leaving a weight-reduced amount (~ 40% of original weight) of TRISYL® Silica powder or solid adsorbent to be collected on the filter.
- This results in a much reduced quantity of “filter cake” which enables higher filtration flows and a much longer filtration cycle.

A reduction in adsorbent use results in:

- A lower quantity of filter cake
- Lower waste management and associated disposal concerns and costs
- Reduced oil losses in the filter cake
- Longer filtration cycles
- Improved overall cost-efficiency of the process



Water is one of the most precious elements on Earth we have to preserve.

Increase Your Oil Yield and Reduce Environmental Footprint

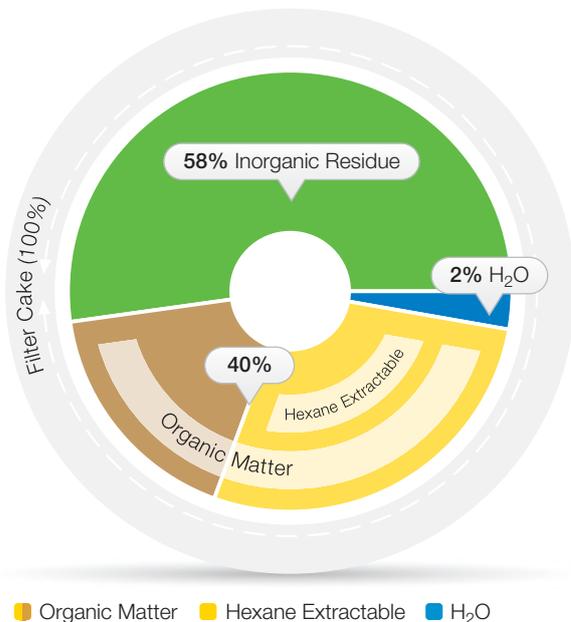
TRISYL® Silica Gel can easily be incorporated into different stages of the edible oil refining process, be it chemical, physical or enzymatic refining.

TRISYL® Silica improves your process yield

The concept of NOL (Neutral Oil Loss) on the filter cake is well known by the Oils & Fats Industry. By asking how much oil is entrapped in your adsorbent's spent cake, it's quite common to get an answer between 20 and 25%. However, when critically analyzing filter cakes, the typical oil content will be higher.

If you want to know more on this topic, please refer to our brochure or please contact our technical service expert.

General filter cake composition



Water Reduction

TRISYL® Silica reduces your environmental footprint

The way TRISYL® Silica will benefit your environment is multi-fold:

- By reducing the filter cake to be disposed
- Improving workplace's safety
- Reducing the amount of process water

Don't hesitate to contact us for discovering more on which value contribution we may bring to make your process greener.

TRISYL® Silica For Your Process

The major objectives of using TRISYL® Silica in a refinery are to enhance the quality of the refined oil, assist in process optimization and maximize economic value; reducing refining costs.

As there are many different refinery configurations, Grace has developed a variety of novel processes to allow for the easy incorporation of TRISYL® Silica.

- Sequential Addition (2-Step addition)
- Packed Bed Bleaching
- Modified Caustic Refining
- Modified Physical Refining
- Post Treatment of Modified Oils/Fats
- In Enzymatic Processes
- Staggered TRISYL® Silica Tri-Clear Refining Process



Don't hesitate to contact our technical expert and discover more on how to improve your process efficiency.



TRISYL® Silica for Biofuel Feedstock Purification

Grace Renewable Technologies

Biodiesel demand is expected to double within the next years as governments around the world mandate its use as a means of reducing greenhouse gas emissions, building energy security, and improving domestic economies.

TRISYL® Silica is recommended for the pre-treatment of feedstock oil in biodiesel production. It enables the economic conversion of biomass to biodiesel by increasing yields and improving fuel quality.

Our global technical support team for biodiesel applications consists of experienced technicians, scientists and engineers with direct experience in a range of biofuel processes.

For more information about our products and processes, please visit our website biofuels@grace.com or contact your local Grace representative.

**It's Clear. It's Clean.
It's TRISYL® Silica.**



Safety Issues

Safety is a priority at Grace. TRISYL® Silica is approved by a variety of international authorities such as the European Directive 2008/EC for E 551 and the FDA (for indirect food contact) and is fully REACH registered. For further information, our EHS department will offer assistance.

Quality Management

Our Quality Management System takes a customercentric approach and is based on Grace's philosophy of continuous improvement in every area of the organization.

- All our facilities are ISO 9001 and 14001, and our plant in Worms/Germany is also ISO 50001 (Energy) certified, and we implement internal and external audits to find ways to improve our processes and services.
- We employ Statistical Process Controls (SPC) to monitor and analyze production and related work processes.
- Our well-equipped Quality Control department works around the clock to ensure constant product quality.
- We continuously collect and assess customer information and feedback as an important factor in our Quality Management System.

In order to meet the needs and expectations of our customers, the Quality Management program includes the functional groups of marketing, research and development as well as customer service. Our dedicated work force is an important asset and customer satisfaction is our most important objective.

The Six Sigma® Advantage

At Grace, we are committed to a Quality Management System, including the continuous improvement of our processes. To maintain Grace's high standards, we employ Grace's Six Sigma® tools. These were designed to investigate process parameters, quantify their effects and optimize these in order to achieve the best possible results. Our Six Sigma® initiative aims at improving both product consistency as well as production flexibility using advanced statistical methods and evaluation procedures. Our customers benefit from products of the highest quality.

Grace is a leading global supplier of catalysts; engineered and packaging materials; and, specialty construction chemicals and building materials. The company's three industry-leading business segments – Grace Catalysts Technologies, Grace Materials Technologies and Grace Construction Products – provide innovative products, technologies and services that enhance the quality of life. Grace employs approximately 6,000 people in over 40 countries.

Grace products meet all current REACH requirements.*

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