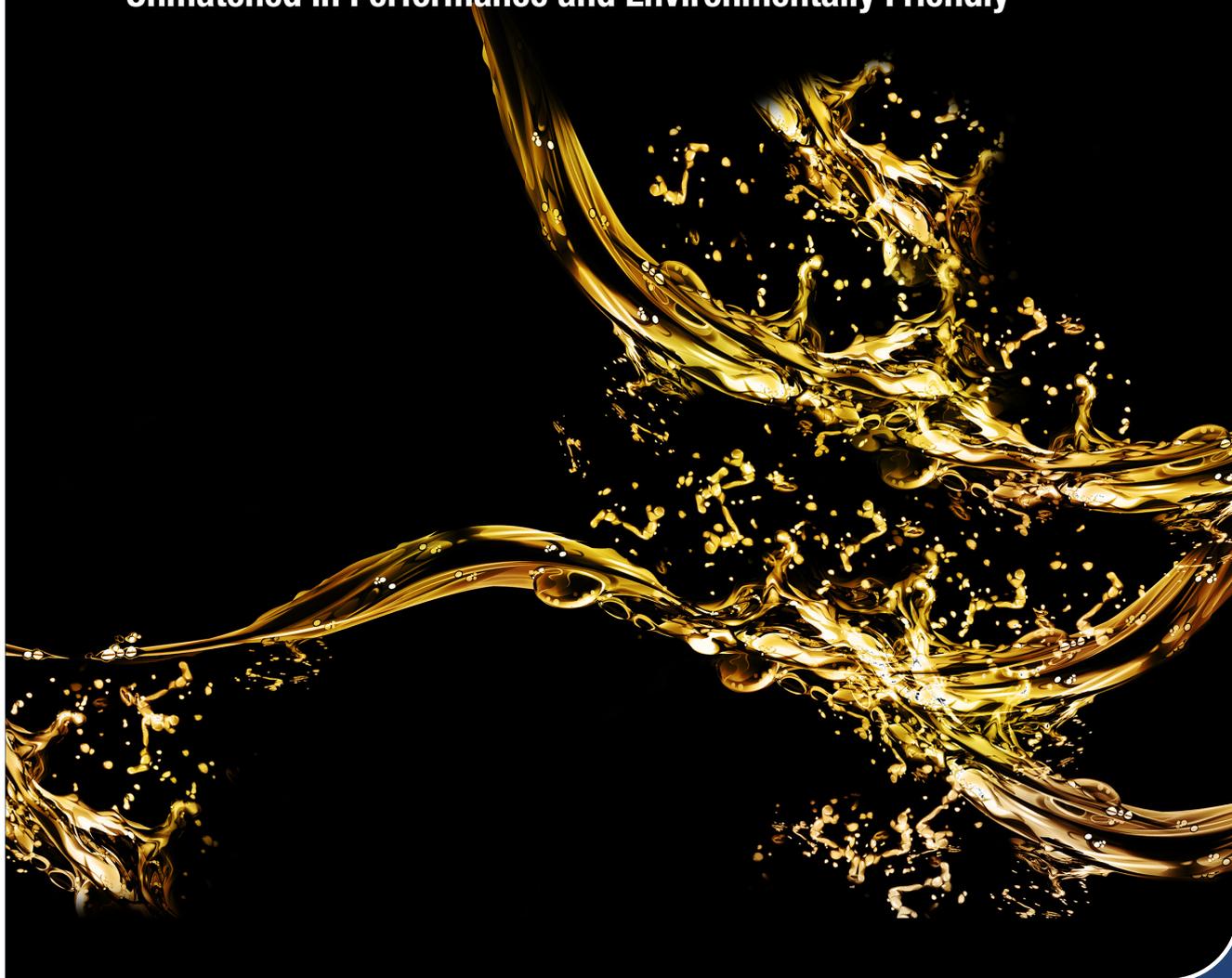


# The Nano Neutralization Process

Unmatched in Performance and Environmentally Friendly



Oils & Fats

desmet ballestra

*Science behind Technology*

[www.desmetballestra.com](http://www.desmetballestra.com)

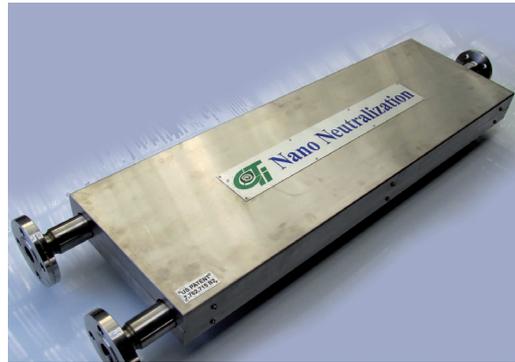
Based on patented technology developed by CTi and exclusively brought to the oils and fats industry by Desmet Ballestra, the Nano Neutralization process offers enhanced performance for your refining operation: improved oil refining yield, lower operating expenses, reduced environmental impact, excellent oil quality...

**This revolutionary new oil neutralization process, which can be easily added to existing oil refineries, is commercially proven and will offer you a quick return on investment.**

Your **new** or **existing** refining plant deserves the best!

*CTi Nano Neutralization™ is an add-on technology for existing oil refinery neutralization lines which can improve oil yield and save silica (or wash water), reduce phosphoric acid and caustic and can even save on steam, maintenance, repair parts and labor costs.*

*Nano Neutralization is also available for implementation in new refining plants. The process reduces equipment and installation costs while also providing the competitive advantages realized with chemical savings mentioned above.*



#### **The Advantages of Nano Neutralization Process**

##### **Refined oil yield increase by over 0.2%**

Improved conditioning of the oil in the Nano Reactors® results in optimized separation of the heavy aqueous phase from the light oil phase in the neutralizing centrifuge. Less neutral oil remains in the heavy phase and overall oil yield is increased.

##### **As much as a 50% reduction in silica usage**

Silica can be saved via the optimized separation of the heavy phase from the light phase in the neutralizing centrifugal separator due to oil conditioning in the Nano Reactors®. Less soap remains in the neutralized oil phase, thus reducing the need for silica (or wash water) downstream to remove the residual soap. Less silica (or wash water) also translates directly to less oil loss in the spent silica (or spent wash water). Our customers have experienced as much as a 50% reduction in silica usage!

##### **Up to 90% reduction in phosphoric acid consumption**

Nano Reactors® significantly facilitate the removal of non-hydratable phospholipids. As a consequence, the use of phosphoric acid or citric acid is reduced. With the Nano Neutralization process, phosphoric acid usage is substantially decreased or totally eliminated.



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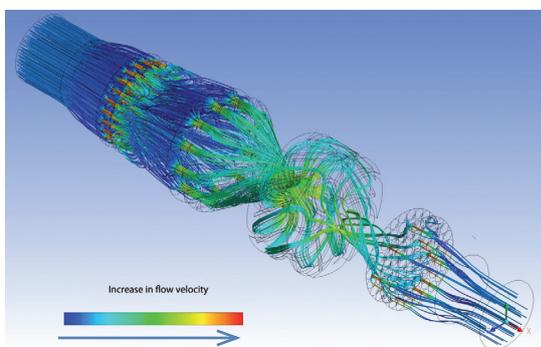
### Over 30% reduction in caustic usage

The significantly lower phosphoric acid consumption consequently allows savings in caustic usage. Caustic addition is further lowered, due to superior mixing of the caustic water solution and oil inside the Nano Reactors<sup>®</sup>, resulting in a perfect stoichiometric need of caustic to convert all FFA into soaps without the need for an excess quantity.

### Savings in steam consumption and maintenance

Steam can be saved in refineries that presently heat the oil above centrifugal separation temperature during the acid pretreatment step to enhance the process. With Nano Neutralization there is no need to heat the oil above centrifugal separation temperature, thus saving steam.

Repair parts and maintenance costs can be saved in refineries that presently use outdated high shear mixers and acid reactors to mix the acid into the oil and provide retention. In these cases, the high shear mixer and tank agitator are taken out of service. The annual maintenance and repair parts costs for this equipment far exceeds that of Nano Neutralization.



## Oils & Fats

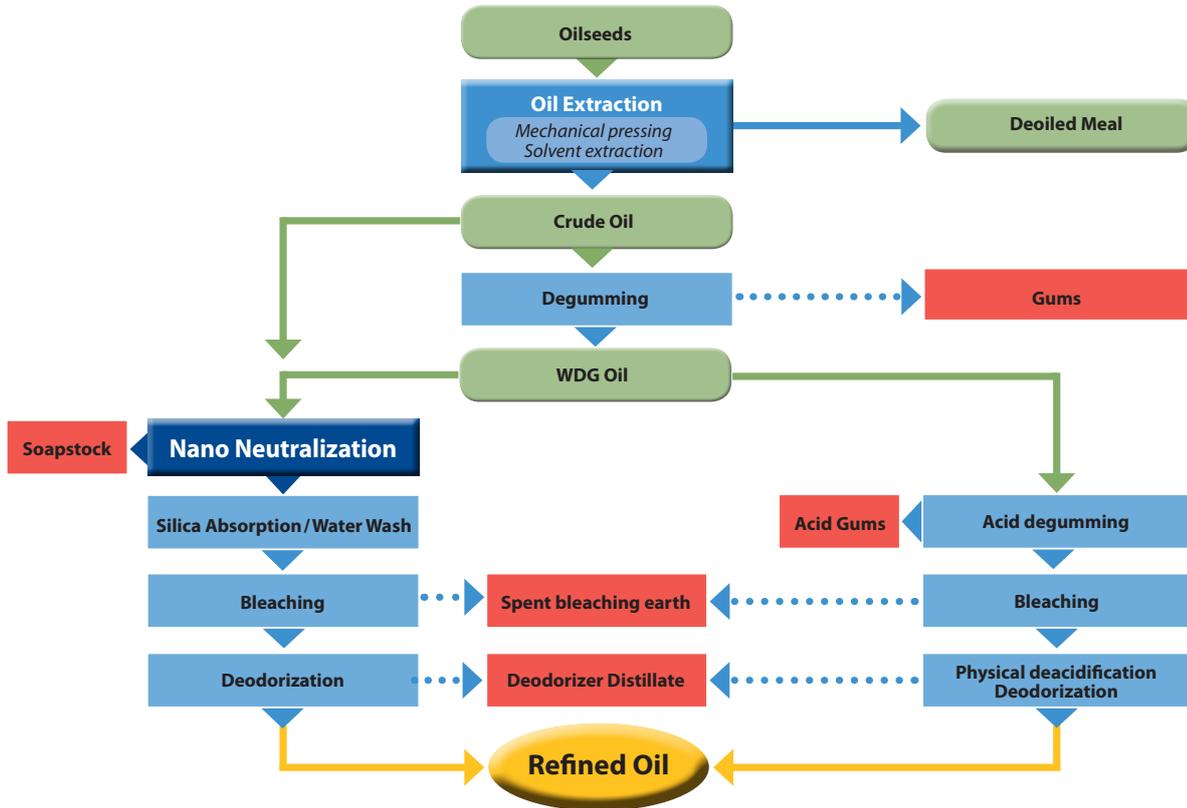
### Nano Neutralization Process described, soon to be “The Industry Standard”

Crude oil or water degummed oil is pumped from the (existing) acid pretreatment section through a safety filter and a totalizing flow transmitter, into a small surge tank at a desired process flow rate. The oil is transferred from the small surge tank to the inlet of a high pressure pump by gravity drainage. A caustic water solution is injected into the oil between the small surge tank and the inlet of the high pressure pump from the (existing) caustic dosing system. The amount of caustic water solution is automatically controlled via the PLC by a set-point dosage and the incoming oil flow transmitter data.

Two simple control loops are used to maintain peak performance of the Nano Reactor<sup>®</sup>. The first is a variable frequency drive to adjust the speed of the pump, and hence to maintain the optimal operating pressure. The second is a level transmitter on the surge tank in combination with control valves in the recycle line, to ensure a constant feed to the pump.

The pressure in the Nano Reactor<sup>®</sup> typically ranges from 40 to 80 bar (600 to 1200 psig), with a discharge pressure after the Nano Reactor<sup>®</sup> of 3 to 4 bar (<60 psig). This allows to directly feed the Nano treated oil to the centrifugal separator.

A second totalizing flow transmitter is placed directly after the centrifugal separator to measure the final refined oil yield. The neutralized oil flows then further to the water washing system or silica absorption system to remove the residual soap.



CTi is a research and development company located in California, U.S.A. specializing in hydrodynamic technologies for a wide array of liquid process applications. CTi has patented their Nano Reactors® and have multiple process patents pending in connection with various technological uses.

Desmet Ballestra is an international process engineering Group with proprietary technologies in many areas of the oils & fats industry. It offers unique skill and experience in the design and supply of technologies for production plants covering all stages

of the industry: preparation, pressing and extraction of seeds, refining and fat modification.

Since early 2009, CTi and Desmet Ballestra are collaborating closely on applying CTi's Nano Reactors® in processes and technologies specific to the oils & fats industry.

Desmet Ballestra has exclusive global rights from CTi to market Nano Neutralization through Desmet Ballestra's worldwide network of offices.



A collaboration with



More information

[www.nanoneutralization.com](http://www.nanoneutralization.com)